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# CHAMBERS'S ENCYCLOPÆDIA

A DICTIONARY OF UNIVERSAL KNOWLEDGE

*NEW EDITION*

Edited by

DAVID PATRICK, M.A., LL.D

AND

WILLIAM GEDDIE, M.A., B.Sc.

VOLUME III

CATARRH TO DIOPHANTUS

W. & R. CHAMBERS, LIMITED  
LONDON and EDINBURGH

J. B. LIPPINCOTT COMPANY, PHILADELPHIA

1926

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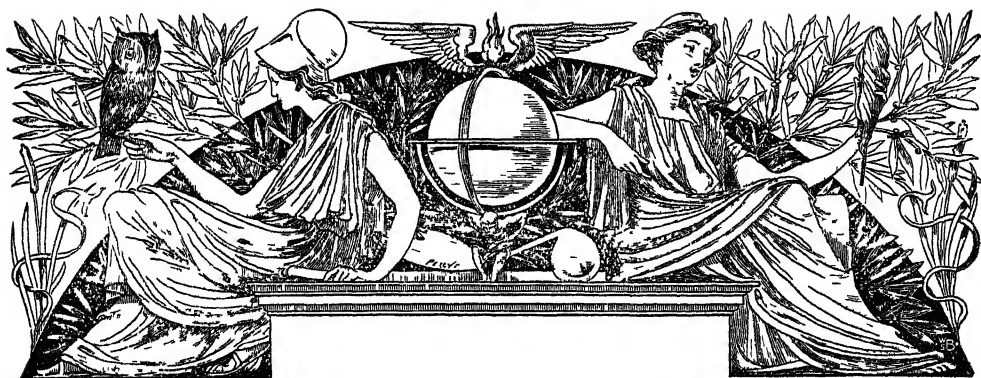


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A great many of the articles named above are new; others written for earlier issues of this Encyclopædia have been so thoroughly revised by their authors as to be virtually new. In addition to these many other revisers have taken part, including Professor J. A. S. WATSON (on Agriculture), Mr CHARLES MORRIS (America), Mr C. INGLIS CLARK (Chemistry), Dr MARY T. RANKIN (Economics), Sheriff IRVINE, Sheriff DUNBAR, Sir THOMAS RALEIGH (Law), Professor WILLIAM PIEDIE (Mathematics and Physics), Dr JOHN D. COMBIE (Medicine), Mr R. C. MOSSMAN (Meteorology), Captain H. M. JOHNSTONE (Military subjects), Admiral Sir REGINALD TUPPER, K.C.B. (Naval subjects).





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**catarrh** (Gr. *katarrhēō*, 'I flow down'), a disease of great frequency in temperate latitudes, especially in changeable moist climates in the winter season. From its well-known connection with sudden falls of temperature, and other epidemic or atmospheric causes (see INFLU-

ENZA), as also from the chill often experienced at the commencement of the disease, it is popularly called *a cold*—a term, however, perhaps somewhat less definite in its meaning than catarrh, which word is usually restricted to the case of a cold affecting the chest, and attended with discharge of mucus by coughing. A 'cold in the head' is termed, in strict scientific language, *Coryza*; we shall, however, keep both forms in view in the present article. Catarrh, or cold, commonly begins with a feeling of chilliness, which may or may not be attributable to external causes. Sometimes this is absent, there being only a sense of languor and indisposition; not unfrequently there is no sensation of an unusual kind, until a stuffing is experienced in the nostrils, or severe headache, or hoarseness with cough, or oppression of the breathing. It most commonly attacks the nostrils first, and afterwards the air-passages leading to the chest. But the mucous membranes of the eyes and mouth are often affected, as well as those of the nose, throat, and lungs; and the disease may begin in any of these situations, and either spread to them all or leave one or more unaffected. When it habitually attacks the chest, without running through its ordinary course as indicated above, there is often some special cause of delicacy in the lungs, or some constitutional tendency towards Consumption (q.v.). The affected mucous membrane is at first abnormally red and swollen, and its secretion diminished. But it soon begins to pour out a discharge, at first watery, but afterwards glairy and of a yellowish colour, or purulent. The early stages of the disease are attended by considerable

irritation of the surfaces affected, and probably no one of the little miseries of life is more prostrating and discouraging for the time than a bad cold in the head. The tendency of catarrh to attack the chest, and thus to pass into Bronchitis (q.v.) or Pneumonia (q.v.), or to lay the foundation of tubercular disease, constitutes almost its only danger.

The treatment of a cold is commonly a simple matter, so far as the particular attack is concerned. But so many colds disappear in a little time without any special treatment that few persons, unless in delicate health, are willing to subject themselves to the confinement which is necessary to give any form of treatment a chance of success. In the earliest stage a warm hip or foot bath, and a large opiate (Dover's powder especially) at bedtime, if followed by confinement to the house, and, in severe cases, to bed or to the sofa for a day or two, light farinaceous diet, and, if the stomach and bowels are at all loaded, a dose or two of some gentle laxative, will generally cut short the disease. In some persons it yields readily and quickly to spirit of camphor, five drops on a lump of sugar every half-hour; but in others no effect is produced. Free bathing of the nose with hot water may relieve the irritability and discharge. In most cases frequent sipping of warm soothing drinks—gruel, barley-water, black-currant tea, &c.—is grateful to the patient; sometimes ice gives more relief. Some persons cure their colds by entire abstinence from food, and as much as possible from drink; others by spirit of mindererus and paregoric; while the inhalation of steam from boiling water, to which has been added a teaspoonful of compound tincture of benzoin and one grain of menthol, gives great, even if only temporary, relief. In the later stages a more liberal diet than at first, and in some cases even a moderate allowance of stimulants, affords considerable relief from the feeling of depression that remains for a time on the subsidence of a catarrh. The injection of a 'vaccine' made from the organisms in the

bronchial secretion is a favourite remedy at the present time among those who are liable to frequently recurring catarrh, though its efficacy is very doubtful. The tendency to this disease, when habitual, and when not dependent on any form of constitutional disorder requiring special means for its cure, is best met by the daily use of the cold bath, with frequent exercise in the open air, and proper ventilation of the sleeping-apartment; also by friction of the skin, and by clothing which, without being oppressive, is comfortably warm. Exposure to draughts or sudden chills when the surface is perspiring is to be avoided; but a close confined air habitually breathed in a workshop or bedroom is a fruitful predisposing cause of the disease.

Catarrh or catarrhal inflammation is also used in modern pathology of an inflammation with the characters above described in any mucous membrane whatever; we have, for example, catarrh of the stomach, intestines, bladder, &c.

**Catarrhini**, Old-World monkeys, with a narrow partition between the nostrils, with a dental formula  $\frac{2.1.3.3}{2.1.3.3}$ , and including two distinct sets of forms, (a) the lower 'dog-like' apes (*Cynomorpha*), and (b) the higher 'man-like' forms (*Anthropomorpha*). See APE, ANTHROPOID APE, MONKEY.

**Catawba**, a grape grown in various parts of the United States, the fruit of a variety of the *Vitis Labrusca*, a North American and Asiatic species, from which have been derived most of the cultivated North American varieties of the vine. It is often said that it was 'first found growing on the banks of the Catawba River' (in North and South Carolina); but it is on record that it was named by Major Adlum, who found it growing wild near Washington, D.C., about 1825. Catawba wines were of various grades, the best being of very decided value. The vine is extremely prolific, the fruit being large, of a deep coppery red, and very sweet. The Catawba grape does best on southern slopes, and on limestone soils. Its slight musky aroma pervaded the wines made from it, and caused some connoisseurs to reject all but the very choicest of the vintage from the catalogue of first-class wines.

**Cat-bird** (*Turdus* or *Galeoscoptes carolinensis*), an American thrush, of the same group as the mocking-bird, which it resembles in its vocal powers. Its name refers to its mew-like cry when disturbed. It feeds on many kinds of fruit and berries, also on worms and insects; builds a large nest of dry twigs, weeds, &c., without any attempt at concealment, in a bush or tree, often in the immediate vicinity of human habitations, and shows extraordinary boldness in the defence of its young. It is a bird of passage, making its way northward in spring through Georgia and Carolina as far as Massachusetts. In winter it migrates southwards, and strayed specimens have been seen as great rarities on the continental coast of the North Sea.

**Catch**, a species of musical composition peculiar to England, written generally in three or four parts, and in the canon form. It was originally synonymous with the Round (q.v.), but the name has been appropriated to a species of it to which an absurd or humorous effect is given by the successive entries of the parts, interrupting or distorting the sense of the words into a new and unexpected meaning. They abounded in the Restoration period, when, as may be surmised, they often had a more than questionable coarseness. Hayes, Webbe, and Callcott, towards the end of the 18th century, were fertile composers in this form. The 'Catch Club' was founded in 1761.

**Catchfly**, the name of the genus *Silene*, of which many species produce a sticky secretion on the calyx, the joints of the stem, &c., which prevents the access of ants and other creeping insects to the honey, so preserving it for the bees or other flying insects by which alone cross fertilisation is effected. Other Caryophyllaceæ, notably *Lychnis Viscaria*, possess the same means of defence. The Nottingham Catchfly is *Silene nutans*. The unrelated *Dionaea muscipula* is also sometimes called the Carolina Catchfly. See LYCHNIS, DIONEÆ.

**Catchpoll**, a sheriff's officer or bailiff, who had power to arrest. From *catch* and *poll*, 'the head'; not as is suggested by the spelling *catchpole* from *pole*; though in various places a long pole was in use for catching or holding criminals by the neck, having at the end of it an iron collar with a V-shaped opening, occasionally armed with spikes on the inside.

**Cateau**, LE, or CATEAU-CAMBRÉSIS, a town in the French department of Nord, on the Selle, 14 miles ESE. of Cambrai; population, 10,000. Here in 1559 the treaty of Cateau-Cambrésis was concluded between Henry II. of France and Philip II. of Spain. See WAR (GREAT).

**Catechism**, any compendious system of teaching drawn up in the form of question and answer. It is derived, through low Latin, from a Greek word *katecheō*, which means to resound, or sound into one's ears; to instruct by word of mouth. Persons undergoing instruction in the principles of Christianity were hence called *Catechumens* (q.v.).

Catechisms have long formed one of the principal means employed for popular instruction in the truths and duties of the Christian religion. The composition of the first catechisms was, in all probability, suggested by the ordinary oral instruction of catechumens, and was intended for the help both of teachers and pupils. It appears to have been in the 8th and 9th centuries that the first regular catechisms were compiled, of which that by Kero, a monk of St Gall, that of Notker Laebo of St Gall, and that ascribed to Otfrid of Weissenburg in Alsace, are among the most noted. At later periods the use of catechisms prevailed chiefly among the opponents of the hierarchy, as among the Waldenses, the Albigenses, the Wyclifites, and, above all, among the Bohemian Brethren. The term catechism appears to have been first employed in its present sense among the latter. At an early period in the history of the Reformation the Reformers began to avail themselves of this method of popular instruction, and their catechisms became important instruments in that great religious movement. After Luther published in 1520 his primer of religion, entitled *A Short Form of the Ten Commandments, the Creed, and the Lord's Prayer*, several catechisms were prepared by leading Protestant theologians, that of Brenz (1527-28) being the most notable. In 1525 Justus Jonas and John Agricola had been intrusted with the preparation of a catechism, and Luther's visitation of the Saxon churches in 1528 led to his preparing his Larger and Smaller Catechisms (1529), which found a place among the standards of the Lutheran churches. The Larger he meant to be for teachers, the Smaller for the people. The latter has been constantly reprinted, and is very extensively used at the present day. A number of catechisms were published also by the theologians of the Reformed churches. The most noteworthy are the Geneva and Heidelberg catechisms, and those of Ecclampadius (Basel, 1526), Leo Judæ (Zurich, 1534), and Bullinger (Zurich, 1556). The Geneva catechisms, Larger and Smaller, were the work of Calvin. The latter was published in French in 1536 (Lat. ed. 1538); the former

appeared in French in 1541 or 1542 (Lat. ed. 1545), was speedily translated into various languages, and became an acknowledged standard of the Reformed churches, not only in Switzerland but in the Low Countries, in France, and in Hungary. The First Book of Discipline of the Scottish Church (1560) directs that the children be taught this catechism—'which catechism is the most perfect that ever yet was used in the kirk'—every 'Sunday' afternoon in the presence of the people. The Church of Geneva has set aside the authority of Calvin's catechisms. The Heidelberg or Palatinate Catechism is of greater importance, however, than any other as a standard of the Swiss Reformed churches. It was compiled by the Heidelberg theologians, Caspar Olevianus and Zacharias Ursinus, at the request of the Elector Frederic III. of the Palatinate; it was published in 1563, was approved by several synods, and recognised as a symbolical book by the Synod of Dort in 1619, and has been translated into all the languages of Europe. It is the standard of the Dutch and German Reformed churches of America. A tercentenary edition of this catechism was published in German, Latin, and English at New York in 1863.—King James said at the Hampton Court Conference that in Scotland 'every one who was the son of a good man' thought himself competent to write a catechism. The catechisms of the Scottish Reformation must have been numerous. The most popular, until it was superseded by the Westminster Catechism, was John Craig's *Smaller Catechism* (Edin. 1581; edited by T. G. Law, 1883).—The doctrines of the Socinians are embodied in the greater and smaller *Racovian Catechisms* (Polish ed. Racow, 1605; Latin ed. 1609). Besides a catechism of 1660, in the form of a conversation between father and son, said to have been written by George Fox, the Quakers have that of Robert Barclay (1673), in which the answers are in the language of the Bible, the distinctive peculiarities of the sect being involved in the questions.

In the Church of Rome there were several catechisms published in Germany and elsewhere before the Tridentine settlement of doctrine. A Scottish catechism, known as Archbishop Hamilton's, was issued by authority of a provincial council in 1552, and was ordered to be read in church by the parish priests. But in 1563 the Council of Trent in its twenty-fourth session determined to compose and prescribe for the whole church an authorised form of catechism, which the bishops were to have translated into the vulgar tongue, and expounded to the people by the curates. The work was, however, not carried through by the council itself, and Pius IV. intrusted its completion to a commission of four theologians. Eminent scholars were also appointed to perfect its latinity, and when finished in 1564 it was once again submitted to a new commission under Cardinal Sirletus. It finally appeared in 1566 under the title *Catechismus Romanus ex decreto Concilii Tridentini Pii V. Pont. Max. jussu editus*. In form it is not catechetical, and it is addressed, not to the people, but to the curates as a guide to them in their instructions. It possesses very high authority, but is ill adapted for popular use. For lay teaching it has fallen into desuetude, and has been superseded by various catechisms of more private origin. The most popular of these were prepared by the Jesuit Peter Canisius. His larger work, entitled *Summa Doctrinæ et Institutionis Christianæ*, was published in 1554, and the shorter (1556) reached more than 400 editions, and was used in the schools of all countries. In the present day, as a general rule, each diocese possesses a catechism of its own approved by the bishop. In England the short 'Penny Catechism' is used by authority of all the bishops in concert.

The catechism called the *Orthodox Confession of the Catholic and Apostolic Eastern Church*, was prepared about 1640 by Peter Mogilas, metropolitan of Kiev, and received symbolical authority from a synod at Jerusalem in 1672. It is often called the *Larger Russian Catechism*, to distinguish it from the *Smaller Catechism* prepared by order of Peter the Great in 1723. These were practically superseded by the catechisms of Platon, metropolitan of Moscow (first published in 1762), and of Philaret, also metropolitan of Moscow, which has since 1839 been in general use in the schools and churches of Russia.—Besides these catechisms, which have a historic interest, or are of importance from their symbolical character, there have appeared at all periods, since the Reformation, many others, both Protestant and Roman Catholic, some doctrinal, some controversial, some devoted to particular subjects, as the sacraments, or to particular purposes, as the preparation of candidates for admission to the Lord's Supper, some adapted to the mental capacity of very young children, &c. The opinion, however, has become prevalent, that doctrinal abstracts are not the best form in which religion can be presented to the young, and the use of catechisms has accordingly been in some measure relinquished in favour of other methods of instruction.

The catechism of the Church of England with which we are most familiar is the smaller one published in the Book of Common Prayer. It is in two parts: the first contains and explains the Baptismal Covenant, the Creed, the Ten Commandments, and the Lord's Prayer; the second explains the two sacraments, Baptism and the Lord's Supper. It is not known with absolute certainty who was the author of the first part; probably Cranmer and Ridley had the principal hand in framing the questions and answers. It was originally put forth in the reign of Edward VI., and condemned as heretical in the reign of Mary, and underwent several modifications from 1549 to 1661. It must not be confounded with Cranmer's Catechism (1548), which was a larger work, differently arranged, and probably translated chiefly from the Latin catechism of Justus Jonas. This first part of the church catechism was formerly spoken of as the *Shorter Catechism*. There was a *larger* church catechism compiled also in the reign of Edward VI. by Poynt, Bishop of Winchester, and published, together with the 42 Articles, in 1553, and it corresponds in some degree with the smaller work above described. It was afterwards revised and enlarged by Dean Nowell, and published in 1570; and, though never officially promulgated by the church, it has some authority from having been approved by the lower house of Convocation. At the Hampton Court Conference (1604), the *Shorter Catechism* was considered too short, and Nowell's larger one 'too long for novices to learn by heart;' accordingly, at James I.'s suggestion, an addition was made to the former of that explanation of the two sacraments which now forms the second part of the church catechism. This is attributed to Dean Overall. The whole is a work much esteemed by all sections of the church as remarkable for its simplicity, truth, and catholicity. It, however, states sacramental doctrine in a way that is not very acceptable to the extreme Low Church party. Hence, the Prayer-book put forth by the Church of Ireland, while leaving the catechism otherwise untouched, ingeniously interpolates an additional question and answer (based on Article XXVIII.), which, in the opinion of many, tends to modify the ideas suggested by the catechism concerning Holy Communion. Modifications occur, too, in the Catechism of the American Episcopal Church. The rubrics in the Common Prayer-book enjoin

the teaching of the catechism in the church on Sundays and holidays after the second lesson at Evening Prayer; and the 59th canon contains a like injunction, imposing penalties on the clergy who neglect this. The custom of catechising in the church had fallen into almost universal disuse, but in many parishes it has been revived with excellent results.

✽ The Larger and Shorter Catechisms, which, with the Westminster Confession of Faith, constitute the standards or symbolical books of the Presbyterian churches throughout the British empire and the United States of America, were compiled by the Assembly of Divines at Westminster (q.v.): the Shorter Catechism 'to be a directory for catechising such as are of weaker capacity;' the Larger, 'for catechising such as have made some proficiency in the knowledge of the Christian religion.' The Larger Catechism was presented to the English House of Commons on 22d October 1647; the Shorter on the 25th November 1647—and both, with proofs added, on or before the 14th April 1648; and in July 1648 both received the sanction of the General Assembly of the Church of Scotland—the General Assembly, in the act approving of the Larger Catechism, declaring it to be 'a rich treasure for increasing knowledge among the people of God,' and that 'they bless the Lord that so excellent a catechism has been prepared.' The Larger Catechism was far too minute in its statements, and too burdensome to the memory to be employed as a catechism. Even the Shorter Catechism was regarded by many, who substantially adhered to its doctrine, as carrying the statement of dogmatic theology beyond what is proper for elementary instruction, if not as obviously unsuitable for the very young and the very ignorant, and its use was usually preceded by that of catechisms more adapted to their capacity. But its influence has been very great in moulding the religious opinions and vocabulary, and in exercising and training the intellectual faculties, wherever Presbyterianism has prevailed; for it was long in almost universal use among Presbyterians, and to some extent among Independents or Congregationalists both in Britain and America. In Holland a translation of it was much used. Even by those whose doctrinal views were not in accordance with it, it has been regarded as an admirable compend of one type of Christian doctrine and duty. Catechisms without number had been issued by Puritan divines in England between 1600 and 1645. A large proportion of the members of the Westminster Assembly had previously published catechisms of their own; and the Assembly's Catechisms were prepared with great care by committees of the Assembly. A catechism setting forth a Calvinistic theology in less uncompromising terms, compiled by the co-operation of members of several of the Presbyterian churches, has met with much favour in the 20th century though not formally adopted by any church.

The undramatic method of setting experienced Christians to seem to demand instruction from children—question by the senior, and answer by the infant—has been usual but not universal in catechisms, the name being applied, as in the Scottish Roman Catholic 'Hamilton's Catechism' (of 1552), to a continuous compendium of doctrine divided into chapters and sections (without questions). A fashion of conveying instruction other than theological by books arranged in questions and answers was much in vogue in the 18th century, and is best remembered in connection with 'Pinnock's Catechisms' (see PINNOCK) and 'Mangnall's Questions' (see MANGNALL). *The Substance of Faith allied with Science* is an application of the same method by Sir Oliver Lodge to the salvage of theology.

**Catechu**, a substance employed in tanning and dyeing and medicinally as an astringent. The catechu of commerce is obtained chiefly from two East Indian trees (*Acacia Catechu* and *A. Sumu*). The former is common in most parts of India, and also in tropical East Africa, and the latter grows in Southern India, Bengal, and Gujerat. Catechu is known in India by the name *kāt* or *lut*, and is called *kachu* in Malay. Cutch is another form, and is a common commercial name. The trees are cut down when they are about a foot in diameter, and according to some accounts only the heartwood is used, but other reports say that the whole of the woody part of the trunk is utilised. The catechu is obtained by cutting it into small chips, and boiling it in water, straining the liquid from time to time, and adding fresh supplies of chips, till the extract is of sufficient consistence to be poured into clay moulds; or when of the thickness of tar, it is allowed to harden for two days, so that it will not run, and is formed into balls about the size of oranges, which are placed on husks of rice or on leaves, and appear in commerce enveloped in them. Catechu is of a dark-brown colour, hard and brittle, and when broken has a shining surface. It possesses an astringent taste, but no odour. It is a very permanent colour, and is employed in the dyeing of blacks, browns, fawns, drabs, &c. Ordinary commercial catechu or cutch is composed of catechu-tannic acid, which is soluble in cold water, and catechin or catechuic acid, which is nearly insoluble in cold but soluble in boiling water. The latter can be separated in the state of minute, acicular, colourless crystals. It is often adulterated with earthy substances, but its ready solubility in water and alcohol should at once show the presence of such by leaving them behind in an insoluble state. *Areca* or *Palm Catechu*, sometimes called *Ceylon Catechu*, differs wholly from the above. It is got from the ripe nuts of the Betel palm, which yield, by boiling, a black, very astringent extract, resembling true catechu, but of inferior quality. This substance is rarely exported from India (see *ARECA*, *BETEL*).—*Gambir* (q.v.) may be regarded as a kind of catechu. *Terra Japonica*, or *Japan Earth*, is an old name for catechu, not quite disused, given in mistake as to its nature and origin. The origin of the error has been sought in the Burmese name for catechu, *sha-pin*. See also *MANGROVE*.

**Catechumens** (Gr. *katechoumenoi*, persons undergoing a course of instruction; see *CATECHISM*), the appellation given, in the early Christian church, to those converted Jews and heathens who had not yet received baptism, but were undergoing a course of training and instruction preparatory to it. They had a place assigned them in the congregation, but were not permitted to be present at the dispensation of the Lord's Supper, which from the end of the 2d century was regarded as a sacred mystery. The name Catechumens first occurs as the designation of a separate body in the time of Tertullian, and their distribution into different classes or grades according to their proficiency, is first referred to by Origen. The most famous catechetical school of the early church was that of Alexandria, which had Pantænus, Clement, Origen, Dionysius and others among its teachers. The only extant specimens of the ancient catechetical teaching (which was not necessarily by question and answer) are twenty-three lectures by Cyril of Jerusalem (348), and Augustine's *De catechizandis Rudibus*.—The term Catechumens was afterwards employed to designate young members of the Christian church who were receiving instruction to prepare them for confirmation or for the Lord's Supper, and it is still often used in this sense. See *DISCIPLINA* *ARCANI*.

**Categories**, in philosophy, the highest classes under which objects of knowledge can be systematically arranged, understood as an attempt at a comprehensive classification of all that exists. The name has come down to us from Aristotle, in whose system the categories are ten in number: *Substance, quantity, quality, relation, place, time, situation, possession, action, and suffering*. From the point of view of logic, these may be reduced to two: substance and attribute; of metaphysics, to being and accident. The Cartesians had the three categories—substance, attribute, and mode; Leibnitz—substance, quantity, quality, action or passion, and relation; and Locke—substance, mode, and relation. J. S. Mill classifies all existences or describable things as follows: (1) Feelings, or states of consciousness, the most comprehensive experience that the human mind can attain to, since even the external world is only known as conceived by our minds; (2) the minds which experience those feelings; (3) the bodies, or external objects, which are supposed to excite all that class of feelings that we denominate sensations; (4) the successions and co-existences, the likenesses and unlikenesses, between feelings or states of consciousness. Although those relations are considered by us to subsist between the bodies, or things, external to our minds, we are driven in the last resort to consider them as really subsisting between the states of each one's own individual mind.

The categories of Kant are conceived under a totally different point of view. The Root-notions of the understanding (*Stamm-begriffe des Verstandes*), they are the specific forms of the *a priori* or formal element in rational cognition—forms inherent in the understanding, under which the mind embraces the objects of actual experience. The Kantian philosophy supposes that human knowledge is partly made up of the sensations of outward things—colour, sound, touch—and partly of mental elements or functions existing prior to all experience of the actual world. (This is the point of difference between the school of Locke, who rejected all innate ideas, conceptions, or forms, and the school of Kant. No such question was raised under the Aristotelian categories.) Kant's categories are as follows: (1) Quantity, including unity, multitude, totality; (2) Quality, including reality, negation, limitation; (3) Relation, including substance and accident, cause and effect, action and reaction; (4) Modality, which includes possibility, existence, necessity. These indicate the elements of our knowledge *a priori*; and though they are the necessary conditions under which alone experiences can be realised to the mind, are merely subjective forms of its own activity, distinct from and inapplicable to the world of *noumena*—the thing in itself—that lies outside and beyond. Fichte based the whole system of the categories of reality on the affirmation of itself by the Ego—the primitive function of self-consciousness. Hegel carried this further, and showed that this primitive function supplied the principle needed to harmonise and unify the objective and subjective elements in thought. Thought and being are ultimately identical, and the categories are thus merely definite aspects or determinations (*Bestimmungen*) of the universal of thought, which is identical with reality or actual existence.

**Catenary**. The catenary is the curve formed by a flexible homogeneous cord hanging freely between two points of support, and acted on by no other force than gravity, the name being suggested by Lat. *catena*, 'a chain.' The catenary possesses several remarkable properties, one of which is, that the Centre (q.v.) of gravity is lower than that of any curve of equal perimeter, with the same fixed points for its extremities. It is of importance for the theory of suspension Bridges (q.v.).

**Cateran** (Gaelic, *ceatharnach*, 'a soldier'), originally an Irish or Highland soldier, a kern; usually, however, a Highland reiver or freebooter. See CLAN, BLACKMAIL, ROB ROY.

**Caterpillar**, the larval stage of butterflies and moths (Lepidoptera), corresponding to the grub stage in beetles, the maggot stage in flies, and so on. It is the palmer-worm of Old English.

**General Structure**.—The more or less worm-like caterpillar consists of a head and thirteen segments, but the penultimate segment is often very small and indistinct, and several of the posterior segments may coalesce. The head corresponds to a number of segments thoroughly fused, and its chitinous cuticle is harder than that farther back. Borne on the head are six (or fewer) pairs of very imperfect visual organs—the eye-spots or ocelli; a pair of very minute antennæ; a pair of large biting mandibles; a pair of small maxillæ; and a small labium, on the middle of which there is a spinneret, the opening of the paired silk-glands. The three segments behind the head correspond to the thorax of the butterfly, and bear three pairs of five-jointed clawed legs. In many cases the third, fourth, fifth, sixth, and tenth segments of the abdomen bear 'pro-legs'—unjointed, unclawed outgrowths, with minute-hooks. The last pair in

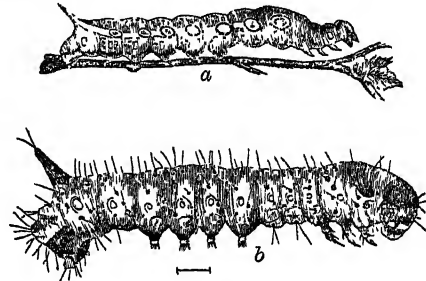


Fig. 1.

a, *Charocampa tersa*, showing eye-like spots; b, young caterpillar of *Dilephila euphorbiae* (after Weismann). Cf. fig. 5.

particular, known as 'claspers,' are used for gripping the plant on which the caterpillar creeps or rests. There are often fewer than the five pairs mentioned. Breathing pores or spiracles occur on the first segment of the thorax, and on the first eight abdominal segments. The caterpillar may be naked, or covered with hairs, bristles, or spines, and the hairs have sometimes irritant properties, as in the Procession Caterpillar. This is in part due to microscopic hooks on their surface, but in some cases there is a poisonous secretion. Odoriferous and other glands frequently occur in the skin, and are in some cases eversible, as in the larva of *Dicranura*, the Fuss Moth. The colour, which is often brilliant, may be due to pigment, or to pigment accentuated by a metallic sheen produced by fine lines on the cuticle. The pigment is usually in the cuticle and in the underlying skin; it may also be in internal organs and tissues. In some cases the coloured food shines through the skin. As to internal structure, the most characteristic features are the two silk-glands, sometimes several times longer than the body, the enormous number of separate muscles, the large size of the stomach, and the frequently large fatty body. The sexes are differentiated very early in the life of the caterpillar, but the sex organs remain quite rudimentary. The nervous system consists of supra-oesophageal and sub-oesophageal ganglia in the head, three thoracic ganglia, and eight abdominal ganglia. Thus the ventral chain of ganglia is much less concentrated than in the adult.

**Development.**—The caterpillar is the result of the development of the egg, and emerges from within the egg-shell as a minute worm-like creature. It feeds voraciously, grows quickly, and moults its cuticle at intervals, often five times in all. In the process of moulting a crack appears along the dorsal surface, and the cuticle is stripped off backwards. Before each moult there is a period of quiescence, and there is a particularly long one when the caterpillar reaches its limit of growth. It ceases to eat, and crawls to a safe resting-place, where it passes into the quiescent pupa state. But it will not do so till it is full-fed, till it has its silk-glands ready, and has become in other ways prepared. The typical pupa of Lepidoptera is known as 'obtect,' which means that there is a firm continuous cuticle over the whole body, to which the appendages of the future butterfly become, as it were, glued. In the transition to the pupa stage, the organs and tissues of the caterpillar are broken down (histolysis), resulting in cream-like debris; groups of active embryonic cells, arising from the skin of the metamorphosing caterpillar, and known as 'imaginal discs,' become the foci of a new developmental process (histogenesis), and play an important part in the differentiation of the moth or butterfly. The wings and some other organs of the perfect insect may be seen in process of formation within the caterpillar some time before it becomes a pupa. The pupa may be hidden in a crevice, or firmly fastened to a tree stem, or hung up by a silken rope; only in rare cases can it wriggle about with the help of spines on its abdominal segments. In moths the pupa is often surrounded by a cocoon of silk, which the caterpillar winds round and round itself before it becomes quiescent. The spinning may last for several days, and Trouvelot calculated that the larva of *Polyphemus* must move its head about 254,000 times when it is making its cocoon. The hairs of the caterpillar are sometimes used in making the cocoon, and leaves, wood, earth, and the like may also go to the fashioning of it. When the metamorphosis has been completed, the pupal covering splits and the imago pulls itself out. The escape of the moth or butterfly from the cocoon is sometimes facilitated by a corrosive secretion which comes out of the mouth, and dissolves the material of the



Fig. 2.—*Peripatus*.

cocoon. The term chrysalis was primarily restricted to pupæ with a golden sheen, which may be of protective value among dry rocks glistening with pyrites or the like. As to the significance of the caterpillar stage, it must be regarded as an adaptation which secures growth and a store of reserve material. In insects without metamorphosis, such as locusts and cockroaches, there is no such stage. In the great variety of life-histories exhibited by the different types of animals, there are many instances of lengthening out one period and shortening or telescoping another. What has happened in insects with complete metamorphosis is the interpolation of a post-embryonic period of growth, insinuated, as it were, in the very midst of the development, and separating it into two very different chapters—that within the egg-case and that during the pupal stage. The differentiation of the highly specialised adult form is thus postponed until there has been great growth and an accumulation of reserves. The characters of cater-

pillars are in great part adaptive to this growing and storing. It may be noted that *Peripatus* (see fig. 2) and its allies, forming the class *Prototracheata* or *Onychophora*, are somewhat caterpillar-like or vermiform primitive animals, intermediate between Annelid worms and the series of *Tracheata Antennata* to which insects belong. But any resemblance that there is between caterpillars and *Peripatus*—and there is very little—is wholly superficial. It must be emphasised, then, that the characters of caterpillars are not primitive, but secondarily adaptive to peculiar conditions of life.

**Protective Adaptations.**—Caterpillars are eaten by birds, lizards, frogs, and various other animals, and their relatively slow movements render them liable to easy capture. It is not surprising, therefore, to find numerous protective adaptations which tend to secure their safety. These are mostly of a passive kind, and a special reason for this is to be found in the fact that the body is tense with blood or hæmolymph. As Wallace pointed out, it is advantageous that they should escape from being even tentatively pecked at, 'for a slight wound entails great loss of blood, while a moderate injury must prove fatal.' A few are able to exude corrosive secretions, a few brandish whip-like filaments at the posterior end of the body (the *Puss Moth* larva can do both); but, as Professor Poulton says, 'nearly all the means of defence against enemies (other than *Ichneumons*, &c.) are such as tend to prevent the larva

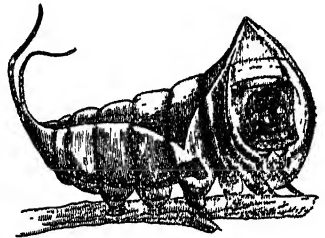


Fig. 3.—Terrifying attitude of larva of *Dicranura vinula* (after Poulton).

from being seen or touched, rarely such as to be of any avail when actually attacked. There may be various changes in the mode of defence, but the object is always the same—to leave the larva untouched, a touch being practically fatal.'

Some are unpalatable; others have irritant hairs; others have a repulsive smell. Some strike 'terrifying attitudes' when they are molested; others pass into a state of catalepsy or 'sham-death.' Many are effectively concealed by their likeness to something else. A caterpillar may rest like a twig or a knob on a branch; it may be almost indistinguishable from a piece of lichen; it may resemble the excrement of a bird or the curled margin of a withered leaf. The caterpillars of the Swallow-tailed Moth (*Ourapteryx sambucaria*), not uncommon among ivy, present an extraordinary resemblance to twigs. In some cases there is mimicry; thus a large caterpillar may be like a small poisonous snake, another form is posteriorly like a tailor-ant, and the Russian naturalist Portschinski points out that the mature and semi-mature larva of the Lobster Moth (*Stauropus fagi*) resembles a caterpillar attacked by a Pentatomid bug. The pupæ are sometimes protectively coloured as well as the larvæ, and it has been shown experimentally by Poulton and Sanders that the mortality is enormously greater when the pupæ are artificially fixed on conspicuous situations. While some caterpillars are protectively coloured, others are the very reverse, being conspicuous and impressive. Wallace showed that in some cases this conspicuousness was associated with unpalatability, and served as an advertisement to remind the caterpillars' enemies that they should be left alone. Poulton has noted, however, that the unpalatable are not more than

relatively safe. Thus the cuckoo will freely devour conspicuously coloured larvæ unpalatable to other birds.

An interesting series of studies on the colour and markings of caterpillars will be found in Weismann's *Studies in the Theory of Descent*, to the translation of which Professor Meldola has added valuable editorial notes. The caterpillar of the Large Elephant Hawk Moth (*Chorocampa elenor*) is yellowish-white, except a black caudal horn, when it leaves the egg; it becomes green; it acquires longitudinal stripes; it becomes brown, and the longitudinal stripes disappear, except on the first few segments, where one of them forms several eye-like markings; oblique stripes take the place of the longitudinal ones. Now this is a frequent order in individual development, though some forms never get beyond the uniform stage, and others never get beyond the longitudinal striped stage. There are many diversities, but it must be allowed, for instance, that the oblique stripes never precede the longitudinal lines.

Weismann's argument is twofold—that the individual succession of markings is a recapitulation of the historical evolution, and that the markings are on the whole protective. Thus many non-patterned forms live in concealment or feed at night; many

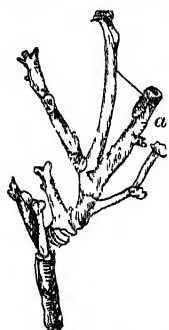


Fig. 4.—Hawthorn twig with attached twig-like larva (a) of *Rumex Cratægata* or Brimstone Moth (after Poulton).

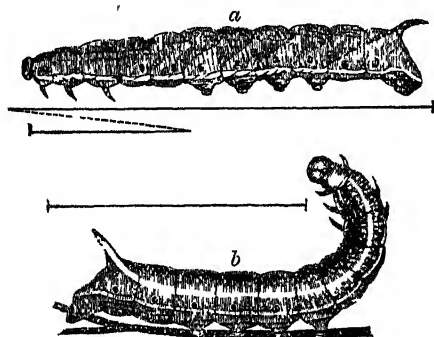


Fig. 5.

a, Caterpillar of *Sphinx convolvuli*; b, larva of *Macroglossa stellatarum*, showing lines and spots (after Weismann).

of those with permanent longitudinal markings feed on grasses; the oblique stripes break up the surface and make it less conspicuous; the ring-spots are sometimes deceptively like the berries of the food-plant, and sometimes repellently like staring eyes. Many of the utilitarian interpretations of colour and markings are very ingenious; but more experimental proof of their protectiveness is much to be desired.

Of great interest and importance are the numerous experiments made by Professor E. B. Poulton on the relation between caterpillars and the colour of their surroundings. Sometimes the pigments of the food-plant accumulate in the food-canal of the caterpillar, and are seen through the skin; sometimes they form the basis of other pigments which are found within the caterpillar though outside of the food-canal; sometimes the pigments are proper to the caterpillar itself, but are modifiable by the dominant colour of the immediate environment,

which may be the food-plant. In the case of the caterpillar of *Smerinthus ocellatus*, the colour adaptation is individual, though its limits are prescribed by heredity; it depends not on what is eaten, but on the colour of the surrounding leaves; it is brought about by an intricate nervous reaction which operates on the skin during a susceptible period.

**General Life.**—Most caterpillars eat voraciously and move about as they exhaust their supplies. They have an innate tendency to move against gravity. When stopped they have a characteristic way of moving the head up or down. Some of them are very fastidious as to their food, and will not make even a slight change. Others are more plastic, and the younger stages seem often to be free to establish unusual nutritive relations. Experiments prove that some have a short memory of unpalatable meals, refusing to try again until some time has elapsed. A few are known to utilise animal food, a change of habit which might perhaps arise from the occasional cannibalism. A few are aquatic (e.g. those of the China Mark Moths or Hydrocampine), others are in great part subterranean, some bore into wood, but the majority creep about on plants. A few Lyceid caterpillars are known to live in friendly relations with ants, who stroke them for the sake of a secreted juice. Some gregarious forms spin silken tents which serve as shelters. Migrating armies of caterpillars are occasionally observed, the moving impulse being hunger; the Procession Caterpillars (*Cnethocampa pityocampa*) of the south of Europe, which march in long files, are seeking for a suitable place for pupation. As they go they sometimes secrete a composite thread, and it is their instinct to follow their leader without question. When the direction of the leader of an Indian file is gradually altered, so that the head of the leader is brought into contact with the hind-end of the last of the line, the procession continues in a circle—even for several days, thus affording a good instance of the limitations of instinctive behaviour. When the procession reaches a suitable soft place in the soil, the caterpillars mass together and work their way below the ground. Among caterpillars in general there is great mortality, many being destroyed by the weather, by hungry birds and other enemies, and by Ichneumon Flies (q.v.), which make them the receptacles of their eggs and the edible cradles of their larvæ. Poulton notes that out of 533 caterpillars of Large Garden White (*Pieris brassicae*), no fewer than 422 were destroyed by ichneumon grubs.

**Injurious Caterpillars.**—From the large appetite and vegetarian diet of caterpillars, it follows that they must often be prejudicial to the interests of farmer, gardener, and forester. Among those injurious to farm-crops may be mentioned—the caterpillar of the Diamond-back Moth (*Plutella maculipennis*), infesting turnips and cabbages, and riddling the leaves, checked with dressings of soot and lime; of the Surface Caterpillar, e.g. of the Turnip Moth (*Agrotis segetum*), and of the Heart and Dart Moth (*A. exclamatoris*), infesting mangolds, turnips, and potatoes, checked by treating the fields with lime and gas-lime; the similar 'cut-worms' of the United States, which cut the stems of plants just below the surface; of the Cabbage Moth (*Mamestra brassicae*), destroying cabbages, turnips, strawberries, maize, and many other plants, checked by hand-picking; of *Leucania unipunctata*, the Army-worm, which ravages grass and corn in North America, and migrates in great bands in search of food and for other reasons; of *Aletia xylinæ*, the Cotton-worm, which does enormous damage to the cotton crop. Among the many injurious to trees may be noted—the caterpillar of the Goat Moth (*Cossus ligniperda*), boring galleries

in many stems (e.g. poplar, beech, lime, ash), to be checked by burning infested wood; of the Wood Leopard Moth (*Zeuzera aesculi*), boring in stems and branches of many trees (e.g. sycamore, ash, apple, pear); of the Oak Miner (*Nepticula rufigipunctella*) and others like it, which make twisted burrows in leaves and are known as leaf miners, a term also applied to the larvæ of some flies and beetles; of the Nun (*Psilura monacha*), very destructive to conifers; of the related *Ocnerna dispar* accidentally introduced from Europe into the United States, where it has done great damage. Among those injurious to fruit trees and bushes may be noted—the caterpillars of winter moths (e.g. of *Cheimatobia brumata*), on apple and plum and other trees, destroying the buds in spring, checked by ringing the trees with grease-bands, so that the wingless female moths cannot creep up to lay their eggs; of the Raspberry Moth (*Lampronia rubiella*), small red larvæ very destructive to raspberry canes, checked by deeply forking and cleaning the ground around the bushes; of the Magpie or Currant Moth (*Abraxas grossulariata*), destructive especially to gooseberry and currant crops, wintering as larvæ and destroying the young leaves in spring, checked by cleaning the ground around the plants and spraying early in the year; of the Codling Moths (*Carpocapsa pomonella*), boring in apples, checked by banding the trees so as to trap the caterpillars when crawling up or down; of Seed-borers, allied to the Codling Caterpillar, *C. saltitans*, infesting the seeds of a Croton, and causing the phenomenon of 'jumping beans'; of Ermine Moths, living gregariously in spun webs on the branches of fruit trees, such as apple and plum, destroying the leaves, checked by picking and spraying; of the Lackey Moth (*Chisocampa nevustria*), and the Brown-tail Moth (*Porthesia chrysorrhæa*), known as 'tent caterpillars,' because of their silken shelters on the branches of many kinds of trees, checked by spraying; of the Vapourer Moth (*Orgyia antiqua*), harmful to a great variety of fruit trees and forest trees, checked by destroying the egg-masses and cocoons, by shaking off the caterpillars, and by spraying. The caterpillars of some of the small Tineidæ destroy clothes and woollen stuffs, e.g. *Tinea* (*Trichophaga*) *tapezella*, the Clothes Moth, and *Tinea pellionella*, the Woollen Moth. Naphthalene usually drives them away. Information in regard to many injurious caterpillars, and the preventive or remedial measures to be resorted to, may be conveniently obtained from the valuable leaflets issued by the Board of Agriculture in London, and by the entomological stations throughout the United States. The devastations of caterpillars are to some extent compensated for by the silk of the silk-worms (*Bombyx mori*, &c.), and by the part that some of the adult insects play in the pollination of flowers. A few caterpillars are used as food. They are of great scientific interest in their adaptations and in their remarkable metamorphosis. To poetical fancy, even, they have been found suggestive, for since Swammerdam saw in the metamorphosis of caterpillars 'the resurrection painted before our eyes,' many authors have delighted to point to the analogies to be found in the crawling immature caterpillar, with faint promise of its future, in the seeming death of the chrysalids, and in the heavenward flight of the perfected winged insects.

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**Caterpillar Tractor**, a heavy vehicle carried upon a ribbed band which revolves about the wheels and serves as a track. It is used for agricultural, war-like, and other purposes when difficult ground has to be traversed.

**Catesby, MARK**, naturalist, born about 1679, probably in London, travelled in North America in 1710-19 and 1722-26, and published *Natural History of Carolina, Florida, and the Luluama Islands* (2 vols. 1731-43), *Hortus Britannico-Americanus*, and a work on the fishes, reptiles, and insects of the Isle of Providence. German translations of the first and last appeared at Nuremberg. He died in London, 23d December 1749.

**Catesby, ROBERT**, born in 1573, was a Northamptonshire Catholic of good fortune and lineage, being sixth in descent from Richard III.'s Catesby, who was hanged three days after Bosworth. Robert, however, had suffered much as a recusant both by fines and imprisonment, when in 1604 he engaged in the Gunpowder Plot (q.v.). He was shot dead in the defence of Holbeache House, 8th November 1605.

**Cat-fish**, in Britain, is usually a name for the Wolf-fish (q.v.).—In America the name is commonly applied to a very different fish, one of the genus *Pimelodus* and family Siluridæ. Sixteen species occur in the lakes and rivers of North America. The skin is naked, and the head has eight fleshy barbules. The Common Cat-fish (*P. atrarius*), or Horned Pout, is one of the commonest river fishes of the United States, especially in the east and north. It is from 7 to 9 inches in length, and is a very important food fish, though its flesh, like that of all the cat-fishes, is insipid. Like all its congeners it prefers muddy bottoms, and is sluggish in its movements. The Great Lake Cat-fish (*P. nigricans*) of Lakes Erie and Ontario is from 2 to 4 feet long, and weighs from 6 to 30 pounds.

**Catgut** is employed in the fabrication of the strings of violins, harps, guitars, &c.; as also in the cords used by clockmakers, in the bows of archers, and in whipcord; and in surgery catgut strings are employed in the suturing of wounds. It is generally prepared from the intestines of the sheep, rarely from those of the horse, ass, or mule, and not those of the cat. The first stage in the operation is the thorough cleansing of the intestines from adherent feculent and fatty matters; after which they are steeped in water for several days, so as to loosen the external membrane, which can then be removed by scraping with a blunt knife. The material which is thus scraped off is employed for the cords of battle-boards and rackets, and also as thread in sewing the ends of intestines together. The scraped intestines are then steeped in water, and scraped again, when the large intestines are cut off and placed in tubs with salt, to preserve them for the sausage-maker; and the smaller intestines are steeped in water, thereafter treated with a dilute solution of alkali (4 oz. potash, 4 oz. carbonate of potash, and 3 to 4 gallons of water, with occasionally a little alum), and are lastly drawn through a perforated brass thimble, and assorted into their respective sizes. In order to destroy any adherent matter which would lead

to putrefaction, and the consequent development of offensive odours, it is customary to subject the catgut to the fumes of burning sulphur—i.e. sulphurous acid, which acts as an Antiseptic (q.v.), and arrests decomposition. The best strings come from Italy, and are used for musical instruments. These are known as *Roman strings*, but they are made in several Italian towns, the most valuable coming from Naples. About 10 per cent. of the violin strings manufactured are *false*—i.e. they produce two sounds. Gut strings for musical instruments become useless after being kept a few years. Cord for clockmakers is made from the smallest of the intestines, and occasionally from larger ones, split longitudinally into several lengths. The catgut obtained from the intestines of horses, asses, and mules is employed in the same way as leather belts for driving lathes and other small machines. The so-called Silkworm Gut (q.v.) used for fishing-lines is not gut of any kind.

**Catha**, a genus of Celastraceæ, often reckoned under Celastrus *C. edulis*, Arabian Tea, or Khât (also Katt, Kat, Kât; Arabic *gat*), is a shrub highly valued by the Arabs on account of its leaves, which are chewed or infused like coffee or tea, to which its properties seem essentially similar. It is cultivated on terraces 3000 to 4000 feet above sea-level.

**Cathari** (Gr. 'pure'), or CATHARISTS, a name assumed by a widely diffused Gnostic sect of the middle ages, which took its rise most probably among the Slavs in Southern Macedonia, and spread over the whole of Southern and Western Europe. In Thrace it found a kindred sect in the Paulicians (q.v.), who had been transported thither about 970, and they were there known as Bogomili (q.v.). In the second half of the 12th century they were in great strength in Bulgaria, Albania, and Slavonia, and divided into two branches, distinguished as the Albanensians (the more extreme section), and the Concorezians (named from Goriza in Albania). It is remarkable that the name *Bulgari*, by which they were known to the returning French crusaders, is the origin of the low French word *Bougre*, just as the German word for 'heretic' (*Ketzer*) is derived from *Gazzari*, the Lombard form of *Cathari*. In Italy the heresy first appeared at Turin about 1035, and existed down to the 14th century. Its adherents were called *Patarini*, from *Pataria*, a street in Milan frequented by rag-gatherers, where they held their secret meetings in 1058. The Cathari reached their greatest numbers in Southern France, where they were commonly called Albigenses (q.v.) or *Publicans*, the latter term being a corruption of *Paulicians*, with whom they were confounded. After the great Albigensian wars, they were gradually rooted out by the Inquisition, and after the first half of the 14th century they disappear from history. The Cathari based their teaching on the New Testament and an apocryphal 'Vision of Isaiah' and 'Gospel of John.' The only extant Catharist writing is a short ritual in the Romance language of the 13th-century troubadours (printed at Jena in 1852 by Professor Cunitz from the MS. at Lyons). All the Cathari held more or less Manichæan views, and practised a rigid asceticism. Deliverance from evil was only to be attained by renunciation of the (material) world, including marriage, property, and the use of animal food. They distinguished between the great mass of their *Credentes* or 'Believers,' and the *Perfecti*, who had received the Baptism of the Spirit by the laying on of hands, called *Consolamentum*, because in it the Comforter was imparted. These 'pure' ones, estimated at only 4000 in all Europe about the year 1240, formed the Catharist Church—the 'only true and pure church on earth.' Their worship was

extremely simple, and their church government was by bishops (each with two assistants, the *Filius Major* and the *Filius Minor*) and deacons.

See C. Schmidt, *La Secte des Cathares* (1849); Lombard, *Pauliciens et Bons-hommes* (1879); Lea, *History of the Inquisition* (1888); and Dollinger, *Sektengeschichte* (1889).

**Catharine**, the name of several Christian saints: (1) *St Catharine* proper, a virgin of royal descent in Alexandria, who publicly confessed the gospel at a sacrificial feast appointed by the Emperor Maximinus, and was therefore put to death, after they had vainly attempted to torture her on toothed wheels, 307 A.D. Hence the name of 'Catharine wheel.' No less than fifty heathen philosophers sent by the emperor to convert her in prison were themselves converted by her winning eloquence; whence she is the patroness of philosophers and learned schools. Having steadily rejected all offers of earthly marriage, she was taken in vision to heaven, when the Virgin presented her to her son, and Christ plighted his troth to her with a ring. This subject has been a favourite one with many artists (as signifying the union of the redeemed soul with Christ); the Christ being usually represented as an infant. It has been suggested that the attributes of the unhistorical St Catharine seem to have been derived from those of the actual Hypatia (q.v.), a heathen who suffered death at the hands of Christian fanatics. St Catharine's festival falls on 25th November.—(2) *St Catharine of Siena* (1347–80), one of the most famous saints of Italy, was born in Siena, a dyer's daughter. While yet a child she practised extraordinary mortifications, and devoted herself to perpetual virginity. She became a Dominican, and therefore afterwards a patron saint of the Dominicans. Her enthusiasm converted the most hardened sinners, and she was able to prevail upon Pope Gregory XI. for the sake of the church to return from Avignon to Rome. She died in 1380. It was claimed that Christ's stigmata (see STIGMATISATION) were imprinted upon her body; and she wrote devotional pieces, letters, and poems. See books on her by Miss Drane (3d ed. 1899), Miss Scudder (1905), Miss Roberts (1907), Edmund Gardner (1908), and Dr R. Fawtier (1922).—*St Catharine of Bologna* (1413–63) and *St Catharine of Sweden* (died 1381) are of less note. *St Catharine of Genoa* (died 1510) was a remarkable mystic; see book by Von Hügel (trans. 1909).

**Catharine de' Medici**, the wife of one king of France, and the mother of three, was the daughter of Lorenzo de' Medici, Duke of Urbino, and was born at Florence in 1519. In her fourteenth year she was brought to France, and married to Henry, the second son of Francis I. The marriage was a part of the political schemes of her uncle, Pope Clement VII., but as he died soon after, she found herself friendless and neglected at the French court. In these circumstances she conducted herself with a submission which seemed even to indicate a want of proper spirit, but which gained her the favour of the old king, and in some measure also of her husband. The accession of the latter to the throne of France, however, made very little difference in her situation. It was not till the accession of her eldest son, Francis II., in 1559, that she found some scope for her ambition. The Guises at this time possessed a power which seemed dangerous to that of the throne, and Catharine entered into a secret alliance with the Huguenots to oppose them. On the death of Francis II. in 1560, and accession of her second son, Charles IX., the government fell entirely into her hands. Caring little for religion in itself, although she was very prone to



superstition, she disliked the Protestants, chiefly because their principles were opposed to the absolute despotism which she desired to maintain. Yet she sought to rally the Protestant leaders around the throne in order to serve as a counterpoise to the Guises. This attempt having failed, and the civil war which ensued having ended in the peace of Amboise, highly favourable to the Protestants, she became alarmed at the increase of their power, and entered into a secret treaty with Spain for the extirpation of heretics; and subsequently into a plot with the Guises, which resulted in the fearful massacre of St Bartholomew's Day. This event brought the whole power of the state into the hands of the queen-mother, who boasted of the deed to Roman Catholic governments, and excused it to Protestant ones, for she now managed all the correspondence of the court. About this time she succeeded, by gold and intrigues, in getting her third son, afterwards Henry III., elected to the Polish throne. But her arbitrary and tyrannical administration roused the opposition of a Roman Catholic party, at the head of which was her own fourth son, the Duke of Alençon. It was very generally believed that she was privy to the machinations that led to his death. When, after the death of Charles IX., Henry III. returned from Poland to be king of France, his mother still ruled the court, and had the principal share in all the intrigues, treacheries, and political transactions of that wretched time. Having betrayed all who trusted them, she and her son found themselves at last forsaken and abhorred by all. The League and the Guises had no more confidence in them than had the Protestants and Henry of Navarre. Vexation on this account preyed on the proud heart of the queen-mother in her last days; and amidst the confusion and strife of parties, she died at Blois on 5th January 1589, unheeded and unlamented. She may fairly be regarded as a representative woman of an age when the first principles of human conduct were hopelessly confounded by religious strife and the intrigues and corruptions of courts.

Some historians maintain that the Bartholomew massacre was quite contrary to Catharine's policy, which it tended to stultify, and accordingly that it came about in spite of her—as Col. G. F. Young in *The Medici* (1909); see also Reumont's *Jugend Caterinas de' Medici* (Berlin, 1854), T. A. Trollope's *Girlhood of Catharine de' Medici* (1856), Capefigue's *Catherine de Médicis* (Paris, 1856), La Ferrière's *Lettres de Catherine de Médicis* (1880-92), and Miss Edith Sichel's *Catherine de Medici* (1905) and *Later Years of Catherine de Medici* (1908).

**Catharine I.**, wife of Peter the Great, and Empress of Russia. She was a Lithuanian peasant's daughter, and her original name was Martha Skavronska. The date of her birth is about 1683. Being left an orphan, she was brought up chiefly by a Lutheran pastor, Gluck, in Marienburg, Livonia. In 1702 she married a Swedish dragoon, but Marienburg being taken by the Russians in the same year, she was made prisoner, and became the mistress of Prince Menshikoff. She then attracted the notice of Peter the Great. In 1703 she went over to the Greek Church, and took the name of Catharina Alexievna. After being for some years the emperor's mistress, she was privately married to him in 1707; and the marriage was publicly avowed in 1711. When Peter the Great and his army seemed entirely in the power of the Turkish army on the Pruth in 1711, Catharine, according to the common account, managed by skilful bribery to procure the deliverance of the Russians. Catharine was now received into greater favour than ever, and was solemnly crowned in 1712. The story, however, does not rest on sufficient evidence. At anyrate Catharine continued to enjoy her high position till the death of Peter in 1725. The new party con-

cerned in promoting the reforms of Peter the Great supported Catharine's claim to be his successor, and she was acknowledged Empress and sole ruler of All the Russias. Under Menshikoff's direction, the affairs of government went on well enough for a time; but the empress ere long began to yield to the influence of a number of favourites, addicted herself to drunkenness, and lived such a life as could not fail to hurry her to the grave. She died 17th May 1727. See PETER.

**Catharine II.**, Empress of Russia, was born at Stettin in 1729. Her paternity was doubtful; her mother was the dissolute wife of the Prince of Anhalt-Zerbst, a Prussian field-marshal and governor of Stettin. She received the name of Sophia Augusta; but the Empress Elizabeth of Russia having selected her for the wife of her nephew Peter, she passed from the Lutheran to the Greek Church, and took (like the Empress Catharine I.) the name of Catharina Alexievna. In 1745 her marriage took place. She soon quarrelled with her husband, and both of them lived a life of unrestrained vice. Among his attendants was a Count Soltikoff, with whom her intimacy soon became scandalous; and Soltikoff was sent on an embassy abroad. But the young Polish count, Stanislaus Poniatowski, almost immediately supplied his place. After the death of the Empress Elizabeth in 1762, Peter III. ascended the Russian throne; but the conjugal differences became continually wider. Catharine was banished to a separate abode; and the emperor seemed to entertain the design of divorcing her, declaring her only son, Paul, illegitimate, and marrying his mistress, Elizabeth Woronzoff. The popular dislike to Peter, however, rapidly increased; and at length, he being dethroned by a conspiracy, Catharine was made empress. A few days afterwards Peter was murdered (July 1762). What participation his wife had in his murder has never been well ascertained.

Catharine now exerted herself to please the people, and among other things, made a great show of regard for the outward forms of the Greek Church, although her principles were, in reality, those prevalent among the French philosophers of the 18th century. The government of the country was carried on with great energy; and her reign was remarkable for the rapid increase of the dominions and power of Russia. Not long after her accession to the throne her influence secured the election of her former favourite, Stanislaus Poniatowski, to the throne of Poland. In her own empire, however, discontentment was seriously manifested, the hopes of the disaffected being centred in the young prince Ivan, who was forthwith murdered in the castle of Schlüsselburg. From that time the internal politics of Russia consisted chiefly of court intrigues for the humiliation of one favourite and the exaltation of another. The revolt of the Cossack Pugatcheff in 1773, though for a time it looked serious, only served to fortify her throne. The first partition of Poland in 1772, and the Turkish war which terminated in the peace of Kainardji in 1774, vastly increased the empire. In 1787 she made a progress in her southern provinces through flourishing towns, villages, and festive scenes; but the whole was a sham, having been got up for the occasion by Potemkin to impress Catharine with the prosperity of her empire. The Turkish war which terminated in the peace of Jassy in 1792 had similar results, and also the war with Sweden, which terminated in 1790. The second and third partitions of Poland, and the incorporation of Courland with Russia, completed the triumphs of Catharine's reign. She also began a war with Persia, and cherished a scheme for the overthrow of the British power in India; but a stroke of apoplexy cut her off, 17th November 1796.

She was a woman of great ability, but she had in a large measure the vices of the time and station in which she lived. Her gallantries were both liberal and systematic. She always had a paramour who dwelt in her palace, and might be regarded as filling an acknowledged office of state, with large revenues and fixed privileges. Of these Potemkin (q.v.) is best remembered. Yet distinguished authors flattered her; and she invited to her court some of the literati and philosophers of France. She professed the desire to model her rule on the enlightened theories of these men, and did effect some improvements; but the French revolution made her reactionary. See RUSSIA; Catharine's own *Memoirs* (trans. 1859); Carlyle's *Friedrich*; works by Walszewski (trans. 1893, 1894), Gribble (1912), Hodgetts (1914), and Anthony (1926); and Fitzgerald Molloy, *The Russian Court in the 18th Century* (1905).

**Catharine Archipelago.** See ALEUTIAN ISLANDS.

**Catharine Howard.** See HOWARD.

**Catharine of Aragon,** Queen of England, the first wife of Henry VIII., and fourth daughter of Ferdinand and Isabella, king and queen of Castile and Aragon, was born December 1485. She occupies a prominent place in English history, not for what she herself was, but for what she was the occasion of—the Reformation. Married on 14th November 1501, when scarcely sixteen, to Arthur (1486–1502), Prince of Wales, son of Henry VII., she was left a widow on 2d April, and on 25th June was betrothed to her brother-in-law Henry, as yet a boy of only eleven years old. The pope's dispensation enabling such near relatives to marry was obtained in 1504, and the marriage took place in June 1509, seven weeks after Henry's accession to the crown as Henry VIII. Between 1510 and 1518 she bore him five children, one only of whom, the Princess Mary, survived; but, though Henry was very far from being a model husband, and though he had conceived a passion for Anne Boleyn (q.v.) as early as 1522, he appears to have treated Queen Catharine with all due respect, until 1527. He now expressed doubts as to the legality of his marriage, and sought to have it nullified, till at length, all other means failing, Cranmer in May 1533 pronounced it null and void from the beginning (see HENRY VIII.). Queen Catharine, who had offered a dignified passive resistance to all the proceedings, did not quit the kingdom, but took up her residence first at Amptill, in Bedfordshire, and afterwards at Kimbolton Castle, Huntingdonshire, where she led an austere religious life until her death on 7th January 1536. It is still maintained that she was the accredited ambassador of Spain in England, was equal in duplicity to those pitted against her, and in morals was no better than her contemporaries. Martin Hume believed that in her widowhood she had undue intimacy with her Spanish confessor; see his *Wives of Henry VIII.* (1905).

**Catharine of Braganza.** See CHARLES II. and Life by Miss L. L. Davidson (1908).

**Catharine Parr.** See PARR.

**Cathartics,** a name originally for all medicines supposed to purify the system from the matter of disease; ultimately limited to remedies acting on the bowels (see APERIENTS, CONSTIPATION).

**Cathay** is the name by which the Chinese empire was commonly known in Europe during medieval times—in connection with Marco Polo's travels, for example; and Kitai is still the Russian name for China. Cathay, originally Khitai, is derived from the *Khitai*, the earliest of the northern races known to have conquered China (possibly akin to the Tunguses), who disappeared about

the beginning of the 12th century. See CHINA; and Yule, *Cathay and the Road Thither* (Hakluyt Society, 1866; new ed. 1914 *et seq.*).

**Cathcart,** WILLIAM SCHAW, first Earl Cathcart, a British general and diplomatist, son of the ninth Baron Cathcart of Cathcart, Renfrewshire, was born September 17, 1755. Educated at Eton and Glasgow, and admitted an advocate in 1776, when he succeeded his father, he next year entered the army, took a prominent part in the American war, and fought with distinction in Flanders and North Germany. In 1803 he was made commander-in-chief in Ireland. In 1805 he was engaged on a diplomatic mission to Russia; in 1807 commanded the land-forces co-operating with the fleet in the attack on Copenhagen, and, for his services, was made a British peer, with the title of viscount, and received a vote of thanks from both Houses of Parliament. Sent in 1813 as ambassador to St Petersburg, he accompanied the Tsar Alexander in the campaigns of 1813 and 1814, and was present at the congresses of Châtillon and Vienna. In 1814 he was raised to the rank of earl; and he died June 16, 1843.—His eldest son and successor, CHARLES MURRAY, long known as Lord Greenock, was born in 1783, served in Spain and at Waterloo, afterwards acted in Canada, and was made a general. He died 16th July 1859.—A younger son, SIR GEORGE CATECART, was born in 1794. Educated at Eton and Edinburgh, he entered the army in 1810, served with the Russians in the campaigns of 1812 and 1813, and as aide-de-camp to the Duke of Wellington, was present at Quatre Bras and Waterloo. After helping to suppress the Canadian rebellion of 1835, and after holding the post of deputy-lieutenant of the Tower for five years, in 1852 he was made governor at the Cape, with command of the forces, and brought to a successful end the harassing Kaffir war. He returned to England in 1854 in time to be sent out to the Crimea as general of division. His bravery here was conspicuous, especially in the battle of Inkermann (November 5), where the odds were so terribly against the British, and where he fell, shot through the heart. He was buried on the spot where he fell, which in his honour was named Cathcart's Hill. Cathcart was the author of a very valuable work entitled *Commentaries on the War in Russia and Germany in 1812–13* (Lond. 1850). See vol. v. of Kinglake's *Invasion of the Crimea*.

**Cathedral,** from a Greek word *cathedra*, signifying a seat. Thus, 'to speak *ex cathedra*,' is to speak as from a seat of authority. The cathedral city is the seat of the bishop of the diocese, and his throne is placed in the cathedral church, which is the parish church of the whole diocese. The diocese was, in fact, anciently called *parochia*, until the application of this name to the smaller portions into which it was divided. Cathedrals vary in rank with the dignity of the see to which they belong, and may be episcopal, archiepiscopal, metropolitan, or patriarchal. Anciently only a cathedral was styled *matrix ecclesia*, but now this title is applied to all churches, even parochial only, which have other churches or chapels dependent on them. When two cathedrals are found in the same town (as is sometimes the case), they are called 'con-cathedrals.' In the Roman Church the establishment, suppression, or union of cathedrals is reserved to the pope alone. A cathedral town has generally been understood to be entitled to the honours of a city, even although the town be not a borough incorporate; but in one case, at least, that claim was disallowed by a court of law. The distinction between cathedral and collegiate churches consists principally in the see of the bishop being at the former. The governing body

of a cathedral is called the dean and chapter—i.e. the dean and canons who meet for corporate purposes in the chapter-house of the cathedral. The property of the cathedral vests in this body. In England they elect the bishop of the diocese on the issue of a *congé d'élire* from the crown, but as the person to be elected is always named, and they may be compelled by a mandamus to elect that person and no other, the election is merely a form.

The bishop is 'visitor' of the dean and chapter, and the metropolitan is visitor of all cathedrals within his province; while the crown holds that office during the vacancy of the archbishopric. In England all cathedrals—other than those of dioceses founded or revived by Henry VIII. or in modern times—are distinguished as being either of the old or the new foundation. The cathedrals of the old foundation are those which have from the first been served by secular canons; those of the new foundation were originally monastic churches, and served by monks. These were dissolved at the Reformation, being then refounded on the footing of the secular churches. For new dioceses, parish or other churches have been converted into cathedrals (as St Michael's at Coventry). By the Act of 1840, all members of cathedrals, except the dean, are styled canons. Their *seats* in the cathedral are called their *stalls*. They are no longer called prebendaries in most cathedrals, but this title is retained in the cathedrals of York, London, Wells, Chichester, Exeter, Hereford, and Lichfield (and in St Davids and St Asaph). In two cathedrals, Lincoln and Salisbury, both titles are used simultaneously, and the holders are styled 'canons and prebendaries.' In all these cases, however, the prebendaries rank below the canons residentiary, and, save for their slender prebends, are on almost the same footing as the 'honorary canons' of recent institution, who have no share in the cathedral revenues or government. At St Davids the first 'curial prebend' vested in the crown, and the sovereign was senior prebendary of that cathedral. The French kings enjoyed similar privileges in six chapters, and the old German emperors were *ex officio* canons of St Peter's at Rome. Canons must reside three months in each year. The bishop was always considered of common right to have the patronage of canonries, but formerly there were exceptions. Now, the appointment to all canonries is vested either in the bishop or in the crown. Where the bishop is patron, he 'collates,' and the dean and chapter 'induct,' by placing the new canon in a stall in the church. The crown appoints by letters-patent, and the canon is installed without collation. Honorary canons have no emoluments, but rank after the canons residentiary. Minor canons, of whom there are from two to six in each cathedral, perform the daily choral services; see SERVICE (MUSICAL). For the general plan of cathedral buildings, see CHURCH. The English cathedrals, some forty in number, are noticed under their respective cities.

See Murray's, Bell's, and the S.P.C.K.'s Cathedral handbooks; Dean Goulburn's *Cathedral System* (1871); F. H. Allen, *The Great Cathedrals of the World* (Boston, 1888); W. J. Loftie, *The Cathedrals of England and Wales* (1892); Mrs Rensselaer, *English Cathedrals* (1892).

**Cathelineau**, JACQUES, leader of the Vendéans in their resistance to the Republic, was born at Pinen-Mauge, Anjou, in 1759. But a poor linen-merchant at the outbreak of the Revolution, in the spring of 1793 he put himself at the head of a handful of stubborn recruits, and soon became famous for the courage and success of his exploits, the greatest of which was the storming of Cholet. Spite of his own modesty, the supreme command was forced upon him after the victory of Saumur. He immediately determined to make an attack upon Nantes, and managed to penetrate into the town, but was

mortally wounded by a musket-ball, and his troops immediately dispersed. He was carried to St Florent, where he died twelve days later, July 11, 1793. Cathelineau was a man of great simplicity and honesty of character, and his piety was such that he was called the Saint of Anjou.

**Catherine.** See CATHARINE.

**Catheter** (Gr. *kathîrmi*, 'I thrust into') was a name applied indifferently to all instruments for passing along mucous canals. In modern times, however, it has generally been reserved for tubular rods through which fluids or air may pass, and is now restricted to those used for emptying the urinary bladder, and those used for injecting air or fluids into the Eustachian tube (Eustachian Catheter). The catheter for the former purpose is a very old surgical instrument. The ancients made theirs of copper, which accumulated verdigris. In the 9th century silver was substituted by the Arabian surgeons as a cleaner metal, and is still used by all who are not obliged, for economical reasons, to have their catheters made of German silver or pewter. The urinary catheter for the male varies in length from 10 to 11 inches; the female catheter need not be more than 4 or 5 inches. The form is a matter of less importance, but most surgeons prefer an instrument straight to within the last few inches of its length; the latter should be curved into the segment of a small circle. Others, however, use a double curve (bicoudé catheter). Flexible catheters are made of gum elastic (see BOUGIES), which may be used either alone or supported on a wire. Many other materials have been proposed, but vulcanised india-rubber is the only one generally in use, and forms the most widely applicable type of catheter. The Eustachian catheter is commonly made of metal or vulcanite, 6 or 7 inches in length, with the last inch or less slightly curved. It is introduced into the Eustachian tube along the floor of the nose, and air or fluid, as may be necessary, forced along it by an india-rubber bag which can be attached to it. See EAR.

**Cathode.** See ANODE.

**Catholic and Apostolic Church** is the only name recognised by those often termed 'Irvingites'—a name which they repudiate as implying that they are sectarians and followers of a man. In the winter of 1829-30 the Rev. Edward Irving (q.v.), then a minister of the Scotch Church, Regent Square, London, delivered a series of lectures on spiritual gifts, in which he maintained that those which we are in the habit of calling 'extraordinary' or 'miraculous' were not meant to be confined to the primitive church, but to be continued through the whole period of the present dispensation. About the same time, as if to confirm the views of the great preacher, there occurred at Port-Glasgow, in the west of Scotland, and elsewhere, certain strange phenomena. It was alleged that miraculous acts of healing had happened, and that the gift of tongues had returned. After what seemed to be a sufficient investigation on the part of some of the members of Mr Irving's church, it was concluded that the manifestations were genuine. Similar manifestations shortly after occurred in his own church, which were also pronounced to be genuine. They were held to be of two kinds: 1st, speaking in tongues, and 2d, prophesying. As the former bore no resemblance to any language with which men were conversant, it was believed to be strictly an 'unknown tongue,' the Holy Ghost 'using the tongue of man as a sign in a manner which neither his own intellect could dictate, nor that of any other man comprehend.' The latter, 'prophesying,' consisted chiefly of 'exhortations to holiness, light upon Scripture, open-

ings of prophecy, and explanations of symbols.' In 1831 Irving was deposed from his office for heresy by the Church of Scotland, but meanwhile the truths of which he was so eminent an exponent had been assuming a more definite shape. He died in 1834. It was not till July 1835 that the Catholic and Apostolic Church took definite ecclesiastical shape. With this organisation Irving had no concern, nor had he anticipated it.

The organisation comprises a fourfold ministry (Ezek. i. and Eph. iv.)—1st, 'Apostle;' 2d, 'Prophet;' 3d, 'Evangelist;' and 4th, 'Pastor.' The apostles are invested with spiritual prerogatives; they alone can minister the Holy Ghost by the laying on of hands, directly or by delegation; through them the mysteries of God are unfolded to the church; and they decide on matters of order and discipline. Nothing that occurs in any church in the way of 'prophetic utterance' can be authoritatively explained save by them; and the various 'angels of the churches' are bound to bring all such utterances under their cognisance. The function of the 'prophet' has been already indicated. The work of an 'evangelist' consists in declaring the truths of the gospel, and bringing home to the church generally the principles taught by apostles. The office of the 'pastor' is that of ministering to the help and comfort of the various members of the flock. The 'angel' of the Catholic Apostolic congregation corresponds in a limited sense to the bishop of other Christian denominations; but he has only the rank of angel-pastor in the universal church. The ministers of each full congregation comprise an angel, with a four-fold ministry (consisting of elders, prophets, evangelists, and pastors), and a ministry of deacons to give diaconal instruction and to take charge of temporal matters. The ministry is supported by tithes, the people giving a tenth of their income for the support of the priesthood. The ordinary affairs of the church are managed by the angel in a council of deacons, or if needful, of priests and deacons. The whole organisation is based on the types of the Mosaic tabernacle, in which the constitution of the Christian church is held to have been shadowed forth.

The congregation of this communion do not arrogate to themselves the title of the Catholic Apostolic Church. There is but one church built on the foundation of the apostles and prophets; the members of it throughout the world are not baptised into any section—Greek, Roman, Protestant, established, or non-established—but into the Eternal Trinity. A community of them holding the views above indicated regard themselves as a congregation of the Catholic and Apostolic Church assembling at a given place.

The Catholic and Apostolic Church does not differ from other Christian bodies in regard to the common doctrines of the Christian religion; it only accepts, in what it considers to be a fuller and more real sense, the *phenomena* of Christian life. It believes that the wonder, mystery, and miracle of the apostolic times were not accidental, but are essential to the divinely instituted church of God, and expressive of its supernatural life, whereby a people are preparing for the second advent of Christ, the hope of which is held in instant expectation. It is held that the end of this dispensation has two phases—the gathering of a first-fruits, and the subsequent great harvest, of which it is the earnest. The doctrine of Symbolism is firmly maintained, of which the most marked feature regards the mystical presence of the Lord under the elements of bread and wine, duly consecrated by the words of the institution and the presence of the Holy Ghost. Both transubstantiation and consubstantiation are repudiated. There

are services daily at 6 o'clock A.M. and 5 P.M.; prayers at 9 A.M. and 3 P.M.; the litany every Wednesday and Friday; and the eucharist is celebrated every Lord's Day, or, where there are clergy enough, daily. The liturgy, dating from 1842, is mainly based on the recognised Greek, Roman, and Anglican liturgies, with additional prayers. Lights and incense are used; and the vestments (surplice, alb, cope, chasuble, and stole) are similar to those of the Roman communion.

The Catholic and Apostolic Church has upwards of eighty churches in the United Kingdom, and representatives not only in Canada, Australia, and India, but in most Continental countries, including France, Belgium, Switzerland, Germany, Denmark, Sweden, and Russia. See the official *Liturgy of the Divine Offices*, and *The Purpose of God in Creation and Redemption*, Miller's *History and Doctrines of Irvingism* (1878); and books cited at IRVING (EDWARD).

**Catholic Church**, a term literally equivalent to 'universal church,' cannot, therefore, properly be applied to any particular sect or body, such as the Roman, Greek, Anglican, Reformed, Lutheran, or Presbyterian, all of which form merely portions more or less pure of the 'church universal.' It occurs for the first time in the pseudo-Ignatian Epistle to the Smyræans. It was first employed from about 160 A.D. to mark the difference between the orthodox 'universal' Christian church and the various sects of the Gnostic heretics; though, afterwards, it served also to distinguish the all-embracing Christian church from the religious exclusiveness of the pre-Christian ages, in which the church was restricted to a single nation. The formal principle of the Catholic Church is thus expressed in the famous canon of Vincentius of Lerinum (434 A.D.), 'Quod ubique, quod semper, quod ab omnibus creditum est'—i.e. the marks of the Catholic Church are *universality*, *antiquity*, and *unity*. The name has been retained by the Church of Rome, which claims to be the visible successor of the primitive one; and although Protestant divines have been careful to deny its applicability to a church which they consider essentially changed by the corrupt accretions of centuries, yet the term Catholic is still used by the populace of almost every Protestant country as synonymous with Roman Catholic. Anglicans insist on their claim to it, the Church of England being in England the representative of the Ancient as well as of the Western Church.

See ROMAN CATHOLIC CHURCH, GREEK CHURCH, OLD CATHOLICS, GERMAN CATHOLICS.

**Catholic Creditor**, in Scots law, is one whose debt is secured over two or more subjects belonging to the debtor. Where one subject is also burdened with other securities, the catholic creditor must not act capriciously to the prejudice of postponed creditors. Thus, if he draw his whole debt from that subject, he must assign them his security over the other. Similarly, if more than one of the subjects are so burdened, he must not favour one postponed creditor, but draw his whole debt rateably from these subjects, or assign the rateable proportion of his rights over the favoured estate. In no case, however, is he bound to forgo a legitimate interest of his own.

**Catholic Emancipation**. After the Reformation, both in England and in Scotland, Roman Catholics were subjected to many penal regulations and restrictions. As late as 1780 the law of England—which was actually enforced in 1764–65—made it felony in a foreign Catholic priest, and high treason in one who was a native of the kingdom, to teach the doctrines or perform divine service according to the rites of his church. Catholics were debarred from acquiring land by purchase. Persons educated abroad in the Catholic

faith were declared incapable of succeeding to real property, and their estates were forfeited to the next Protestant heir. A son or other nearest relation being a Protestant, was empowered to take possession of the estate of his Catholic father or other kinsman during his life. A Catholic was disqualified from undertaking the guardianship even of Catholic children. Catholics were excluded from the legal profession, and it was presumed that a Protestant lawyer who married a Catholic had adopted the faith of his wife. It was a capital offence for a Catholic priest to celebrate a marriage between a Protestant and Catholic. Such was the state of the law, not only in England but in Ireland, where the large majority of the population adhered to the old faith. In Scotland, also, Catholics were prohibited from purchasing or taking by succession landed property. The inexpediency and irrationality of imposing fetters of this description on persons not suspected of disloyalty, and from whom danger was no longer apprehended, began about 1778 to occupy the attention of liberal-minded statesmen; and in 1778 Sir George Savile introduced a bill for the repeal of some of the most severe disqualifications in the case of such Catholics as would submit to a proposed test. This test included an oath of allegiance to the sovereign, and abjuration of the Pretender, a declaration of disbelief in the several doctrines, that it is lawful to put individuals to death on pretence of their being heretics; that no faith is to be kept with heretics; that princes excommunicated may be deposed or put to death; and that the pope is entitled to any temporal jurisdiction within the realm. The bill, from the operation of which Scotland was exempted, eventually passed into law. An attempt which had been made at the same time to obtain a like measure of relief for the Catholics of Scotland, was defeated by an outburst of religious fanaticism. The populace of Edinburgh, stirred up by a body called 'The Committee for the Protestant Interest,' attacked and set fire to the Catholic chapel and the houses of the clergy and of such persons as were suspected to be favourable to Catholic relief. The frenzy spread to England, where a 'Protestant Association' had been formed to oppose the resolutions of the legislature (see GORDON, LORD GEORGE). In 1791 a bill was passed affording further relief to such Catholics as would sign a protest against the temporal power of the pope, and his authority to release from civil obligations; and in the following year, by the statute 33 Geo. III. chap. 44, the most highly penal of the restrictions bearing on the Scottish Catholics were removed without opposition, a form of oath and declaration being prescribed, on taking which they could freely purchase or inherit landed property.

Endeavours were made at the same time by the Irish parliament to get rid of the more important disqualifications, and place Ireland on an equality in point of religious freedom with England. In 1780 Grattan carried his resolution that the king and parliament of Ireland could alone make laws that would bind the Irish, and separation from England was urged as the alternative with repeal of the disqualifying statutes. The agitation culminated in the Irish rebellion of 1798; the union of 1800 followed, which was partly carried by means of virtual pledges given by Pitt—pledges which Pitt was unable to redeem owing to the king's scruples about his coronation oath, and Pitt resigned. Meantime, in England, Catholics continued subject to many minor disabilities which the above-mentioned acts failed to remove. They were excluded from sitting in parliament, and from enjoying numerous offices, franchises, and civil rights, by the requirement of signing the declaration against transubstantiation, the invoca-

tion of saints, and the sacrifice of the mass. In the early part of the 19th century many measures were proposed for the removal of these disqualifications, and in 1813 and succeeding years one bill after another for this end was thrown out. Fox, Grenville, Canning, Castlereagh, and Burrell were among those who made efforts in the direction of emancipation. Meanwhile, the agitation on the subject among the Catholics themselves greatly increased, and in 1824 it assumed an organised shape by the formation of the 'Roman Catholic Association' in Ireland, with its systematic collections for the 'Catholic rent.' The Duke of Wellington, who for a long time felt great repugnance to admit the Catholic claims, was at last brought to the conviction that the security of the empire would be imperilled by further resisting them, and in 1829 a measure was introduced by the duke's ministry for Catholic emancipation. An act having been first passed for the suppression of the Roman Catholic Association—which had already voted its own dissolution—the celebrated Roman Catholic Relief Bill was introduced by Peel in the House of Commons on the 5th of March, and after passing both Houses, received the royal assent on the 13th April. By this act (10 Geo. IV. chap. 7) an oath is substituted for the oaths of allegiance, supremacy, and abjuration, on taking which Catholics may sit and vote in either House of Parliament, and be admitted to most other offices from which they were before excluded. They, however, continue to be excluded from the offices of Guardian and Justice or Regent of the United Kingdom, Lord Chancellor, Lord Keeper, or Lord Commissioner of the Great Seal of Great Britain or Ireland, and Lord High Commissioner to the General Assembly of the Church of Scotland. As members of corporations they could not vote in the disposal of church property or patronage. But the public use of their insignia of office, and of episcopal titles and names, was denied them; the extension of monachism was prohibited; and it was enacted that the number of Jesuits should not be increased, and that they should henceforth be subject to registration. In 1842 47 most of the acts still in force against Catholics were removed; and in 1867 the office of Chancellor of Ireland was thrown open, though a Catholic priest may not sit in the House of Commons. The form in which the British sovereign in his coronation oath repudiated Catholic doctrines was modified in 1910 in reference to Catholic feeling.

See ECCLESIASTICAL TITLES ACT, O'CONNELL, ABJURATION, ALLEGIANCE; *The History of Catholic Emancipation*, by W. J. Annerst, S.J. (1886); and *The Dawn of the Catholic Revival* (1909) and *The Eve of Catholic Emancipation* (1911-12), by Mgr. Bernard Ward.

**Catholic Epistles**, the name given, according to Clemens Alexandrinus and Origen, to certain epistles addressed not to particular churches or individuals, but either to the church universal or to a large and indefinite circle of readers. Originally the Catholic Epistles comprised only the first epistle of John and the first of Peter, but at least as early as the 3d century, and especially after the time of Eusebius, they included also the Epistles of James, of Jude, the 2d of Peter, and the 2d and 3d of John. These seven thus constituted the Catholic Epistles, although the genuineness and authenticity of the last-mentioned five were not universally acknowledged; but the designation commended itself as supplying a convenient distinction of these letters from the fourteen bearing the name of Paul; and this very incorporation with epistles whose canonicity was not questioned, naturally had the effect of confirming their authority, so that in a short time the entire seven came to be considered a portion of the canon.

**Catholics, OLD.** See OLD CATHOLICS.

**Catholikos** is the title of the head of the Armenian Church. See ARMENIA.

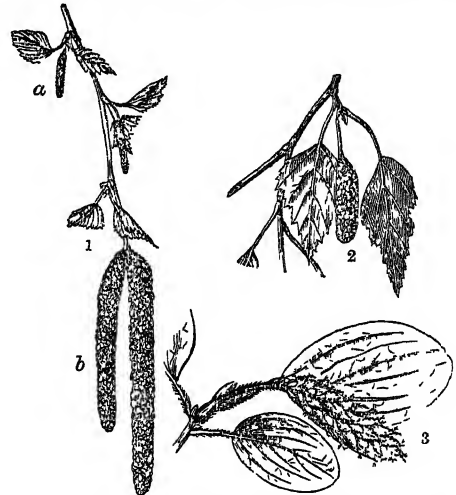
**Catili'na**, LUCIUS SERGIUS, the Roman conspirator, was born about the year 108 B.C. of an ancient patrician but impoverished family. His youth was stained with profligacy and crime. He attached himself to the party of Sulla, and revelled in the bloodshed and confusion that disgraced its triumph. His body was capable of enduring any labour or fatigue, and his mind was masterful, resolute, and remorseless. Despite his infamies he was elected prætor in the year 68 B.C., and next year governor of Africa, but was disqualified as a candidate for the consulship in 66 by charges of maladministration in his province. Disappointed thus in his ambition, and burdened with debts, he saw no hope for himself but in the chances of a political revolution, and therefore entered into a conspiracy, including many other young Roman nobles, in morals and circumstances like himself. The plot, however, was revealed to Cicero by Fulvia, mistress of one of the conspirators. Operations were to commence with the assassination of Cicero in the Campus Martius, but the latter was kept aware of every step of the conspiracy, and contrived to frustrate the whole design. In the night of November 6 (63 B.C.), Catiline assembled his confederates, and explained to them a new plan for assassinating Cicero; for bringing up the Tuscan army (which he had seduced from its allegiance), under Manlius, from the encampment at Fæsulæ; for setting fire to Rome, and putting to death the hostile senators and citizens. In the course of a few hours, everything was made known to Cicero. Accordingly, when the chosen assassins came to the house of the consul, on pretence of a visit, they were immediately repulsed. Two days later, Catiline with his usual reckless audacity, appeared in the senate, when Cicero—who had received intelligence that the insurrection had already broken out in Etruria—commenced the celebrated invective beginning: *Quousque tandem abutere, Catilina, patientia nostra?* ('How long now, Catiline, will you abuse our patience?') The conspirator was confounded, not by the keenness of Cicero's attack, but by the minute knowledge he displayed of the plot. His attempt at a reply was miserable, and was drowned in cries of execration. With curses on his lips, he rushed out of the senate, and escaped from Rome during the night. Catiline and Manlius were now denounced as traitors, and an army under the consul Antonius was sent against them. The conspirators who remained in Rome, of whom the chief were Lentulus and Cethegus, were at once arrested. After a great debate in the senate (December 5), in which Cæsar and Cato took a leading part on opposite sides, the conspirators were condemned to death. The sentence was executed that night in prison. The insurrections in several parts of Italy were meanwhile suppressed; many who had resorted to Catiline's camp in Etruria deserted when they heard what had taken place in Rome, and his intention to proceed into Gaul was frustrated. In the beginning of January he returned by Pistoria (now Pistoja) into Etruria, where he encountered the forces under Antonius, and after a desperate battle in which he fought with more than the courage of despair, he was defeated and slain. Catiline's appearance was in perfect keeping with his character. His face was reckless and defiant in expression, and haggard with a sense of crime; his eyes were wild and bloodshot; his gait restless and unsteady from nightly debauchery and the constant fever of insatiable and disappointed ambition. The *Bellum*

*Catilinarium* of Sallust is a masterpiece. For the view that Catilina was a misrepresented democrat, see Beesly's *Catiline, Clodius, and Tiberius* (1878); see also Mommsen and other histories of Rome; E. G. Hardy, *The Catilinarian Conspiracy in its Context* (1924), and Ben Jonson's tragedy.

**Cation.** See IONS, ELECTRICITY.

**Cat Island.** See BAHAMAS.

**Catkin**, or AMENTUM, a crowded spike or tuft of small unisexual flowers with reduced scale-like bracts. Examples are found in the willow, hazel, oak, birch, alder, &c. (see the articles on these). In some, as in the hazel and oak, the male flowers



1, Shoot of Birch in spring, bearing large terminal Male (b) and Female (a) Catkins. 2, Shoot of Birch in autumn with ripe Female Catkin. 3, Female Catkin of Willow.

only are in normal catkins, the female catkin of the former being much reduced. Male catkins fall off after shedding their pollen, and even during life are frequently weak and pendulous, like the stamens of grasses, but these consequences of extremely reduced vegetative life become no doubt also of advantage at first in developing, and later in scattering, the pollen. The appearance of catkins in early spring before the leaves open also doubtless favours wind-pollination.

**Catlin**, GEORGE, one of the first authorities on the habits of the North American Indians, was born in Pennsylvania in 1796. He was bred to the law, but soon turned to drawing and painting, which he had taught himself. In 1832 he went to the Far West to study the native Indians, and spent the next eight years among them, everywhere painting portraits of individuals (not less than 470 full length) and pictures illustrative of life and manners, which are now in the National Museum at Washington. Catlin travelled (1852-57) in South and Central America, and lived in Europe until 1871. At London in 1841 he published his learned and amply illustrated *Manners, Customs, and Condition of the North American Indians*, and in 1844 *The North American Portfolio*. He died at Jersey City, December 23, 1872. Other books are *Notes of Eight Years in Europe* (1848); *The Breath of Life, or Mal-Respiration* (1861), on the benefit of keeping one's mouth always closed.

**Catmint**, or CATNEP (*Nep'eta Cataria*), a labiate herb of Europe and western Asia, whose peculiar fragrance is very attractive to cats, much in the same way as valerian.

**Cato, DIONYSIUS**, is the name prefixed to a little volume of moral precepts in verse, which was a great favourite during the middle ages, but the author of which is unknown. Its usual title is *Dionysii Catonis Disticha de Moribus ad Filium*. It begins with a preface addressed by the supposed author to his son, after which come fifty-six injunctions of rather a simple character, such as *parentem ama*. Next follow 164 moral precepts, each expressed in two dactylic hexameters, the whole monotheistic in tone without being distinctly Christian. The book was early translated into most of the western languages. An English version by Benedict Burgh was printed by Caxton before 1479. See Prof. W. J. Chase's translation, with intro., &c. (1922).

**Cato, MARCUS PORCIUS**, frequently surnamed *Censorius* or *Censor*, also *Sapiens* ('the wise'), and afterwards *PRISCUS* or *MAJOR*—to distinguish him from his great-grandson, Cato of Utica—was born at Tusculum in 234 B.C. He was brought up on his father's farm in the Sabine country, and here he learned to love the simple and severe manners of his Roman forefathers. He made his first campaign in his seventeenth year, distinguished himself at the capture of Tarentum (209), at the defeat of Hasdrubal on the Metaurus (207), and in the later years of the second Punic war. At the same time he had been making himself a reputation as an orator and statesman. He became quaestor in 204, and served under the pro-consul Scipio Africanus in Sicily and Africa, denouncing his commanders' luxury and extravagance on his return to Rome. He was ædile in 199, and prætor the following year, when he obtained Sardinia as his province. So high was his reputation for capacity and virtue, that in 195, although his family had hitherto been unknown, he was raised to the consulship. Spain fell to him as his province, and here he showed such vigour and military genius in crushing a formidable insurrection, that in the following year he was honoured by a triumph. In 191 he served in the campaign against Antiochus, and to him the great victory won at Thermopylæ was mainly due. He now turned himself strenuously to civil affairs, and strove with all his might to stem the tide of Greek refinement and luxury, and advocate a return to a simpler and stricter social life after the ancient Roman pattern. In 187 he opposed the granting of a triumph to M. Fulvius Nobilior after his return from Ætolia victorious, on the ground that he was too indulgent to his soldiers, that he cherished literary tastes, and even kept poets in his camp. These rude prejudices of Cato were not acceptable to the senate, and his opposition was fruitless. In 184 Cato was elected censor, and discharged so rigorously the duties of his office that the epithet *Censorius*, formerly applied to all persons in the same station, became his permanent surname. He repaired the watercourses, paved the reservoirs, cleansed the drains, raised the rents paid by the publicans for the farming of the taxes, and diminished the contract prices paid by the state to the undertakers of public works. More questionable reforms were those in regard to the price of slaves, dress, furniture, equipage, and the like. Good and bad innovations he opposed with equal animosity and intolerance, and his despotism in enforcing his own idea of decency may be illustrated from the fact that he degraded Manilius, a man of prætorian rank, for having kissed his wife in his daughter's presence in open day.

In the year 175 Cato was sent to Carthage to arbitrate between the Carthaginians and King Masinissa, and was so impressed by the dangerous power of Carthage that ever afterwards he ended every speech in the senate-house—whatever the immediate subject might be—with the well-known words: '*Ceterum censeo Carthaginem esse delendam*'

('For the rest, I vote that Carthage must be destroyed'). Cato died in the year 149, at the age of 85. He had been twice married, and in his eightieth year his second wife bore him a son, the grandfather of Cato of Utica. Cato treated his slaves with old-fashioned harshness and cruelty, and in his old age became greedy of gain, although it cannot be said that his avarice impaired his honesty. He wrote several works, of which only the *De Re Rustica* (ed. by Keil, 1882-94), a kind of collection of the rules of good husbandry, has come down to us. There exist but a few fragments of his *Origines*, a summary of the Roman annals. These are reprinted by Jordan (Leip. 1860). Of his speeches, which were read with approval by Cicero, none remain. We possess his life as written by Cornelius Nepos, Plutarch, and Amelins Victor.

**Cato, MARCUS PORCIUS**, named CATO THE YOUNGER, or CATO UTICENSIS (from the place of his death), was born 95 B.C. Having lost, during childhood, both parents, he was educated in the house of his uncle, M. Livius Drusus, and, even in his boyhood, gave proofs of his decision and strength of character. In the year 72 B.C. he served with distinction in the campaign against Spartacus, but without finding satisfaction in military life, though he proved himself a good soldier. From Macedonia, where he was military tribune in 67, he went to Pergamus in search of the Stoic philosopher, Athenodorus. He brought him back to his camp, and induced him to proceed with him to Rome, where he spent the time partly in philosophical studies, and partly in forensic discussions. Desirous of honestly qualifying himself for the quaestorship, he commenced to study all the financial questions connected with it. Immediately after his election he introduced, in spite of violent opposition from those interested, a rigorous reform into the treasury offices. He quitted the quaestorship at the appointed time amid general applause. In 63 B.C. he was elected tribune, and also delivered his famous speech on the conspiracy of Catiline, in which he denounced Cæsar as an accomplice of that political desperado, and determined the sentence of the senate. Strongly dreading the influence of unbridled greatness, and not discerning that an imperial genius—like that of Cæsar—was the only thing that could remedy the evils of that overgrown monster, the Roman Republic, he commenced a career of what now appears to us blind pragmatical opposition to the three most powerful men in Rome—Crassus, Pompey, and Cæsar. Cato was a noble but strait-laced theorist, who lacked the intuition into circumstances which belongs to men like Cæsar and Cromwell. His first opposition to Pompey was successful; but his opposition to Cæsar's consulate for the year 59 not only failed, but even served to hasten the formation of the first triumvirate between Cæsar, Pompey, and Crassus. He was afterwards forced to side with Pompey, who had withdrawn from his connection with Cæsar, and become reconciled to the aristocracy. After the battle of Pharsalia (48), Cato intended to join Pompey, but hearing the news of his death, escaped into Africa, where he was elected commander by the partisans of Pompey, but resigned the post in favour of Metellus Scipio, and undertook the defence of Utica. Here, when he had tidings of Cæsar's decisive victory over Scipio at Thapsus (46), Cato, finding that his troops were wholly intimidated, advised the Roman senators and knights to escape from Utica, and make terms with the victor, but prohibited all intercessions on his own behalf. He resolved to die rather than surrender, and, after spending the night in reading Plato's *Phædo*, committed suicide by stabbing himself in the breast,

His example was more fruitful in results than the achievements of his life, for he became the typical example of the stoic that kindled to imitation the imaginations of the noblest Romans for two centuries under the empire.

**Cat-o'-nine-tails.** See FLOGGING.

**Catoptrics** is that division of geometrical optics which treats of the phenomena of light incident upon the surfaces of bodies, and reflected therefrom. See OPTICS.

**Cato Street Conspiracy**, a plot formed in London in 1820 by a handful of crazy ruffians for the murder of Lord Castlereagh and the other ministers of the crown, so called from the place of meeting in Cato Street, Edgeware Road. As usual the plot was revealed beforehand to the police by one of the gang, and accordingly the conspirators were seized, after a short scuffle, in a stable in Cato Street. Arthur Thistlewood, the ringleader, and four of his dupes, were hanged, while five more were transported for life.

**Catrail** (also known as the *Picts' Work* or *Picts' Work Ditch*) is the name applied to the remains of a large earthwork, about 50 miles in length, which, beginning at Torwoodlee Hill, near the junction of the Gala Water with the Tweed, runs with a semi-circular sweep southward through the counties of Selkirk and Roxburgh to a point under Peel Fell, in the Cheviots. The earthwork consisted of a deep ditch, with a rampart on each side, and varied in breadth from 20 to 26 feet. The cultivation of land and other causes have resulted in the destruction of the ramparts in many places. The Catrail was first described by Gordon in his *Itinerarium Septentrionale* (1728).

**Cats**, JACOB, a Dutch statesman and poet, was born at Brouwershaven, in Zealand, in 1577, and after studying law at Leyden and Orleans, finally settled at Middelburg. He rose to high offices in the state, and was twice sent as ambassador to England, first in 1627, and again in 1652, while Cromwell was at the head of affairs. From this time till his death, September 1660, he lived in retirement at his villa near The Hague. Here he wrote his autobiography. As a poet, 'Father Cats' enjoyed the highest popularity. His poems are characterised by simplicity, rich fancy, clearness, homely vigour, and purity of style, and by their excellent moral tendency; while throughout are richly scattered those shrewd maxims and worldly-wise axioms which have been so dear to his practical countrymen. The most highly prized of his productions were the *Houwelyc*, and the *Trouwring* (a series of romantic stories of remarkable marriages), and the *Spiegel van den Ouden en Nieuwen Tyd*. His works, first collected in 1658, have been often reprinted. There are Lives by Derudder (in French, 1898), Kalf (in Dutch, 1902).

**Cat's Cradle**, a pastime widely distributed among children and primitive peoples. A looped string, passed from player to player, is transformed from one symmetrical figure to another. Ethnologists have found in these figures both matter for study and a means of getting into touch with uncivilised strangers. See Haddon, *Study of Man*; Rouse Ball, *Introduction to String Figures* (1920).

**Cat's-eye**, a beautiful variety of chalcedonic quartz receiving its name from the resemblance which the reflection of light from it, especially when cut *en cabochon*, or in a convex form, is supposed to exhibit to the light that seems to emanate from the interior of the eye of a cat. It has a sort of pearly appearance, and is *chatoyant*, or characterised by a fine play of light, which is supposed to result from the parallel arrangement of fine fibres of some foreign substance, such as ami-

anthus, or of minute hollow tubules similarly arranged. It is of various colours, and is obtained chiefly from India and Ceylon. Chatoyant chrysoberyl is often termed cat's-eye; and occasionally the same name is given to opalescent feldspar.

**Catskill**, a village of New York, U.S., on the Hudson, 34 miles SSE. of Albany by rail; pop. 5000.

**Catskill Mountains**, a group of mountains in the state of New York, U.S., west of the Hudson River, and south of the Mohawk. They belong to the Appalachian system, and are continuous northward with the Helderbergs, southward with the Shawangunks, south-westward with the Delaware Mountains, and westward with a high plateau which occupies much of the region of the southern half of Western New York, and a part of the northern counties of Pennsylvania. The Catskills proper cover about 5000 sq. m., chiefly in Greene County, N.Y. Some peaks reach nearly 4000 feet in height. The mountains generally have steep and often precipitous ascents, and their summits are broad and rocky. The deep valleys or 'cloves' of this region, with almost perpendicular walls, form a remarkable scenic feature. What is known as 'the Catskill red sandstone' is regarded by most geologists as the very latest formed of the Devonian strata of North America. The mountains are well wooded, and afford many summer-resorts for the people of the larger cities.

**Cat's-tail.** See BULRUSH; TIMOTHY GRASS.

**Cattaro** (Serb. *Kotor*), a strongly fortified port of Yugoslavia, in Dalmatia, lies at the head of the Gulf of Cattaro, 40 miles SE. of Ragusa, under the steep Montenegrin hills. Cattaro has a cathedral, and a population of 6000, chiefly engaged in the Montenegrin trade. At one time the capital of a small republic, the town in 1420 joined the republic of Venice, and after varied fortunes was handed over to Austria in 1814 by the treaty of Vienna, and became Yugoslav with the rest of Dalmatia.—The Gulf of Cattaro (Bocche di Cattaro, Boku Kotorska), an inlet of the Adriatic, consists of three basins or lakes, connected by straits of about half a mile in breadth. Its length is 19 miles, and its depth from 15 to 20 fathoms. It was used as a naval base against Montenegro in the Great War.

**Cattogat**, or KATTEGAT, the bay or arm of the sea between the east coast of Jutland and the west coast of Sweden, to the north of the Danish islands. It is connected with the Baltic Sea by the Great and Little Belt (q.v.), and by the Sound; and the Skager-Rak (q.v.) connects it with the North Sea. The length of the Cattogat is about 150 miles, and its greatest breadth 85 miles. Its greatest depth is 36 fathoms, but it has numerous sand-banks; and navigation is rendered more dangerous by its strong currents and violent storms. The Danish shores are low, with stretches of sand or reefs, but the Swedish shore is very steep and rocky.

**Cattermole**, GEORGE, water-colour painter and book-illustrator, was born at Dickleborough, Norfolk, 8th August 1800. He began life as a topographical draftsman. At the age of sixteen he was engaged upon Britton's *English Cathedrals*, and in 1830 he visited Scotland to obtain materials for his fine series of illustrations to the Waverley Novels. He was soon known as a brilliant designer, and was largely employed by the publishers, contributing to the annuals, his best work of this class being the illustrations to his brother, the Rev. C. Cattermole's *Historical Annual*, dealing with the period of the Civil War. In 1822 he was elected an associate exhibitor, and in 1833 a member, of the Water-colour Society, to whose exhibitions he contributed 'Sir Walter Raleigh witnessing the Execution of the Earl of Essex' (1839), 'Old English

Hospitality' (1839), 'The Castle Chapel' (1840), 'The Assassination of the Regent Murray' (1843), 'Cellini defending the Castle of St Angelo' (1845), and others of his best water-colours, examples of which may be studied in the South Kensington Museum. He retired from the society in 1850, and turned his attention to oil-painting, exhibiting 'A Terrible Secret,' a work in this medium, in the Royal Academy of 1863. He died at Clapham Common, 24th July 1868. As an artist he was distinguished by great versatility, and by considerable power of grouping and composition. He was learned in costume, and his works show much dramatic feeling. He gained a first-class gold medal at the Paris Exposition of 1855, and was a member of the Royal Academy at Amsterdam, and of the Belgian Society of Water-colour Painters.

**Catti**, or **CHATTI**, a German people, erroneously included by Cæsar under the name *Suevi* (see *SWABIA*), who inhabited a country nearly corresponding to the present Hesse. They took part in the general rising of the Germans under Arminius; and during the reign of Marcus Aurelius, in the end of the 2d century, they made incursions into Roman Germany and Rhaetia. In the 3d century their name began to give place to that of the Franks (q.v.).

**Cattle.** In Great Britain and Ireland there are thirteen important native breeds of cattle. England claims seven of these—namely, the Shorthorn, Hereford, Devon, South Devon, Red Poll, Sussex, and Longhorn breeds. In Wales the local varieties have now been united into one breed, the Welsh Black. Four distinct breeds have arisen in Scotland, these being the Polled Aberdeen-Angus, Galloway, Ayrshire, and West Highland breeds. The remaining one is the native breed of Ireland, the hardy little Kerry, regarded as one of the purest and truest existing representatives of the ancient *Bos longifrons*. The Dexter Kerry is a variety of the breed. In addition to these thirteen native races, other two very useful breeds, the Jersey and Guernsey, have become domiciled in the British Isles, and the British Friesian, descended from the well-known Dutch breed, is now numerously represented and rapidly increasing. These various races, with an almost endless variety of crosses between two or more of them, make up the entire cattle stock of the United Kingdom, which numbered 12,025,000 in 1922.

The *Shorthorn* is by far the most numerous and most widely diffused. It has not inaptly been titled the 'Cosmopolitan Shorthorn.' It has found a home in almost every county in the United Kingdom. The county of Durham is generally regarded as the 'cradle' of shorthorns; indeed, they have often been spoken of both at home and abroad as the 'Durham breed.' But the valuable race of native cattle from which the improved shorthorn

The brothers Charles and Robert Colling were the first to begin the systematic improvement of the breed. In those days the 'rank and file' of shorthorn cattle were large, high-standing cattle, good milkers, but rough in form and slow in fattening. The Collings would seem to have at once directed themselves to the improvement of the native cattle where they were most defective, and they were successful in establishing a stock of cattle of a decidedly more profitable character—wider in the rib, more symmetrical in the frame, shorter in the leg, slightly smaller in size, heavier in flesh, and more speedy in maturing and fattening. It has been said, but not established beyond contention, that in effecting this improvement the Collings made use of an infusion of blood from some of the other smaller breeds. It is more likely that they relied upon 'selection' in breeding—the mating of animals of the shorthorn breed which most nearly approached to their ideal character, and fixing the type by pursuing what is designated as 'in-and-in' breeding—i.e. mating animals which are closely related to each other, a system that is known to assist greatly in stamping or fixing peculiar features and characteristics upon races of stock. The success of the Collings was speedy and complete, for the fame of their cattle spread so rapidly that even earlier than 1810, the year of the 'first great public sale of shorthorns,' they had sold cows and bulls at £100 each, and had hired bulls for use to other breeders at premiums of from £50 to £100 a year. At Charles Colling's historical sale at Ketton in 1810, 29 cows and heifers realised an average of £140, 4s. 7d.; and 18 bulls £169, 8s. each. Eight years later, at Robert Colling's sale at Barmpton, in a time of great depression, an average of £128, 9s. 10d. was obtained for 61 animals. The sensational event of the memorable sale at Ketton was the purchase of the celebrated bull 'Comet' at the fabulous price of 1000 guineas.

The importance and interest attaching to the operations of these two great pioneer breeders will at once be understood when it is mentioned that there is not at the present day a well-bred living shorthorn in whose pedigree Colling blood does not figure prominently. Colling's successors were, on the one hand, Thomas Bates; on the other, the Booth family, whose representatives then were Thomas and John Booth. At the Ketton sale (1810) Thomas Bates purchased the two-year-old heifer 'Young Duchess' for 183 guineas. Thomas Booth bought the bull-calf 'Albion' for 60 guineas; and at the Barmpton sale (1818) his brother, John Booth, secured the yearling bull 'Pilot' for 270 guineas. With these purchases the shorthorn breed drifted into two great channels, which by degrees absorbed the main current of the race, so that for many years the terms 'Booth' and 'Bates' shorthorns were as applicable in relation to the bovine world as Whig and Tory to the political. These two strains of Bates and Booth, as has been seen, had one common origin in Colling's blood, but in course of time they developed distinctive shapes and characteristics which in the purer representatives are still well maintained. Mr Robert Bruce, than whom there was no higher authority, thus described the characteristics of 'Booth' and 'Bates,' speaking in the first place of 'Bates' cattle: 'They are higher standing, better milking, and perhaps gayer looking cattle than the Booths. They have as a rule more upright shoulders, flatter fore ribs, opener sides, with long hindquarters less fully packed with flesh than the rival strain. As a rule their heads are clean cut and pretty wide, while the bulls have long arched muscular necks and keen tempers. The prevailing colours in this strain of blood are, generally

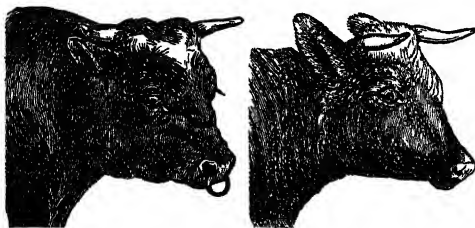


Fig. 1.—Shorthorn Bull and Cow.

was raised abounded freely in adjoining counties as far back as reliable history enables us to trace their career. Early in the 19th century they were also known as 'Teeswater' cattle, the first famous shorthorns having come from the valley of the Tees.

speaking, deeper than in the other, being reds and rich roans. The Booth cattle are wider, deeper, and perhaps less pretty. Their shoulders are more laid back, their foreribs and flanks deeper and better filled. They are more a beef than a milk breed, with well-packed quarters and thick loins. The sires remind one more of a fat Smithfield ox, and they move without that courage and dash so peculiar to the "Duke's" and other highly valued strains of the Bates tribes. Since about 1890 another type of shorthorn, evolved mainly by Ainos Cruickshank in Aberdeenshire, has come into favour, and has ousted the Booth and Bates types. The Cruickshank or Scotch type is an almost purely beef strain, massively built, thick-fleshed, and robust. More recently still, during the present century, many herds of dairy or dual purpose shorthorns have been built up.

In precocity, production of meat, and general utility, the shorthorn is unsurpassed. Other varieties may excel it in special points for peculiar purposes or in certain limited districts, but for a combination of all the more useful properties of domestic cattle and adaptability to varying conditions of soil and climate, there is no equal to the shorthorn. The facility with which the shorthorn adapts itself to changes of soil, climate, and treatment is quite remarkable, and this combined with the valuable property which it also possesses in an unequalled degree—suitability for crossing with and improving other and inferior classes of cattle—has spread the improved shorthorn far and wide, not only in its own native land, but in countries beyond the seas. In North and South America, the continent of Europe, Australia, New Zealand, and other parts, the shorthorn has been extensively introduced. In all these countries, as at home, it has been one of the most active and effective agents in improving the native races of cattle and in increasing the production of high-class beef. Many breeders of shorthorn cattle have cultivated the fattening to the detriment of the milking properties. Still, while it is quite common to meet with a very light milker amongst shorthorn cows, there is a large section of the breed which possesses dairying properties of the highest order. Good shorthorn cows give from 700 to 1000 gallons of milk in twelve months. At the London Christmas Fat Stock Show in December 1916 the classes for steers and heifers over two and not exceeding three years old, averaging two years and ten months, weighed 1639 lb. Steers under two years old, and averaging a little over twenty-two months, show a mean live-weight of over 1400 lb.

Hereford cattle display strongly fixed and peculiarly distinctive characteristics both in outward features and general attributes. The improved breed traces directly from the stock of cattle which were found by the earliest writers on agricultural topics existing in the county of Hereford and adjoining districts—the same aboriginal variety from which have descended the Devon and Sussex breeds. The improvement of the Hereford would seem to have been begun by the Tomkins family far back in the 18th century, and was taken up in a systematic manner by Benjamin Tomkins about 1766, and carried on by him with much energy and success until his death in 1815. His herd was continued by his daughters till 1819 (one year later than the Barmpton sale of shorthorns), when it was dispersed by public auction. Twenty-eight breeding animals realised an average of £149 per head; four adult bulls having brought as much as £267, 15s. each; and two bull-calves £181, 2s. 6d. each. From that time the fortunes of the breed fell into other hands, and never for a moment have the Hereford stock-owners wavered in their loyalty to their fine old breed of cattle. There is

little doubt that infusions of foreign blood contributed to some extent to the building up of the modern Hereford. In the 17th century cattle had been imported into Hereford from Flanders by Lord Scudamore, and in later times there had been introductions of stock from various parts of England and Wales. The dominant ingredient, however, is the aboriginal race of the county, and selection in breeding and careful management have been the principal agencies by which the breed has been brought to the high standard it has now attained. The modern typical Hereford is red in colour, with white face and white marks in the top



Fig. 2.—Hereford Bull and Cow.

line of the neck, back over the crops, as well as in the chest and bottom line all the way backwards. The 'white face' is indeed the 'tribal badge' of the Hereford, and with their wide and graceful horns they are singularly handsome in outward appearance. Formerly there were gray-faced or spotted Herefords; and even yet there is in existence a strain of Herefords known as 'smoky-faced Montgomeries.' The Herefords are similar in size to the shorthorn; usually broad along the back and heavily fleshed, but occasionally light in the thighs and deficient in internal fat. Their highest property lies in their value as grazing cattle; and this has led to the extensive employment of Hereford bulls in breeding cattle for the rolling prairie-ranches of the western states of America. They are hardy cattle, with a rank coat of hair and thick mellow hide, and they are excellent 'foragers'—all points of special importance in ranch cattle. It is pre-eminently a beef-producing breed; matures early and yields meat of the finest quality. As a rule the cows are deficient as milkers, for this property has never been cultivated as it ought to have been. The average live-weight of Hereford steers and heifers over two and not exceeding three years of age at Smithfield Fat Stock Show in 1916 was 1533 lb. There are a few excellent herds of Herefords in Ireland, and they have been exported in large numbers to foreign countries, notably North and South America, Australia, and New Zealand.

Devon cattle are deep red in colour, and have frequently a white spot on the belly just in front of the udder, with wide round loins, smaller in size than the two breeds just mentioned. It is noted for the almost perfect formation of the shoulder, which is laid into the body with remarkable neatness. The breed has still its headquarters in Devon and Somerset, where it has held undisputed sway for hundreds of years. It won the admiration of Arthur Young, who gives interesting information regarding the breed in his report dated 1776. Here also there was one 'master mind' at work on the improvement of the breed. Mr Quartly of Molland is described by Young as the most celebrated of breeders in North Devon; and the greatest of our early writers on agriculture gives a most minute account of the scheme of breeding which was pursued by Mr Quartly and his brother, 'the clergyman who interests himself much in live-stock.' The ideal animal which the

Quartlys kept before them and bred up to exactly corresponds to the typical Devon of to-day; and there is no doubt that their sound and systematic method of breeding imparted an indelible stamp upon the race through which the blood of their stock has freely permeated. In former times, when cattle were beasts of burden, the Devons were greatly esteemed for their agility and hardiness. Now that the yoke has fallen upon other shoulders, the 'Rubies of the West,' as the plump little Devons have been called by their admirers, are holding a high position as beef-producers. The quality of their meat is excelled by none; and while they are small in size, they give a good return for the food they consume. The dairy properties of the breed are, generally speaking, not of a high order, though many individual herds can show creditable records, and considerable progress in milking qualities has been made in the past few years. The yield of milk is comparatively small, but its quality is exceptionally rich. Some rare specimens of the breed have reached 19 cwt. live-weight at four years old, but the average is much below that. At the London Christmas Fat Stock Show in December 1916 the classes for steers and heifers between two and three years old averaged 1418 lb.

The *South Devon* ranks as a distinct breed, being larger than the Devon, lighter and somewhat browner in colour, and less compact in build. It is, moreover, a dual purpose type, giving a considerably larger yield of milk than the Devon, while it is slower in feeding for beef. The South Devon is greatly valued in South Africa on account of its general adaptability whether for beef, milk, or draught. The differences appear to have arisen partly owing to the introduction of Channel Island bulls in the early part of the 19th century, though the evidence on this point is not conclusive.

The *Red Poll* cattle of Norfolk and Suffolk are supposed to bear a close affinity to the polled breeds of Scotland through the circumstance that formerly Scotch cattle were freely transported to be fattened on the Norfolk pastures. Be this as it may, the red polled breed has been sufficiently long associated with Norfolk and Suffolk to enable these counties to claim them as natives. Marshall in his *Political Economy of Norfolk*, published in 1782, tells us that the native cattle of Norfolk were 'a small, hardy thriving race, fattening as freely at three years old as cattle in general do at four or five. They are small boned, short legged, round barrelled, well loined; the favourite colour a blood-red with a white or mottled face.' Arthur Young, writing in 1794, says the Suffolk breed of cattle 'is universally polled, that is, without horns; the size small; few rise when fattened to above 50 stone (14 lb.); the milk veins remarkably large; cows upon good land give a great quantity of rich milk.' These are the progenitors of the modern red polls, and all the good features of the old breed have been retained and developed. The cattle are now relatively larger, still blood-red in colour, but with no white face, good meat-producers, and, taken as a whole, perhaps the best of all the native English breeds from a dairying point of view. Individual shorthorn cows will be found to exceed them in yield of milk, but red-polled cows are distinguished for high average milking properties. The breed has found much favour in the United States of America and elsewhere abroad. Its uniformity of colour, absence of horns, and usefulness both as beef and milk producers have won for it many hearty admirers in America.

*Sussex* cattle are also uniformly red in colour, with strong spreading horns, larger in size than the Devons, heavy meat-producers, but deficient in dairying properties. Marshall is probably right

in stating (1796-98) that the Sussex, Devon, Hereford, North Wales, and Gloucestershire cattle had all sprung from the same aboriginal stock; and that in fact they were 'varieties arising from soils and management of the native breeds of this island.' Formerly Sussex cows were highly esteemed for their milking properties, but in the rage for beef-production these have unfortunately been destroyed. Sussex cattle mature early, grow to great weights, and in late years they have been improving in quality. They have also found supporters in foreign countries, chiefly in the United States of America. The mean weight at Smithfield Show in 1916 of steers and heifers two to three years old was 1603 lb.

The *Loughorn*, which some years ago was threatened with extinction, has now been revived, and is being developed on the lines of a hardy dairy or dual purpose type. They are big, somewhat rough, and ungainly cattle, with long drooping horns which are often so shaped as to make it difficult for the animals to graze short pasture. The cows give a good quantity of very rich milk, and the bullocks grow and fatten to great weights. The breed thrives well in the colder and bleaker districts. Peculiar interest attaches to this breed from the fact that it was upon it that the great improver of farm live-stock, Robert Bakewell (q.v.) of Dishley, tried his earliest experiments. The improvement of live-stock upon scientific principles dates from 1755, when Bakewell began his great work with longhorns. These cattle were at one time widely diffused through England, and also obtained a footing in Ireland, but were many years ago supplanted by shorthorns, Herefords, Devons, or other varieties.

*Welsh* cattle present considerable variety of type and character, yet there is all through a noticeable family likeness, arising of course in their common origin in the aboriginal cattle of the principality. They are black in colour, with long horns, hardy in constitution, good milkers, slow in maturing, but able to subsist and thrive upon scanty fare. In late years they have been considerably improved, especially in their fattening properties. They vary greatly in size, but many of them attain great weights at from three to four years old. The average live-weight of Welsh steers at the London Christmas Fat Stock Show in 1916 was 1420 lb. each at one year and eleven months old.

Amongst the four Scotch breeds of cattle the *Polled Aberdeen-Angus* is well entitled to precedence. Descended directly from the ancient polled cattle of Angus (Forfarshire) and Buchan (in Aberdeenshire)—two varieties of the same type, known in the former as 'Doddies,' and in the latter as 'Humlies'—this valuable beef-producing breed has made great strides in public favour since 1873, when with five plump black polls the late Mr William M'Combie (1805-80) of Tillyfour carried off the champion prize for the best group of 'meat-making' cattle at the Paris Exhibition, where no fewer than sixty different varieties of cattle were represented, including the best of the English breeds. That remarkable triumph has been followed by great achievements at home, the breed having in recent years won about half the championships at Smithfield for live cattle, and the great majority of the carcass championships as well. The improvement of the breed was begun before the advent of the 19th century, and all through its breeders have been careful to preserve and cultivate its exceptionally high properties in the production of meat of the choicest quality. In this lies the chief excellence of the breed, and in these times the characteristic is one of great value. This property in the northern polls, combined with the

sound system of feeding pursued in Scotland, has secured 'prime Scotch' beef the highest favour and longest price in the London market. At one time the cows of this breed gave a bountiful yield of rich milk, but owing to the breeders' attention having so long been mainly directed to the cultivation of the

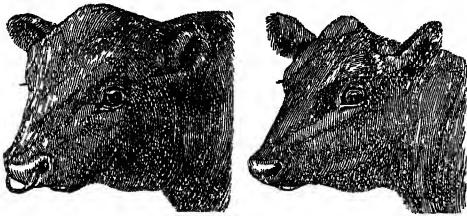


Fig. 3.—Polled Aberdeen-Angus Bull and Cow.

fattening properties, they are now only moderate milkers. In recent years the breed has improved considerably in early maturity, and now it may be said to surpass all other breeds in this important property. At the Smithfield Show the average live-weight of steers at twenty-two months old has been 1361 lb., and at thirty-three months 1774 lb. Black is the prevailing colour, but occasionally a red calf is dropped.

The *Galloway* breed, which takes its name from the south-west of Scotland, where it has existed it is believed for centuries, has an undeniable claim to an ancient lineage. Its origin is lost in the mists of bygone ages, but enough of its history is known to insure for this breed a high position amongst the native races of British cattle. Black and hornless like the polled Aberdeen-Angus breed, *Galloway* cattle differ substantially from the former, not only in outward features, but also in their inherent properties. They are

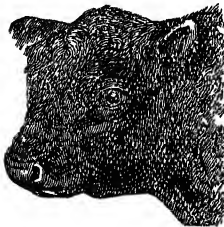


Fig. 4.—Galloway Bull.

similar in size, more shaggy and muscular in appearance, having a thicker hide and ranker coat of hair, but they do not mature so quickly, and are not so well suited for rapid house-feeding as the northern polls. But the *Galloways* are excellent grazing cattle, and for this property they have been highly esteemed for many generations, both in England and Scotland. In recent years they have been exported in large numbers to America, where they have been found admirably adapted for ranching purposes. They are exceedingly robust and hardy, and have surpassed several of the other finer varieties on the ranches of the western states of America, where the cattle have to accomplish a great deal of walking in finding food and water.

From a dairy-farmer's point of view, the *Ayrshire* is the most valuable of all the British breeds of cattle. Its origin is uncertain, but it is considered more than probable that its progenitors were of Dutch extraction. Be this as it may, it was well established as a famous dairy breed in the south-west of Scotland before the close of the 18th century. The prevailing colours are brown and white, but some are almost entirely white, others are almost a whole brown. They are wide, low-set cattle, with fine horns curving upwards. They are second-rate cattle as beef-producers, but as profitable general dairy cattle they are unsurpassed. A fairly good *Ayrshire* cow will give 600

gallons of milk in a year, a very large quantity for her moderate size.

There is no more handsome animal of the bovine species than a genuine representative of the *West Highland* breed. Almost as large in size as the shorthorn, and quite as well proportioned in the frame, the *West Highlander* gains in appearance by his rank shaggy coat of hair, long, spreading, gracefully turned horns, and hardy, muscular, and defiant gait. With the *Wild White* cattle of *Chillingham* and the tiny little *Kerry* of *Ireland*, the *West Highland* is regarded as the finest existing representative of the ancient cattle of *Britain*. The breed presents considerable variety in size and colour. *Dun* or *yellow* of various shades is the prevailing

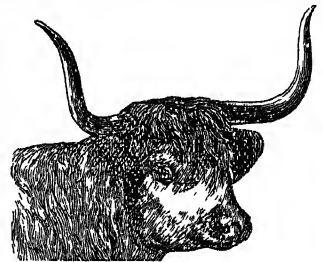


Fig. 5.—West Highland Cow.

colour, but many are black or 'brindled'. They mature slowly, but their beef is much esteemed for its quality and flavour. They are unequalled for hardiness, and can be kept with advantage where no other breed would subsist. The cattle of *Orkney* and *Shetland* differ considerably from the varieties on the mainland, but they are as a rule of an inferior character and small in size.

The *Kerry* is the smallest of all the recognised varieties of British cattle. The breed has its headquarters in the bleak hills and upland pastures of the county from which it takes its name, and having been much neglected by Irish farmers, it forms only a very small proportion of the cattle stock of *Ireland*, which now mainly consists of crosses between the improved shorthorn and 'old Irish cows,' which were of mixed-bred nondescript character. *Kerry* cattle are very hardy, and the attributes of the *Kerry* cow have thus been truthfully described by *Youatt*: 'Truly the poor man's cow, living everywhere, hardy, yielding for her size abundance of milk of good quality, and fattening rapidly when required.' Black is the prevailing colour, and their horns are upturned and often peculiarly 'cocked.' There is a sub-variety called the 'Dexter *Kerry*,' shorter in the leg, thicker in body, and heavier in the flesh than the *Kerry* proper.

The extension of dairy-farming in the United Kingdom, and the somewhat meagre milking properties of the greater proportion of British cattle, have led to the importation of large numbers of *Channel Island* cattle.

These—formerly indiscriminately called *Allderney* cattle—comprise the *Jersey* and *Guernsey* breeds, supposed to be from one common origin, but known to have been bred in purity in the respective islands of these names for upwards of a hundred years. They are both essentially dairy breeds,



Fig. 6.—Jersey Cow.

giving an abundant yield of rich highly coloured milk. The *Jersey* is the smaller of the two, and is docile, delicate, and of graceful deer-like form. In the production of beef it is of little value. The *Guernsey* is not only larger, but also harder and more generally useful. When in full milk, whole

herds of Jersey cows give an average of 9½ lb. of butter each cow per week, an exceptional cow occasionally giving as much as 16 lb of butter in one week. Good Jersey cows yield from 500 to 700 gallons of milk and from 300 to 350 lb. of butter in twelve months. Guernsey cows have exceeded 800 gallons of milk in a year, and the noted cow 'Select,' when six years old, gave 22½ lb. of butter in seven days, this quantity being obtained from 19 quarts of milk per day. In America still higher records have been obtained.

The British Friesian has greatly increased in popularity during recent years, owing to the suitability of the breed for dairies carried on under an intensive system. The milk yielded is of somewhat poor quality, but the quantity is very great. Herds frequently average over 900 gallons annually, and individual records up to 2000, and even over, have been obtained.

It has been stated that the improvement of cattle-breeding on scientific principles was begun by Bakewell in 1755. Almost continuously since then the good work has been prosecuted with energy and success, and for many years the British Isles have been regarded as the origin and headquarters of almost all the most valuable varieties of farm live-stock. For generations foreign countries have freely resorted to these islands for improved live-stock, and this export trade goes on as briskly and as extensively as ever. The United States of America have in particular drawn very largely upon British herds, and a great stimulus to this trade with the United States has been given by the extension of the ranching system. Vast areas of grazing land in the western states and territories have been acquired by syndicates for the breeding and rearing of cattle; and with the view of improving the stock of native cattle, large numbers of well-bred bulls of the leading British varieties, either imported from the United Kingdom or descended from imported stock, have been sent to the West for use on ranches.

The cattle of the United States and Canada present almost endless variety of form and character. This is what might be expected when it is remembered that they are descended from importations of cattle from Spain, Holland, Sweden, Denmark, France, and England, Scotland, and Ireland. About the year 1525, some six years after the discovery of Mexico by the Spaniard Cortes, cattle were introduced into that country from Spain, and in the abundant pasturage of the Mexican territory they increased rapidly, spreading with the enterprising Spanish settlers into Texas, California, and other parts of the Far West. Exactly a hundred years later the Dutch settlers in New York brought cattle thither from Holland, and a few years earlier small importations of cattle had been made from the West India Islands into Virginia. The earliest of these arrivals in Virginia are assigned to 1610 and 1611, but that colony was broken up in 1622 by the Indians, who massacred 347 men, women, and children, and, it is presumed, also destroyed their cattle. In 1624—four years after the landing of the English Plymouth colony there—cattle were introduced into Massachusetts from England, and many other importations followed during the next few years. The Swedes brought cattle into Delaware in 1627, and in 1631 and two following years Danish emigrants introduced cattle from their native country into New Hampshire. English emigrants settled in Maryland in 1633, in North and South Carolina in 1660 and 1670, and in Pennsylvania in 1682, and took with them, or had sent after them, large numbers of English cattle. The French colonists brought cattle into

Quebec as early as 1608; and towards the close of the 17th century fresh importations of European cattle poured into the great American continent. It so happens, however, that while importations of cattle were made from all the countries named, and perhaps from others also, the existing cattle stock of America—leaving out the Mexican, now more commonly called Texan, cattle, which are now almost extinct—are largely of British origin. In the earlier importations, again excluding Mexico, British cattle preponderated; and just as the English language has submerged all others in the gradual development of the American continent, so has British blood become the dominating element in the main bulk of the cattle stock of the country. There is no authentic information as to the character of the cattle first introduced into America, but all the leading breeds of the British Isles, as well as the chief milking breeds of the European continent, are now strongly represented in North America. There, as at home, the English Shorthorn predominates, and there are also strong representations of the Hereford, Polled Aberdeen-Angus, Galloway, Devon, Red Poll, Jersey and Dutch breeds. The cattle of America are being speedily improved, chiefly by the use of well-bred bulls, either imported from the British Isles or bred from imported cattle. The Texan cattle have been so graded up that the pure breed is now nearly extinct.

The cattle of Australia, which were small, slow-growing, and of inferior quality as beef-producers, have also been greatly improved by the introduction of British stock, chiefly of the Shorthorn, Hereford, and Polled Aberdeen-Angus breeds.

In the *management* of cattle there is perhaps even greater variation than in the character of the cattle themselves. A full description of the various methods of management would itself occupy a moderate volume. It must suffice here to mention two or three leading features in cattle economy. In the British Isles the ox is no longer a beast of burden, save in a very few localities. The yoke has fallen upon the horse, except where both have been relieved by the steam-engine and the oil tractor. The two main purposes for which cattle are now reared are the production of milk and butcher-meat. Certain breeds, as already indicated, are peculiarly adapted for milk-production, such as the Jersey and Guernsey and Ayrshire cattle; others, notably the shorthorn and red-poll breeds, are distinguished for the combination of both milking and fattening properties of the highest order; while others again, such as the Polled Aberdeen-Angus, the Hereford and Devon, &c., display remarkable aptitude to fatten, and yield meat of the choicest quality. The farmer of course selects the breed best adapted to the locality in which he lives, and to the purposes he has in view. As a rule cattle of all kinds, whether dairying or fattening, spend the summer on the pasture fields; and it is only in exceptional cases, either where there is a deficiency of grass, or where it is desired to force the growth, fattening, or milking of the animals, that any food beyond what they can pick up for themselves is given to cattle on the fields. Oil-cake, cotton-cake, and bruised grain—partly imported, mostly home grown—are the principal auxiliary foods on pasture. Where a careful system of management prevails, the cattle are put into comfortable houses overnight as soon as the chill autumnal evenings set in; and throughout the winter they are kept almost entirely in the houses, store-cattle getting out now and again about mid-day when the weather is favourable. As winter food, turnips and straw or hay preponderate, but in the improved practice of recent years smaller quantities of roots and more of the concentrated foods, such as cake and grain, are

being given to cattle. Silage is fast becoming an important article of food for cattle. Now cattle are fattened off at from eighteen to thirty months old, instead of from three to five years, as prior to 1850. The essence of the feeder's art is to produce the maximum quantity of first-class meat in the shortest possible time and at the lowest possible cost; and in the struggle after this the maturing and fattening properties of cattle have been greatly accelerated. The young or 'baby-beef,' as it has been called, is more tender and perhaps more palatable than the substantial 'jounds' of the slow-growing five-year-old beeves of a century ago; but it is questionable if it is either so wholesome or so strength-giving. Be that as it may, the popular taste is entirely in favour of the 'baby-beef,' and what the public desire the feeder must endeavour to supply.

Of late there has been considerable growth in dairy-farming throughout the British Isles. But as in 1914 butter to the value of £24,014,000 (not to speak of £3,977,000 worth of imitation butter), and cheese to the value of £7,966,000, were imported, it will be seen that there is room for still further extension. The system of management on dairy-farms varies according to the locality and objects of the farmer. Where the milk can be conveniently disposed of or despatched to towns, attention is given mainly to milk-selling, which is the least troublesome, and perhaps also the most profitable system of dairying. In other cases butter is the staple produce of the dairy; in other parts again, cheese-making is the prevailing feature. The consumption of milk as human food has vastly increased in recent years. The rate of consumption keeps on growing, and ingenious facilities are devised for bringing fresh milk from distant dairies—dairies from 50 to 60 miles distant—into towns every morning. As would be expected, the calves bred on dairy-farms get little of their mothers' milk. They are reared principally on 'milk substitutes,' either prepared at home or by firms who make the production of cattle foods their sole or chief business. Linseed in various forms is very extensively used in calf-rearing.

Cattle are very variously used, and are the only or the chief beasts of draught in many countries, as the Cape and large part of America. In India also horned cattle are the only beasts used for ploughing, and are chiefly valued as draught animals. A famous breed was formed for military purposes; and in the Central Provinces there is a high-class breed of trotting bullocks. The best ghee of India is obtained from the milk not of cows but of buffaloes. In China, no use whatever is made of cow's milk, though human milk is sometimes given to old people as a restorative. Nearer home, in Italy even, milk and butter are but little used, and cows are in request mainly for rearing calves. The large Italian breed can do little more than feed their young; and milch cows, if wanted, are brought from Switzerland. In Italy and some other countries, cattle are all stall-fed, vine, elm, and oak leaves forming an important part of their food.

**Wild Cattle.**—In various parts of the world, species occur of cattle more or less wild, which are certainly different from any of the domesticated European breeds. Such are the Banteng (*Bos banteng*), the Gaur Ox (*B. gaurus*), the Zebu (*B. indicus*). But besides these extra-European wild cattle, there are abundant remains of three virtually extinct European species, from which the domesticated breeds are believed to have gradually originated. These are *B. primigenius*, *B. longifrons*, *B. frontosus*. The first became virtually extinct within historic times, is known as the *Ur* in the Nibelungenlied, was domesticated in

Switzerland in the Neolithic period, was common in Britain and on the Continent in the time of Cæsar, seems to have persisted in Poland till the 17th century, and still survives in a semi-wild stage, 'though much degenerated in size,' in Chillingham Park in the north of Northumberland. In 1692 the herd numbered but twenty-eight; it is now about sixty. The herd at Cadzow, near Hamilton, are believed to be the descendants of a domesticated breed, like the Pembroke breed at Woburn, not really wild animals. A herd at Chartley, in Staffordshire, had dwindled to nine when it was sold in 1904; one at Gisburn, in Yorkshire, became extinct in 1859; others were at Lyme and Somerford, in Cheshire; Veynol or Vaynol, in Carnarvon; and Kilmory, in Argyll. Though the interesting survivals preserved at Chillingham 'are less altered from the true *primigenius* type than any other known breed,' there is some reason to suppose from their white colour and some other features that they are descended from a partially domesticated ancestry. As to other descendants of *B. primigenius*, which have diverged further from the primitive type, it is generally supposed that the Podolian cattle of South Russia, Hungary, &c., the larger breeds in Friesland, Holland, and other parts of the Continent, and the Pembroke breed in England, are to be referred back to the same source.

*B. longifrons* or *brachyceros* was a smaller animal with short body. It was domesticated in Switzerland in the Neolithic period; it was early introduced into Britain (vast quantities of its bones having been found in remains of a lake-dwelling at Croyland); and it has its probable descendants in some of the mountain breeds of Switzerland, the Tyrol, and Bavaria (e.g. the Appenzell cattle), and, according to Owen, in some of the Welsh and Highland cattle.

*B. frontosus* is found along with the latter species, to which it is closely allied. It occurs in the peat-mosses of Scandinavia, and also in Ireland. It is regarded as the probable ancestor of the Norwegian mountain cattle, of the Bern cattle, and, according to Owen and others, of some of the Scotch Highland varieties. In regard to many of these pedigrees, dogmatic statement is quite impossible, and much difference of opinion obtains. The most divergent opinion is that of Wilckens, who maintains that some of the European domestic breeds are descended from the European bison.

Darwin's *Animals and Plants under Domestication*, vol. i., may be conveniently consulted for facts and references. See the articles BOVIDÆ, BREED, BULL-FIGHT, GAUR, MUSK OX, RANCHING, YAK, ZEBU, &c. The diseases of cattle are discussed under their own heads—PLEURO-PNEUMONIA, ANTHRAX, MURRAIN, BOT, BLACK QUARTER, &c.; the law thereof under CONTAGIOUS DISEASES. See also DAIRY, BUTTER, CHEESE, and MILK. On cattle generally, see Youatt's *Complete Grazier* (re-written by Dr Wm. Frearn); Pringle's *Live Stock of the Farm*; Wallace's *Farm Live Stock of Great Britain*; Stephens's *Book of the Farm* (new ed. by Macdonald); and Allen's *American Cattle* (New York). For Wild Cattle, see Ramm, *Die Arten und Rassen des Hausrindes* (Stuttgart, 1901); J. A. Smith, *Ancient Cattle of Scotland* (1873); and Harting, *Extinct British Animals* (1880).

**Cattle-plague.** See RINDERPEST.

**Cattleya**, a genus of orchids, including about twenty species, natives of tropical America from Brazil to Mexico, with large showy flowers. The lip is not united with the column, as in the allied Epidendrum, but encloses it.

**Catto'lica**, a town of Sicily, with sulphur-works, 14 miles NW. of Girgenti; pop. 10,000.

**Cattraeth.** See ANEURIN.

**Catullus**, GAIUS VALERIUS, the greatest lyric poet of ancient Italy, and one of the greatest poets

of all ages, was born at Verona either in 87 or, more probably, in 84 B.C. Few of the incidents in his life are known to us, and the dates assigned to these are in most cases only conjectural. He appears to have belonged to the equestrian order, and his years were spent mainly at Rome, where he settled about 62 B.C., and at his villas, to which he was fond of retiring, at Tibur and Sirmio. He began to write verses when a boy of sixteen or seventeen. 'When my primrose youth was in its pleasant spring,' he says, 'I played enough at rhyming.' In Rome he mingled with the best society, becoming intimate with the two Ciceros, the Metelli, Hortensius, and probably with Lucretius. And in Rome he met the lady whom, under the name of Lesbia, he has sung in verses which stand at the head of the lyric poetry of passion. It is almost certain that the Lesbia of Catullus was none other than Clodia, the sister of Cicero's enemy, Publius Clodius Pulcher. One of the most beautiful and accomplished women of her time, she inspired Catullus with a passionate love of which the changing phases are mirrored in a wonderful cycle of poems. There is first a time of rapturous joy; then come doubts, quarrels, and reconciliations, and in the end betrayal and despair. The final rupture seems to have happened in 57 B.C., and in that year Catullus accompanied the prætor Gaius Memmius to his province of Bithynia. He returned to Rome disappointed in his hopes of enriching himself, and entered impetuously into the contest which was then being waged between the senatorian and the democratic parties. Like Cicero and most of the men of letters of his day, he espoused the cause of the senate. A fiery, unscrupulous partisan, he assailed his enemies with equal scurrility and wit, and directed one of his coarsest lampoons at the head of Julius Cæsar. His closing years were darkened by the loss of a favourite brother, on whose tomb in the Troad, which he visited when returning from Bithynia, he wrote one of the most exquisite of all poems that breathe regret for the dead. He was himself cut off in early life, for, though the exact date of his death can only be conjectured, in all probability he did not survive the year 54 B.C.

The extant works of Catullus comprise 116 pieces, many of which are extremely brief, while the longest of them contains only some 400 lines. There is considerable variety, however, in this somewhat slender body of poetry. There are graceful, playful verses of society, and there are verses, struck out in the heat of party warfare, in which satiric wit sparkles through fescennine raillery. There are elaborate descriptive and mythological pieces, such as the *Coma Berenices* and the stately and richly-coloured *Peleus and Thetis*, which appear to have been translated or adapted from the Greek. There is the *Attis*, a strange poem, unlike any other work of a Latin writer in its wild imaginative power and in the magnificent sound and sweep of its galliambic verse. And there is the crowning series of love-poems, in which the incarnation of burning passion in exquisite language, the mastery of verbal music, are carried to what is seemingly the highest attainable point of perfection. In these 'Lesbia poems' there is no sign of the laborious art which produced the mosaic-work of the Horatian odes. They seem to have flowed forth—thought, feeling, phrase, and cadence combined in a perfect whole—at a single creative impulse. Their author's mastery of the Latin tongue was unerring and unbounded. In his works it seems endowed with the elastic and radiant strength of the Greek. He revealed all it had of energy, sonority, and sweetness, of monumental dignity and laughing grace.

He moulded it into lines which neither Lucretius nor Virgil has surpassed for majesty of rhythm; he wove it into lyrics which for lightness of movement and caressing sweetness of cadence are unmatched in all the fields of Latin verse. For breadth of vision, fertility of thought, insight into human character, we must turn to other writers than Catullus. For fire and music and unlaboured felicity of phrase he has no superior among the lyric poets of all time.

The text of the works of Catullus, after having been lost for more than three hundred years, was discovered in the 14th century at Verona. The manuscript was again lost, and for long only one copy, preserved at St Germain, and now in Paris, was believed to exist. A manuscript in the Bodleian Library, however, was discovered by Dr Bahrens to be a sister copy of the St Germain manuscript; and a third has since come to light.

**Catydid.** See KATYDID.

**Caub.** a town in the Prussian province of Hesse-Nassau, on the right bank of the Rhine, 30 miles WNW. of Wiesbaden by rail. Here Blücher crossed the Rhine with his army, 1st January 1814; and here, too, till 1866, toll was levied by the Duke of Nassau—the only ruler who kept up this feudal privilege—from vessels navigating the Rhine. Caub has underground slate-quarries; and opposite, on an island in the river, where Louis le Débonnaire died in 840, is a castle called the Pfalz, built in 1326, which is said to have been resorted to for safety by the Countesses Palatine during childbed. In 1876 and 1879 Caub was the scene of two serious landships.

**Cauca,** a river of Colombia, in South America, which, after a northerly course of 600 miles, falls into the Magdalena. Its valley is one of the richest and most populous districts of the continent, and is rich in minerals.

**Caucalis,** a genus of plants of the order Umbellifera, related to carrot, coriander, and cumin; natives of the northern hemisphere and South Africa. Of about a score of species five are British, including the very common roadside weed, upright hedge-parsley (*C.*, or *Torilis*, *Anthriscus*).

**Caucasus** and the **Caucasians.** The great mountain-range of the Caucasus forms the backbone of a well-marked geographical region, nearly coincident, before the Revolution, with the Russian governor-generalship or lieutenantancy of Caucasia. The northern limit is the great Manitch depression, extending from the Sea of Azov to the Caspian, and including the basins of the Kuban and Terek rivers. The southern natural limit is along the basins of the Rion and Kur rivers. The Russian province comprised all the Russian territory to the old Turkish and Persian frontiers, including also part of the Armenian highlands and the mountain masses adjoining them, now known by the infelicitous name of Little Caucasus, south of the Rion and Kur rivers. Little or Anti-Caucasus is connected with Caucasus proper by the narrow Mesk ridge crossing the Rion-Kur Valley between the headwaters of those streams. The Sea of Azov and the Caspian seem at one time to have been connected by the Manitch depression; south of which extend vast steppes of flat treeless land—fertile, but with little or no water. South of the steppe to the northern spurs of the mountains is luxuriant park land covered with magnificent grasses, and also quite level. Beyond this rise the mountains in successive terraces. On the south side, towards the Rion and Kur, the mountain face is much steeper and more sudden.

The Caucasus occupies the isthmus between the Black Sea and the Caspian, its general direction being from west-north-west to east-south-east.

From the peninsula of Taman on the Black Sea. to the peninsula of Apsheron on the Caspian, it has a length of about 750 miles. The breadth, including the secondary ranges and spurs, is about 150 miles, but that of the higher Caucasus does not exceed 70 miles. This range is sometimes treated as part of the boundary line between Europe and Asia, but the region is really Asiatic in character (see ASIA). The higher and central part of the range is formed of parallel chains, not separated by deep and wide valleys, but remarkably connected by elevated plateaus, which are traversed by narrow fissures of extreme depth. The highest peaks are in the most central ridge or chain, at least six of them well over 16,000 feet, much exceeding the highest Alps. Mount Elbrus, or Elburz, reaches a height of about 18,500 feet above the sea; Kazbek reaches 16,500 feet or so; and between these come Koshtan-tau and Dikh-tau. Here the line of perpetual snow is between 10,000 and 11,000 feet high; but the whole amount of perpetual snow is not great, nor are the glaciers very large or numerous. For more than 100 miles' length of the main ridge there are no passes lower than 10,000 feet. The central chain, in its highest part at least, is granitic or even pure granite. On either side of the granitic axis are metamorphic rocks, such as mica-schists and talc-schists; and beyond these, clay-slates and schists. The secondary parallel chains on both sides of the central ridge are of limestone. The spurs and outlying mountains or hills are of less extent and importance than those of almost any other mountain-range of similar magnitude, subsiding as they do until they are only about 200 feet high along the shores of the Black Sea. Some parts are entirely destitute of wood, but other parts are very densely wooded, and the secondary ranges near the Black Sea exhibit most magnificent forests of oak, beech, ash, maple, and walnut; grain is cultivated in some parts to a height of 8000 feet, while in the lower valleys rice, tobacco, cotton, indigo, &c. are produced. As might be expected from the geographical situation of the Caucasus, the climate, though it is generally healthy, is very different on the northern and southern sides, the vine growing wild in great abundance on the south, which is not the case on the north. The south declivity of the mountains towards Georgia presents much exceedingly beautiful and romantic scenery.

There are no active volcanoes in Mount Caucasus, but every evidence of volcanic action. Elburz and Kazbek are both of volcanic origin. There are hot springs and mud volcanoes at each end of the range, and there are also famous petroleum wells in the peninsula of Apsheron (see BAKU). Mineral springs also occur in many places, notably at Vladikavkaz. The European bison is found in the mountains; bears, wolves, and jackals are among the carnivorous animals. Lead, iron, sulphur, coal, manganese, and copper are found.

The waters of the Caucasus flow into four principal rivers—the Kuban and the Rion or Faz (the *Phasis* of the ancients), which flow into the Black Sea; and the Terek and the Kur, which flow into the Caspian. Kuban and Terek are north, Rion and Kur or Kura south, of the mountains. The Russians with great labour carried a military road through a valley somewhat wider than most of the Caucasian valleys. This is the tremendous fissure or ravine of the Dariel gorge about halfway from the Black Sea to the Caspian. The road passes over a height of about 8000 feet, and is protected by many forts. The only other road is by the Pass of Derbent, near the Caspian Sea. There is a railway from Baku by Tiflis to Poti and Batumi, and a line by Derbent connects Batumi with Vladikavkaz and the north.

CAUCASIAN was the name adopted by Blumen-

bach (q.v.) for one of his main ethnological divisions of mankind; and as the Georgian skull he had was the finest in his collection, the Caucasian was taken as the finest type of the Indo-European stock. Subsequent ethnologists have, mainly on philological grounds, broken up the Caucasian variety of Blumenbach into two well-marked philological groups, the Aryans (q.v.) and the Semites (q.v.). The name Caucasian was clearly a misnomer when it suggested affinity in blood or in language between the very various races of the Caucasus, classified below, and Aryans or Semites; and Prichard and others proposed actually to connect most of the Caucasus peoples with the Mongolian races of Asia. Later anthropologists, finding the word convenient, use Caucasian or Caucasian for the Fair type of man as opposed to the Mongolic or Yellow type. But some distinctly repudiate any suggestion of community of race or of language between the peoples so named; and desire to indicate a physical fact and an anthropological type. See ETHNOLOGY; also PHILOLOGY.

The Caucasus has been called the Mountain of Languages from the multiplicity of tongues spoken in this narrow area—tongues many of them totally distinct from one another, and, with one exception, apparently unconnected with the languages of any other part of the globe, or race of men; though both Aryan and Turkoman affinities have been alleged for Georgian, and Sayce has suggested that the ancient Hittites (q.v.), whose empire in Asia Minor rivalled that of the Assyrians, were of the same stock. There are certain well-marked groups amongst them, within which manifest affinity prevails. (1) The Southern division or Kartveli stock comprises the Georgians or Grusians, mainly in the upper and middle basin of the Kur; the Imeritians, west of the watershed between the Kur and Rion; the Mingrelians, farther west reaching to the Black Sea; the Gurians, south of the Rion; the Laz, on the old Turkish frontiers; and the Svans or Suanetians, between the Mingrelians and the higher Caucasus. (2) The Western division contains the Tcherkess or Circassian race, formerly on the left bank of the Kuban, north of Caucasus; the Abkhassians in the narrow strip of land between the Caucasus and the Black Sea on the south; and the Kabards, north and east of Elburz. (3) The Eastern division contains the Chechen or Tchetchens on the northern slopes of the Eastern Caucasus down to the Terek; and the Lesghians farther east and south. It is doubtful whether the numerous small tribes called Lesghians have any affinity with the Tchetchens, or how far they are related to one another; only one, the Avars, have a written language, and they use Arabic characters. (4) The Ossetes or Ossetians in the centre of Caucasus, on both slopes about Kazbek, are unquestionably a race of the Aryan stock, and the language has affinity with the Persian branch; they call themselves Irun (probably meaning *Aryan*). The Kartveli group may contain 850,000 persons; the Western group, 130,000; the Eastern, 520,000; the Ossetian, 120,000. All the Caucasian languages are extremely harsh. Some of them are partially inflectional; all save the Ossetian are substantially agglutinative.

In various portions of this territory there are of course other intrusive elements of population of foreign race: Russian Slavs; Tatars; numerous Armenians; Kurds; Greeks; Tats and other Iranians or Tajiks; and a German colony from Württemberg, east of Tiflis. Not merely do the inhabitants of the Caucasus differ widely in race, but they represent great variety of stages of culture, from the indolent, music-loving Georgians to the

wild and semi-barbarous Suanetians. Christianity is the faith of some races, as the Georgians and Ossetes; Mohammedanism of a fanatical type that of others, as the Lesghians; while primitive pagan superstitions seem largely to underlie both religious professions. One Kartvelian tribe, the Khevsurs, has in some measure combined Christianity with Moslem usages.

The resistance which the Caucasian peoples for more than half a century offered to the arms of Russia attracted to them the attention of the world. But with the capture in 1859 of Shamyl, the prophet chief of the Lesghians, who for more than twenty years withstood the armies sent against him, the power of the Caucasians was shattered; by 1870 it was completely broken. The bulk of the Circassians migrated to Turkish territories in Asia or Europe; most of the Abkhassians have done the like. The ancient divisions of the country, Georgia, Imeritia, Svanetia, Mingrelia, &c., were based on tribal distinctions. These disappeared from the Russian administrative system, and the main range of Caucasus divided Ciscaucasia (to the north) from Transcaucasia (to the south); the former comprising the governments of Stavropol, Kuban, Terek; the latter, those of Daghestan (really north of Caucasus), Sakatal, Tiflis, Kutais, Sukhum, Black Sea, Elisabethpol, Baku, and Erivan. Add Batum and Kars, and Caucasia has an area of 181,000 sq. m., and a population of perhaps 14,000,000. In 1917-18 Caucasia, with adjacent Turkish territories, broke up into the Armenian, Georgian, Azerbaijan, Kuban, Terek, and North Caucasus republics, and a rapid succession of confederations, wars, and boundary changes followed. The three first named, which had formed the short-lived Transcaucasian republic, became Soviet republics recognised by Moscow as sovereign states in alliance with Russia, Turkish Armenia reverting to Turkey. The Daghestan (cap. Derbent) and Gorsky (cap. Vladikavkaz) republics were set up by Moscow decree in 1921; and Kabardá autonomous province (cap. Naltchik) was soon after detached from the latter. The chief town in Ciscaucasia is Vladikavkaz; in Transcaucasia, Tiflis; the two connected by the great military road through the Caucasus. The old capital of Georgia was Mtskheta, a good specimen of a Georgian word. See ARMENIA, AZERBAIJAN, CIRCASSIANS, GEORGIA, IMERITIA, TRANSCAUCASIA, and, for the wars with Russia, SHAMYL; also Freshfield, *The Exploration of the Caucasus* (1897); Cunningham, *Eastern Caucasus* (1872); Bryce, *Transcaucasia* (1878); Philipps-Wolley, *Savage Svanetia* (1883); L. Villari, *Fire and Sword in the Caucasus* (1906); J. F. Baddeley, *The Russian Conquest of the Caucasus* (1908).

**Cauchy**, AUGUSTIN LOUIS, mathematician, born in Paris, 21st August 1789, published in 1815 a *Mémoire sur la Théorie des Ondes*, which contributed greatly to establish the undulatory theory of light. Between 1820 and 1830 he wrote several important treatises; and at Prague, where he resided as tutor to the Comte de Chambord, he published his *Mémoire sur la Dispersion de la Lumière* (1837). From 1848 to 1852 he was professor of Astronomy at Paris, but refused the oath of allegiance to Napoleon III., and lived in retirement till his death, 23d May 1857. The Academy republished his works (27 vols. 1882 et seq.). See his *Life* by Valson (2 vols. Paris, 1868).

**Caucus**, a private meeting of politicians to agree upon candidates to be proposed for an ensuing election, or to fix the business to be laid before a general meeting of their party. The term originated in America, where the caucus has taken fast root, the 'ticket,' or list of candidates for federal,

state, and municipal offices, being always decided upon by the party leaders; but the system has been introduced into England, though the word is there used rather for the regularly constituted party organisation. The word, which Sydney Smith used in 1818, and John Adams in 1763, is probably derived from an Indian source, Captain John Smith (1609) having *Cawcawwassoughes* for the Indian councillors of Virginia, and *Caucorouse* for an Indian captain.

**Cauda-galli Grit**, the basement subdivision of the Devonian system of North America. The name (lit. 'cock's tail') is derived from the feathery forms of a common fossil, supposed to be a seaweed.

**Caudebec**, two places in the French department of Seine-Inférieure. *Caudebec-lès-Elbeuf*, 12 miles S. by W. of Rouen, has a population of 10,000, and manufactures cloth. *Caudebec-en-Caux*, a pretty antique village, is on the Seine, 31 miles WNW. of Rouen.

**Caudine Forks** (*Furcula Caudine*), two high, narrow, and wooded mountain-gorges near the town of Caudium, in ancient Samnium, on the borders of Campania; noted for the defeat of the Romans in the second Samnite war (321 B.C.). See ROME.

**Caul**, a portion of the Amnion (q.v.) or thin membrane enveloping the foetus, sometimes encompassing the head of a child when born, the subject of an extraordinary superstition from very early ages down to the present day—the belief that children so born would turn out very fortunate, and that the caul brought fortune even to those who purchased it. Midwives sold the caul to advocates to make them eloquent, and to seamen to save them from drowning. It was also supposed that the health of the person born with it could be told by the caul, which if firm betokened health, but if flaccid sickness or death. In the 17th century cauls were often advertised in the newspapers for sale at from £10 to £30. In 1848 the *Times* offered for six guineas a caul which 'was afloat with its late owner thirty years in all the perils of a seaman's life.' In 1913 a Kentish paper (the *Sidrup Times*) offered two at £20 each, one male and one female, which had been in Australia safely six times, and in America thirteen times.

**Caulaincourt**, ARMAND DE, Duke of Vicenza, a statesman of the French empire, born at Caulaincourt (Aisne), in 1772, early distinguished himself as an officer, was made a general of division in 1805, and shortly after created Duke of Vicenza. Faithful to the last to Napoleon, he was made Minister for Foreign Affairs in 1813, and during the Hundred Days resumed the office, receiving a peerage of France, of which he was deprived after the restoration. He died in Paris, February 19, 1827. See his *Souvenirs* (1837-40).

**Cauliflower**, a variety of the common kale or cabbage. It was cultivated by the Greeks and Romans, but was little attended to in England till the end of the 17th century; yet prior to the French Revolution cauliflower formed an article of export from England to Holland, whilst English cauliflower seed is still preferred on the Continent. The deformed inflorescence or heads of the cauliflower only are used. Its cultivation for the supply of Covent Garden and other markets occupies the attention of the market-gardeners of London, Cornwall, Devonshire, and the Channel Islands to a very large extent during winter and spring. It is much more tender than Broccoli (q.v.), and the plants that are reared in August for the purpose of supplying the first crop of the following summer require to be protected under hand-glasses or frames during winter. They require to be freely exposed

to air in mild or comparatively mild weather, but severe frost must be prevented from entering the glasses or frames. From the middle of August to the 24th of that month, make two or three sowings at intervals of three or four days. The plants reared from these sowings are planted out, a certain portion of the strongest under hand-glasses to furnish the earliest crop; and an abundant reserve of the smaller plants are planted a few inches apart in frames, to be planted out finally in the spring in the open ground. To succeed these a sowing may be made in a hotbed in January or February; and again in March and May, plants should be reared for successional crops, these later sowings being made in the open ground. The ground must be rich and cultivation high for first quality; but there is risk in having the ground too rich for the winter crop in case of severe weather; if the plants are too luxuriant, they will the more readily succumb to frost. Two feet apart is the usual distance when the final planting out is done.

**Caulking**, in wood shipbuilding, is the operation of driving oakum or untwisted rope into the seams of the outside planks, or of the deck planking, to render them watertight. The quantity thus driven in depends on the thickness of the planking; it varies from 1 to 13 double threads of oakum, with 1 or 2 single threads of spun yarn. The caulker first *raums* or *reems* the seam—that is, drives a caulking-iron into it, to widen the seam as much as possible, and close any rents or fissures in the wood; he then drives in a little spun yarn or white oakum with a wood mallet and a caulking-chisel, and afterwards a much larger quantity of black or coarse oakum. The fibres are driven in until they form a densely hard mass, which not only keeps out water, but strengthens the planking. The seam is finally coated or *payed* with hot pitch or resin.

In iron or steel shipbuilding and boiler-making the term covers the operation of driving the edge of one thickness of plating firmly against the other thickness upon which it is superimposed, or to which it is adjacent, thus rendering the joints watertight. The tool employed is a specially formed chisel, struck by a hammer.

**Caulonia**, an Achæan colony in Bruttium, on the east coast of Italy, was destroyed by Dionysius in 389 B.C., and never recovered its importance.

**Caulop'teris**, a generic name for the stems of certain extinct tree-ferns, which range from the Devonian to the Permian system. They are hollow, and covered with markings similar to the leaf-scars on recent tree-ferns.

**Caura**, a considerable river of Venezuela, rises among the sierras of the southern frontier, and flows NNW. to the Orinoco. On both sides stretches the former territory of Caura, with immense forests of tonka beans.

**Caus**, CAULX, or CAULS, SALOMON DE, engineer, born at Dieppe in 1576, was a Protestant, and lived much in England and Germany. He was in the service of the Prince of Wales in 1612, and of the Elector Palatine, at Heidelberg, in 1614–20; but by 1623 he returned to France, and became engineer and architect to the king. He died in Paris, 6th June 1626. At Frankfurt in 1615 appeared his *Raisons des Forces Mouvantes*, &c., a work in which is described an apparatus for forcing up water by a steam fountain, differing only in one detail from that of Della Porta (see STEAM-ENGINE). There is no reason to suppose that the apparatus ever was constructed; but on the strength of the description, Arago has claimed for De Caus the invention of the steam-engine. See the article DE CAUS in vol. xiv. of the *Dict. of National Biography* (1888).

**Causality**, or the theory of the relation between cause and effect, is one of the most intricate and important questions of philosophical doctrine. All scientific investigation is occupied with the search for the causes of given events, or for the effects of given causes, and with the generalisation of these into laws of nature. But the nature and ground of the relation between cause and effect are obscure and disputed.

The difficulty of the question is largely increased by the uncertain signification of the word cause. Thus the investigation into the cause of things, with which early Greek speculation was occupied, was really an inquiry for the ultimate constituent or element from which the variety of actual existence had proceeded; and from this inquiry the quest for a principle of change or development was only gradually distinguished. The first important step in the direction of clear discussion was made in Aristotle's doctrine of the 'four causes.' the *material* cause, out of which a thing is framed; the *formal* cause, or the essence or idea of the thing; the *efficient* or active cause, by means of which it took its present form; and the *final* cause or purpose it subserves. These, it is to be observed, are not so much causes in the modern sense of the term, as principles which enter into the existence of everything. In modern science the meaning of the term is much more restricted, corresponding in some degree to what Aristotle called the efficient cause. Thus both Bacon and Descartes wished to banish the notion of final cause from the scientific interpretation of nature; and although, in Bacon's own method, science was treated as an inquiry into the form or true nature of things (corresponding thus to Aristotle's formal cause), this notion has had little influence. What Descartes sought, and what science still seeks, is the connection rather than the essence of things; and its ideal is a mechanical interpretation of nature in terms of matter and motion. In modern science cause may therefore be said to mean the explanation of change. To some extent it corresponds with Aristotle's efficient cause. But the notion of efficient cause has itself undergone a profound modification, which seems to have been carried out alongside of the formulating of the principle of the conservation of energy. The tendency in science has been to replace the notion of power or efficiency by that of order or constant sequence. The genesis and justification of the notion of efficiency are matters of dispute: whether it is an *a priori* intuition, or derived from the consciousness of the voluntary direction of attention, or from the sensations of innervation and muscular resistance. Both Berkeley and Hume directed a vigorous polemic against the doctrine of power expressed by Locke, as going beyond the observed facts of the motion of bodies, and Hume refused to see in mind any more than in matter anything else than a succession of impressions and ideas. Into the rights of this controversy it is impossible to enter here. But clearness of scientific statement has certainly been gained by the extrusion of the notion of power, and substitution for it of that of regula sequence. It is in following out this view of the *physical* as distinct from the *efficient* cause that the term comes to be defined as the aggregate of the conditions or antecedents necessary to the production of the effect: meaning by necessary conditions those conditions without which the effect either would not have existed at all, or would have been different from what it is. In popular language, however, and even in most scientific inquiries, the term cause is restricted to the one or two conditions by the intervention of which amongst other more permanent conditions

the effect is produced. Thus it is noticeable that while the former or more complete definition corresponds with that expressly given in J. S. Mill's *Logic*, his inductive methods are entirely devoted to explaining modes of discovering causes in the narrower or popular signification.

It is in this meaning of the term that science investigates causes. In doing so, it goes on the presupposition that every event or change has a cause. This has been called the Law of Universal Causation, and may be expressed by saying that the explanation of every event is to be found in antecedent conditions. Scientific investigation also presupposes the Law of the Uniformity of Nature, that the same conditions or cause will be followed (at all times and places) by the same effects. The grounds and mutual relation of these two assumptions form the chief subject of controversy in the philosophical theory of causality. It is to Hume that the credit is due of having drawn attention to the difficulties involved in the principle of causation, in such a way as to determine the whole course of subsequent philosophy. All reasoning about matters of fact, he shows—all physical science, therefore—depends on the relation between cause and effect. Yet, between the cause and the effect there is no discoverable connection. 'There appears not, through all nature, any one instance of connection which is conceivable by us. All events seem entirely loose and separate. One event follows another; but we never can observe any tie between them. They seem *conjoined*, but never *connected*.' Hume's own solution of the difficulty is found in the law of mental association. 'The mind,' he says, 'is carried by habit upon the appearance of one event to expect its usual attendant, and to believe that it will exist. This connection, therefore, which we *feel* in the mind, or customary transition of the imagination from one object to its usual attendant, is the sentiment or impression from which we form the idea of power or necessary connection. Nothing further is in the case. . . . When we say, therefore, that one object is connected with another, we mean only that they have acquired a connection in our thoughts, and give rise to this inference by which they became proofs of one another's existence: a conclusion which is somewhat extraordinary, but which seems founded on sufficient evidence.' The conclusion to which Hume is driven is thus that, while all reasoning about matters of fact is founded on the principle of causality, this principle has itself no other basis than the mental tendency to pass from one impression to the idea of another impression previously experienced in conjunction with the former. Hume's solution is thus not sceptical (except as regards the application of causality or any other principle beyond experience), but it is subjective: the connection of things is resolved into a customary succession of ideas. Of the numerous theories of causation put forward since the question was thus opened, the two most important are J. S. Mill's rehabilitation of Hume's doctrine to suit the requirements of scientific investigation, and the opposed doctrine of Kant and his philosophical successors.

It is characteristic of Mill's doctrine that the principle of causality is made a consequence of the Law of the Uniformity of Nature: 'the familiar truth that invariability of succession is found by observation to obtain between every fact in nature and some other fact which has preceded it.' This principle, which is assumed in every scientific induction, is itself held to be the generalisation of a wide and uncontradicted experience.

A different position is given to the causal principle in Kant's philosophy. The Scottish philoso-

phers and others, as well as Kant, had attempted replies to Hume, contending that causality is an intuitive judgment antecedent to experience. But such a reply remains an arbitrary assertion until it is shown how the causal judgment is connected with experience. In Kant's *Critique of Pure Reason* this connection is thoroughly investigated; the refutation of Hume is only part or consequence of a complete inquiry into the relation of reason to experience. It was, however, largely Hume's doctrine of causality that led to Kant's new point of view, and to the doctrine that experience is the product of the understanding, the realisation of its *a priori* forms. It is not the sequence of events in time, Kant holds, that gives rise to the principle of causality; but the pure notion of causality finds its realisation in this time-sequence, in which each event is determined by its antecedent. Kant's doctrine, as thus stated, is in full harmony with the principles and methods of modern science; asserting the principle that every change—i.e. each successive state—of the universe is the result of its preceding state, and at the same time leaving to empirical investigation the connection in experience of any one definite thing with any other.

See Hume's *Treatise of Human Nature*, book i, part iii., and *Essay Of the Idea of Necessary Connection*; the works of Reid, Stewart, Thomas Brown, and Hamilton; Kant's *Critique of Pure Reason*; Kant's critics and commentators, such as Hutcheson, Stirling, Caird, Watson, Ward, Ewing; Mill's *Logic*; and the more modern logical works of Bradley (1922), Bosanquet (1911), Venn (1889); and Hobhouse's *Theory of Knowledge* (1896).

**Cause.** See CASE, CAUSE CÉLÈBRE, TRIALS; also CAUSALITY.

**Cause Célèbre**, a convenient French term for a specially interesting and important legal trial, criminal or civil, such as the Douglas Cause (1769-71), the Dred Scott case in the United States as to the possession of a negro (1856), the Tichborne case (1871-74). There is a great French collection of *Causes Célèbres et intéressantes* (22 vols. 1737-45), by Gayot de Pitaval, with modern continuations. See TRIALS.

**Causerie**, a name applied to a somewhat short and informal essay on any subject in a newspaper or magazine. More familiar in manner and slighter in structure than the formal essay as usually understood, it is an excellent medium for a writer whose personality interests the reader as much as the value of his thoughts. The name owes its literary currency mainly to the famous *Causeries du Lundi* of Sainte-Beuve; hardly less valuable examples were many of Matthew Arnold's occasional essays.

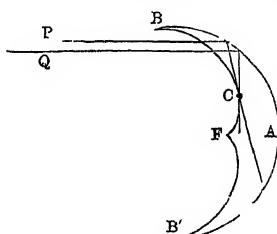
**Causses.** LES. See FRANCE (*The Plateau*), and Baring-Gould's *Deserts of Southern France* (1894).

**Caustic** (Gr., 'burning'), a term for substances that exert a corroding action on the skin and flesh. *Lunar caustic* (so called because silver was called *luna*, 'the moon,' in the alchemists' mystical jargon) is nitrate of silver, and *common caustic* is potash. When used as a caustic in medicine, the substance is fused and cast into moulds, which yield the caustic in small sticks the thickness of an ordinary lead pencil, or rather less.—*Caustic* is also used in chemistry in an adjective sense—thus caustic lime, or pure lime, CaO, as distinguished from mild lime, or the carbonate of lime, CaCO<sub>3</sub>, caustic magnesia, MgO, and mild magnesia, MgCO<sub>3</sub>, caustic potash, caustic soda (for these, see POTASH, SODA, &c.). See CAUTERY.

**Caustics.** When the incident rays are parallel to the principal axis of a reflecting concave mirror, they converge, after reflection, to a single point, called the principal focus. In the case of parabolic mirrors this is rigorously true. For, as is easily seen from the fundamental property of the para-

bola, any ray falling on the mirror parallel to the axis is reflected so as to pass *exactly* through the focus. For other mirrors it is approximately true only when the breadth of the mirror is very small in comparison with its radius of curvature. When the breadth of the mirror is large in comparison with its radius of curvature there is no definite image, even of a luminous point. In such cases the image is spread over what is called a *Caustic*, or sometimes a *Catacaustic*.

An example of the caustic is given in the annexed figure for the simplest case—namely, that of rays falling directly on a concave spherical mirror, BAB', from a point so distant as to be practically parallel.



Two very near rays, P and Q, will after reflection intersect at C. By finding in this way all the points of intersection of the reflected rays, we get a continuous curve, BCFB', which is the section of the caustic surface by a plane passing through its axis.

The curve BCFB' varies of course with the form of the reflecting surface. In the case under consideration it is known as an epicycloid.

The reader may see a catacaustic on the surface of tea in a tea-cup half full by holding the circular rim to the sun's light. The space within the caustic curve is all brighter than that without, as it clearly should be, as all the light reflected affects that space, while no point without the curve is affected by more than the light reflected from half of the surface. The rainbow, it may be mentioned, forms one of the most interesting of the whole family of caustics.

When a caustic is produced by refraction, it is sometimes called a *Diaccaustic*. No such simple example can be given of the diacaustic curve as that above given of the catacaustic. It is only in the simplest cases that the curve takes a recognisable form. In the case of refraction at a plane surface, it can be shown that the diacaustic curve is the evolute either of the hyperbola or ellipse, according as the refractive index of the medium is greater or less than unity.

**Cauterets**, a fashionable French watering-place in the department of Hautes-Pyrénées, lies 3250 feet above sea-level, in the valley of the Lavedan, 5 miles S. of Pierrefitte, the nearest railway station, and 42 SSE. of Pau. The stationary population of the place is only 1000, but it is annually swelled in summer by 15,000 to 20,000 visitors, for whose accommodation numerous sumptuous hotels and bathing-establishments have been built. It is a good centre and guide-station for ascents among the Pyrenees. The sulphurous springs, twenty-five in number, and varying in temperature from 60° to 131° F., are the most abundant in the Pyrenees (330,000 gallons per day), and have been known from Roman times; though their modern reputation dates from the 16th century, when Margaret, sister of Francis I., held her literary court and wrote much of her *Heptameron* at Cauterets.

**Cautery** (Gr. *kaoio*, 'I burn'), in Medicine, is used of any substance which burns the tissues. (The term 'potential cautery,' as applied to caustic substances, is becoming obsolete.) The *actual* cautery is an instrument with a head or blade of steel, iron, or platinum, which is heated in a fire or spirit-lamp. In the *thermo-cautery* (or Paquelin's cautery, from its inventor), the head or blade is

made of hollow platinum, so arranged that a flame of benzole can be kept burning in its interior. The *galvano-cautery* consists essentially of a platinum wire which can be heated to any required degree by passing a strong galvanic current through it. The cautery is used for three main purposes in surgery: to *produce counter-irritation* over an inflamed part (see BLISTER) (actual cautery); to *check bleeding* (actual or thermo-cautery), by slowly destroying the tissues at the bleeding point or surface; to *perform operations*, where the tissues to be divided are either very vascular (thermo-cautery), or very difficult of access (galvano-cautery). See CAUSTIC.

**Caution**, in the Law of Scotland, like Suretyship in England, is an obligation undertaken by a second party, whereby he binds himself, failing the primary obligant, to fulfil an obligation, whether it be of a pecuniary nature or otherwise. Cautionary obligations are thus essentially of an accessory nature, and cannot subsist apart from the principal obligation. The law of this subject has been modified by the Mercantile Law Amendment Act, 1856, which assimilates the laws of England and Scotland, and according to which the creditor may proceed at once against the cautioner, just as if he were a joint obligant, without suing the primary debtor, unless the cautioner has expressly stipulated that this shall be done. The creditor, however, is in every case bound to use proper precaution in retaining and making available securities. He is not, however, bound to make the same full disclosure of material facts as in insurance, and therefore a cautioner should make careful inquiry for himself. Cautionary obligations are generally gratuitous, being, for the most part, undertaken from motives of friendship; but it is by no means uncommon for them to be entered into in consideration of a premium paid by the person guaranteed, or by those interested in his fortunes. Where a premium is paid, the transaction becomes a mere insurance of solvency, honesty, or efficiency; and associations of great public utility (see GUARANTEE ASSOCIATIONS) have been formed, both in England and Scotland, which undertake to guarantee the fidelity of persons employed either in public or private offices of trust. The tendency of the law, both in England and Scotland, for many years past, has been to require greater strictness in the constitution of obligations by sureties and cautioners. In both countries, by statute, all such engagements must be in writing, subscribed by the person undertaking or making them, or by some person duly authorised by him, otherwise they shall have no effect. If a cautionary obligation is dependent on a condition, it will, of course, be ineffectual unless the condition be complied with. The cautioner may, in general, plead every defence which was competent to the principal debtor, and the extinction of the primary obligation extinguishes the secondary one. The cautioner is discharged by any essential change being made on the obligation of the debtor, or in respect of the person relied on, without his assent. By statute, a cautioner to or for a firm is discharged as regards future transactions by a change in the firm. If the creditor gives time—i.e. agrees with the debtor to postpone the period of payment—that will also operate discharge. The discharge of one cautioner, moreover, unless consented to by the rest, is a discharge to all. The cautioner is entitled, on paying the debt, or any portion of the debt, to relief and indemnification against the principal debtor to the full extent to which he has been made answerable for him; and moreover, if the solvency of the principal debtor should seem precarious, he may adopt legal measures for his

relief. Co-cautioners, or persons bound together, whether their obligations be embodied in one or several deeds, are entitled to mutual relief. But where a co-cautioner obtains relief from the others, he must communicate to them the benefit of any deduction or ease which may have been allowed him in paying the debt.

Letters of credit and recommendation raise much the same relation of parties as a formal cautionary obligation, but since 1856 a mere verbal introduction cannot have that effect.

For the forms and effects of ordinary mercantile guarantees, and for the forms of guarantee insurance of fidelity, see **GUARANTY**. For the Scottish cautionary obligation in cash-credit bond, see **BANKING**.

**JUDICIAL CAUTION**, in the Law of Scotland, is of two kinds—for appearance, and for payment. If a creditor makes oath before a magistrate that he believes his debtor to be meditating flight (*in meditatione fugæ*), he may obtain a warrant for his apprehension; and should he succeed in proving the alleged intention to flee, he may compel him to find caution to abide the judgment of a court (*judicio sisti*). The cautioner, or surety, undertakes that the defender shall appear to answer any action that may be brought within six months. But this procedure is now restricted to the small class of cases in which imprisonment for debt is still competent. There is also a form of judicial caution called *judicatum solvi*, now given only in a few cases—e.g. in a general loosing of arrestment in which the surety becomes liable for the whole debt. The commonest form of judicial caution, however, is the security usually given in the Bill Chamber (q.v.) when a bill or bond is brought under suspension; the security is for the principal sum and expenses, if the bill or bond shall be found due. Interdict is also frequently granted upon caution for the damages that may result from the interdict, should it turn out to have been wrongly obtained.

**Cauvery**. See **KAVERI**.

**Cava dei Tirreni**, a town of Italy, in a lovely valley, 5½ miles NW. of Salerno by rail, with a cathedral, and manufactures of silk, woollens, cotton, tobacco, and linen; pop. 10,000. About a mile distant is the Benedictine monastery of the Trinity, celebrated for its archives.

**Cavagnari**, SIR LOUIS, born in France in 1841, was educated at Christ's Hospital, London, and in 1857 was naturalised as a British subject. He had seen twenty-one years' military and political service in India, when on 3d September 1879 he was murdered at Kabul. See **AFGHANISTAN**.

**Cavaignac**, LOUIS EUGENE, born in Paris, 15th October 1802, was a son of General Jean Baptiste Cavaignac (1762–1829), a member of the National Convention. Educated for the military profession, he first served in the Morea, and afterwards in Africa, whither he was sent in 1832 into a kind of honourable exile, in consequence of a too free expression of opinion in favour of republican institutions. Here he won great distinction by his energy, coolness, and intrepidity, was made chef de bataillon in 1837, and rose to the rank of brigade-general in 1844. In 1848 he was appointed governor-general of Algeria, but in view of the impending revolutionary dangers, was called to Paris and assumed the office of Minister of War. He was appointed military dictator in order to suppress the formidable insurrection of June, which he quelled only after a most obstinate contest continued from the 23d to the 26th June. It is estimated that a greater number of Frenchmen fell in the struggle than in the bloodiest battles of the first Empire. Cavaignac's clemency to the vanquished was equal

to his generalship. His task being done, he resigned his power into the hands of the National Assembly, which appointed him President of the Council. As a candidate for the presidency of the republic, when Louis Napoleon was elected, he received nearly a million and a half of votes, out of 7,327,345. On the *coup d'état* of December 1851, Cavaignac was arrested, but released after a short detention; and though he consistently refused to give in his adhesion to the Empire, he was permitted to reside in France without molestation. He died, 28th October 1857, at his country house near Tours. Cavaignac was an able soldier, a zealous republican, and in every way an honourable man. See his *Life* by Deschamps (1870).

**Cavaillon** (anc. *Cabellio*), a town of the French department of Vaucluse, 18 miles SE. of Avignon, with a cathedral, and some Roman remains; pop. 10,000.

**Cavalcanti**, GUIDO, a Florentine poet and intimate friend of Dante, born about 1250, was one of the Guelphs who, to abate the feud of parties, married a Ghibelline wife. When the Guelphs split into two factions, the stronger banished the poet and his family, and he returned in broken health to Florence only to die there, about 1300. His works—sonnets, ballads, and canzoni—are remarkable alike from their language and depth of thought, although his epicurean philosophy gained him, among his contemporaries, the reputation of an atheist. There are translations by D. (i. Rossetti and by Ezra Pound (1912).—Another of the name, BARTOLOMMEO (1503–62), a noble and eloquent Florentine, led a revolt against the Medici, and was afterwards employed by Pope Paul III.

**Cavalcaselle**, GIOVANNI BATTISTA, Italian art writer, born in January 1820, at Legnano, early visited the art centres of Italy, and in 1846 proceeded to Germany, where he met J. A. Crowe (q.v.), with whom he returned to Italy. Banished for his share in the revolution of 1848, he accompanied Crowe to London, and there their first joint work, *Early Flemish Painters* (1857; 3d ed. 1879), was published. Cavalcaselle returned to Italy in 1858, and in 1861 commenced with Crowe the *History of Painting in Italy* (Lond. 5 vols. 1864–71; new and revised edition by Douglas and others, 1903–14). Other joint works are *Titian* (1876) and *Raphael* (1883). Head of the art department at Rome, Cavalcaselle died 2d November 1897.

**Cavalese**, a market-town and summer-resort of Trentino, on the Avisio, 20 miles NE. of Trent.

**Cavalier** (Fr., from Lat. *caballus*, 'a nag'), from 'horseman' acquired the meaning of 'knight' or 'gallant,' in which sense it is used by Shakespeare, like *cavalero*. In 1641 'Cavaliers' was applied as a nickname to Charles's partisans in opposition to the 'Roundheads,' or friends of the Parliament, until, after 1679, it was superseded by 'Tory.' For the 'Cavalier Parliament' (1661–79), see **CHARLES II.**

**Cavalier**, JEAN, a journeyman baker, from Ribaute, near Anduze, who, born in 1681, in 1702 became a famous leader of the Camisards (q.v.), withal a prophet and preacher. He surrendered to Villars in 1704, and entered the service of Savoy; but in 1711 we find him settled with a British pension in England, and he died at Chelsea, governor of Jersey, 17th May 1740. See the *Dict. of National Biography*, vol. ix. (1887).

**Cavaliere Servente**. See **CICISBEO**.

**Cavalieri**, BONAVENTURA FRANCESCO (1598–1647), mathematician and astronomer, was educated at Pisa, and in 1629 became professor at Bologna. His 'method of indivisibles' was a stage in the development of the Calculus (q.v.).

**Cavallieri**, EMILIO DEL (1550?-1599?), musical composer, was born at Rome, but called to the court of the Medici at Florence, where he held a permanent post. He sought to develop figured bass as against contrapuntal music, wrote madrigals, and produced in 1590-95 a series of musical plays which are sometimes accounted the earliest operas, as well as, in *Anima e Corpo* (1600), what may rank as the first oratorio.

**Cavalla**. See KAVALLA.

**Cavalli**, FRANCESCO (1600-76), composer, was the son of a musician in Crema called Bruni, but finding a patron in Cavalli, the *podestà* of Crema, assumed his name. Educated under Monteverde, he became organist of St Mark's in Venice and *maestro di capella*, and as a dramatic composer prepared the way for Scarlatti. He left over forty operas, some of them still admirable, and much fine church music.

**Cavalli**, GIOVANNI (1809-79), artilleryman, was born in Turin, was sent to Sweden to study cannon-founding, and in 1846 began in Italy those experiments in breech-loaders which made such guns practical and formidable weapons.

**Cavallini**, PIETRO (1270-1350), mosaicist and fresco-painter, learnt their art from a family of Greek workers in mosaic, and with them and with Giotto laboured in the adornment of several Roman churches, including San Pietro fuori le Mura, which still displays specimens of his mosaics.

**Cavallo**, TIBERIUS (1749-1809), son of a Neapolitan physician, came to England as a merchant in 1771, but taking up with zeal electrical and chemical research, became F.R.S. in 1779, wrote on the composition and properties of air (inflammable and fixed), treatises on electricity (1786) and magnetism (1787), and *The Elements of Natural and Experimental Philosophy* (4 vols. 1803).

**Cavallotti**, FELICE (1824-98), wrote philippics against German or Austrian rule in Italy, became a Garibaldian soldier, and after the settlement wrote so vehemently against the Piedmontese régime as to be repeatedly imprisoned. He wrote two or three eminently successful plays—*Alcibiade* (1874) the most celebrated—sat as a deputy in the parliament, edited the *Secolo* on stern republican principles, and fell in a duel.

**Cavally**, an American food-fish of the family of which the Scad (q.v.) or Horse-mackerel may be taken as the type. It is found on the Atlantic coasts, attains a weight of 10 lb., and is a voracious fish, taking the hook greedily.

**Cavalry**. Cavalry is a general name for horse-soldiers or troopers trained to act in a body. In the British regular army before the Great War there were 31 regiments of European and 39 of Indian cavalry. In the former slight, in the latter substantial, reductions have been made. The former comprised Guards, Dragoons, Lancers, Hussars, but these names now signify practically no differences. The war-strength of each is 687 in *personnel* and 763 in horses, made up as follows: 1 lieutenant-colonel, 1 major (2d in command), 3 majors or captains commanding squadrons, 3 captains in the 3 squadrons, 12 lieutenants (1 for the section of 12 Hotchkiss guns), and 1 each of adjutant, quartermaster, veterinary officer, doctor, signal officer, 32 non-commissioned officers, 22 artificers (farriers, saddlers, armourers), 6 trumpeters, 580 rank and file. The native Indian cavalry are all *light*, and all armed with rifle and sword, some having lance also. Each regiment consists of 4 squadrons, with 14 British officers, 17 native officers, and 608 rank and file.

In the British army's second line the Territorial Force absorbed the 54 regiments of Horse Yeomanry. Counting in all the dependencies of

the self-governing kind, there were before the Great War some 200 squadrons of horse. After the war the number of these began to be reduced in accordance with the experience gained then. Remount depots are at various places, such as Melton Mowbray and Woolwich; there is one cavalry depot at Canterbury for all categories of cavalry; a cavalry school at Netheravon on Salisbury Plain.

A cavalry regiment (British) has 3 squadrons of 4 troops each. The line on parade is of two ranks, with the troopers almost knee to knee, but the charge, according to the nature of the objective, is often made with considerable intervals between the horses. On a march the pace, including halts, is at the rate of  $3\frac{1}{2}$  miles an hour for the walk, 7 miles for the trot, 5 miles for walk and trot; gallop, a mile in 4 minutes. A very long day's march has been done on occasions, but it is recognised that a cavalry force is easily destroyed by over-fatigue alone.

The proportion of cavalry in armies was very high in the middle ages. Later steady infantry with their pikes, muskets, and bayonets lowered the value of the horse. Frederick the Great raised the arm from the neglect into which it had fallen; under his vigorous insistence on the 'cavalry spirit' and better tactics, the Prussian cavalry became famous for charging home. Some of his hardest battles were won by the cavalry. Napoleon also made great use of cavalry, increasing the French strength of it to a very high figure. He used to say the ratio of cavalry to infantry should be, in hilly or difficult country, as 1 to 4; in easy, open country, as 1 to 2. British armies have always been deficient in horse, but its quality has always been high. Of late years the improvements in all firearms and in rapidly fixed obstacles have raised the question of expecting nothing from the cavalry, as cavalry, in battle, and all are agreed that the horsemen must do most of their work afoot with rifles. Hence all cavalries have become the 'dragoons' of former days, or 'Mounted Infantry.' The Boers were an army of mounted infantry, and thus developed a superior mobility, both strategical and tactical. The Indian army retains the lance. In the Great War cavalry were found indispensable in such campaigns as Palestine; in France and Belgium they only fought as such for a few weeks at the start and the end.

See ARMY, YEOMANRY, VOLUNTEERS AND TERRITORIAL FORCE; Jerram, *Armies of the World* (1900); Wood, *Achievements of Cavalry* (1897); Wagner, *Cavalry Studies from Two Great Wars* (1896); Von Bernhardi, *Cavalry in Future Wars* (trans. Goldmann, 1906); Héthay, *Rôle de la Cavalerie Française à la Marne* (1919); War Office, *Cavalry Training and Field Service Regulations*.

**Cavan**, an inland county in the south of Ulster. It lies in the narrowest part of Ireland, 18 miles from the Atlantic, and 20 from the Irish Sea. Area, 746 sq. m., of which less than a third is under crops. Bogs and hills, with many small lakes, are found in the north-west, where Cullcagh attains a maximum altitude of 2188 feet. The chief rivers are the Erne, the Woodford, and the Annalee. The eastern half of Cavan rests on clay-slate and graywacke; the mountain district in the west is carboniferous formation. Of minerals, Cavan affords coal, iron, lead, and copper, with many mineral springs. The climate is cold and damp; and the soil is poor, wet, and clayey, except along the streams. The chief crops are oats and potatoes, the cultivation of flax having greatly decreased since 1850. The farms are small. Agriculture is the staple industry, but linen is made to a considerable extent. The chief towns are Cavan, Cootehill, and Belturbet. Cavan returns three members to the Free State parliament. Pop. (1851)

174,064; (1881) 129,176; (1911) 91,173, 81·5 per cent. Catholics.—CAVAN, the county town, stands on a branch of the Annalee, 85 miles NW. of Dublin by rail. It has a handsome parish church, a court-house, and a grammar-school (rebuilt 1819); and the beautiful demesne of Lord Farnham lies between Cavan and Lough Oughter, which is about 5 miles west. Pop. 3000.

**Cavatina**, a short form of operatic air, of a smooth and melodious character, differing from the ordinary aria in consisting only of one part, and frequently appearing as part of a grand scena. Examples of cavatina are found in many well-known operas, as *Sonnambula* and *Les Huguenots*. The term is also often used for a complete air or song, such as the 'Salve dimora' in *Faust*.

**Cave**, or CAVERN (Lat. *cavus*, 'hollow'). The natural hollows which occur in and underneath rocks have originated in various ways—some being due to the chemical and mechanical action of water, others to dislocations and disruptions produced by movements of the crust, or by superficial rock-falls and landslips, while yet others are tunnels which now and again occur in or under thick sheets of lava. Caves formed by marine erosion are frequently met with along the coast-line of Britain and other countries, Fingal's Cave at Staffa (q.v.) being a splendid example. They are not confined to any particular kind of rock—although, other things being equal, they are of course more easily formed in readily yielding rocks than in more durable kinds. It is rather the character of their natural division-planes or beds and *joints* than their composition and texture that determines whether the rocks at the base of a sea-cliff shall be hollowed out or not by the action of the waves. If the rocks are thin-bedded and abundantly and regularly jointed, it is obvious that as soon as any portion is undermined by the sea, the overlying masses will immediately yield along their division-planes and topple down. If, on the other hand, the rocks are meagrely and irregularly jointed, and occur in massive beds, then they will not so readily collapse when undermined, and caves will tend to be formed. Caves which have had this origin are not uncommonly met with along the line of old sea-margins in many regions which have been elevated in recent geological times. Most frequently, however, the entrances to such caves are concealed by the rock-rubbish which has been detached from time to time by the action of the weather from the cliffs above. Caves of erosion are also formed by river-action at the base of crags and cliffs in many valleys. And now and again such hollows may be detected at various levels in river-cliffs, as if they had been formed during the gradual excavation of the ravines in which they occur.

In Britain and other countries long occupied by man most of such river-cliff caves or rock-shelters have been artificially deepened and widened, and this to such an extent that it is often hard to say how much of the work can be attributed to nature. By far the most important caves, however, are those which owe their origin to the action of underground water. But before these are described, mention may be made of the hollows which occur now and again in and under lava-flows. Where lava has flowed over and solidified above a mass of snow and ice, the subsequent melting of the latter will leave a hollow behind. Near the Casa Inglese, on the south-east side of the highest cone of Etna, a mass of ice of unknown extent and thickness, covered by lava, was seen by Lyell in 1828 and again in 1853. But this, it must be remembered, is at a height of 10,000 feet above the sea. In lava itself, however, caves of considerable extent occur. Many of

these are simply great blisters or hollows formed by the expansive power of the highly heated vapours contained in the lava at the time of its eruption. Others again may have been caused by the sudden conversion into steam of the water of lakes or streams suddenly overwhelmed by a lava-flow—the steam thus generated might either violently rupture the lava by its explosive force, or produce great tunnels and irregular cavities under the liquid lava, already inclosed in its solid crust, by pressing it upwards. The extensive Fossa della Palomba of Etna is supposed by some to have had such an origin. But probably the greater number of the larger caves under lava have been formed by the escape of the lava itself from its own solidified envelope. When lava pours out from a volcanic orifice it very rapidly coagulates above and below, so that the liquid rock becomes imprisoned in a hardened crust of its own material. The great pressure of the inclosed lava, however, upon the crust at the terminal point of the flow suffices again and again to rupture it, and the lava then flows out freely until it is again imprisoned in the same manner. In the case of very liquid lavas this escape is often completed in a perfect manner—and a long underground tunnel is left behind, from the roof of which depend long stalactites of black glassy lava. Extensive caves formed in this way—some of them measuring over 100 feet in width—occur in the Azores, the Canary Islands, Iceland, and other volcanic regions.

Another class of caves embraces such hollows as have originated during earthquakes or other movements in the crust of the earth. At such times rocks are rent asunder, and when they fall rudely together irregular cavities are left between the disjointed masses, and similar results often take place when great landslips occur. But the most extensive caves and underground galleries have been excavated by the chemical and mechanical action of underground water. Sometimes these hollows continue more or less persistently in one direction, but most usually they wind tortuously about, and often open into similar intricate galleries, which, in like manner, communicate with lateral extensions of the same character. There can be no doubt that caves of this kind are the channels of underground streams and rivers, and that they have been excavated, in the first place, by the chemical action of acidulated water making its way downwards from the surface along the natural division-planes of the rocks, until eventually space has been licked out for the passage of a subterranean stream. The cavities would then tend to be enlarged by the filing action of the sand and gravel which the underground stream and its numerous feeders might sweep along. Many such underground watercourses are well known at the present day, and the direction of some of them can be traced by the swallow-holes, chasms, and 'sinks,' which indicate places where the roofs of the cavities have given way, or have been pierced by the action of acidulated water. In certain regions almost all the drainage is thus conducted underground—rivers after flowing for a considerable distance at the surface suddenly disappear, and follow a hidden course, for it may be many miles, before they emerge again to the light of day. Sometimes, indeed, they never come to the surface again, but enter the sea by subterranean channels. Should anything occur (such as earthquakes, &c.) to interrupt such a system of underground drainage, and the streams and rivers be compelled into new channels, the old subterranean courses will then become galleries more or less dry, which may be accessible by one or even by several openings.

As it cannot be doubted that all such great

underground galleries owe their inception entirely to the chemical action of water seeking its way downwards from the surface, and following the lines of natural division-planes in the rocks, it is obvious that caves will be of most common occurrence in regions where the rocks yield most readily to such chemical action. Among the more soluble rocks are rock-salt and gypsum, but these are only locally developed in such quantities as to give rise on their removal to underground cavities of any extent. Calcareous rocks, more especially limestone, have not only an almost world-wide distribution, but they also occur in greater mass than either gypsum or rock-salt, and hence, although not so readily acted upon by water as the latter two, it is in limestones that nearly all the most renowned caves and subterranean galleries appear.

Many caverns have a calcareous incrustation lining their interior. Sometimes this deposit is pure white; it is, however, more generally coloured by the impurities which the water, percolating downwards from the surface, has taken up from the superincumbent rocks. To the incrustations which are suspended from the roof like icicles, the name *stalactites* is given, while those rising from the floor are called *stalagmites*. The origin of these is as follows: Water which has percolated down from the surface always contains a certain proportion of carbonic acid—it is acidulated water—the acid being derived from the atmosphere and the decaying organic matter of the soil, &c. Water thus charged with carbonic acid has the power of dissolving limestone—i.e. it takes up a certain proportion of carbonate of lime and converts it into the soluble bicarbonate. Arrived at the roof of a cave it oozes out and is there subject to evaporation, the excess of carbonic acid is parted with, and a thin pellicle of carbonate of lime is deposited as an incrustation. When the drops fall to the floor they are subject there in the same way to evaporation, and are thus compelled to give up the remainder of the calcareous matter held in solution. By this constant dropping and falling, icicle-like pendants grow downwards from the roof, while sheets, bosses, and domes gradually accumulate upon the floor—until, not infrequently, these *stalagmites* come at last to unite with the gradually lengthening *stalactites*, and so to form, as it were, pillars which look as if they had been placed to support the roof. See the articles on ADELSBERG, AGTELEK, KENT'S CAVE, MAMMOTH CAVE, JENOLAN, WYANDOTTE, &c.

**BONE-CAVES.**—Caves are of interest to geologists not only because they testify to the potency of the chemical and mechanical action of underground water, but on account of the remarkable evidence they have yielded as to the contemporaneity of man with many extinct and no longer indigenous mammals. This evidence is furnished by the accumulations which so frequently cover the floors of caverns to a greater or less depth. The accumulations in question consist partly of clay, sand, gravel, and shingle, and partly of red earth and sheets of stalagmite. Some of these are doubtless the alluvial detritus carried forward by underground streams. This detritus often consists largely of angular, subangular, and water-worn fragments of limestone, which have doubtless been derived from the roof and walls of the underground galleries, but not infrequently the presence of other kinds of rock-fragments shows that no inconsiderable amount of material has been introduced from the outside by the streams as they plunged into their subterranean courses. Much debris also may have been swept in by heavy rain or flooded torrents washing down through the sinks and swallow-holes that so frequently pierce the roofs of subterranean watercourses. These sinks often become pitfalls to unfortunate cattle in our own day, and in former

times many animals may have been entrapped in the same way—for broken and rubbed bones often occur, sometimes very abundantly, in the old torrential accumulations of deserted subterranean watercourses. When the galleries ceased to be traversed by streams, stalagmitic accretions would then begin to accumulate over the shingle and debris beds. In course of time many of these subterranean hollows, becoming more or less accessible from the outside, were occupied by carnivorous animals, who carried thither their prey, and thus by and by accumulations of bones were formed, which the drip of water from above gradually inclosed in calcareous matter, and eventually covered up under a sheet of stalagmite. Now and again the caves were occupied for shorter or longer periods by man—his presence being still evidenced by his implements and weapons, by charred and split bones, &c., and occasionally by portions of his own skeleton—and these relics, in like manner, subsequently became sealed up in a more or less thick accumulation of stalagmite. Some of these bone-caves contain the record of many physical changes. Thus, we have evidence to show that after having been the haunt of wild beasts or the abode of man for some indefinite but often prolonged period, the cave again gave passage to a flow of water, and deposits of loam, clay, or gravel, &c. were laid down upon the stalagmitic pavement and bone-breccia. Or, as in some cases, the stalagmite, together with bones covered by and inclosed within it, was broken up and partially or wholly removed. Then, at a subsequent date the stream once more deserted its channel, while carnivores or man again returned, and newer heaps of bones and stalagmite accumulated. Commingled with these stalagmites of the bone-caves there is almost always more or less of a reddish earth or clay, which is the insoluble residue of the limestone from the dissolution of which the stalactites and stalagmites are formed. Some of the more remarkable bone-caves which have yielded testimony as to the contemporaneity of man with extinct mammalia, are Kent's Cave (q.v.) and Brixham Cave in England, the caves in the valley of the Lesse in Belgium, the caves of Périgord and the Pyrenees in France, and the Kesslerloch and Schweizersbild in Switzerland. Bone-caves containing the remains of post-tertiary mammals are rare in North America; those of Brazil have many bones of large rodents and edentates. For caves at Wick, still occupied by tinkers, see Sir A. Mitchell, *The Past in the Present* (1880). For special caves, see the *British Association Reports* (for Kent's Cave) and the *Philosophical Transactions* (1822-73). For general descriptions, see Buckland's *Reliquiæ Diluvianæ*, Dupont's *L'Homme pendant les Ages de la Pierre*, Lartet's and Christy's *Reliquiæ Aquitanicæ*, Avebury's *Prehistoric Times*, Dawkins's *Cave-hunting*, J. Geikie's *Prehistoric Europe and Antiquity of Man in Europe*. For further information as to the European cave-dwellers of prehistoric times, see ANTHROPOLOGY, ART, FLINT IMPLEMENTS, MAN, STONE AGE, and Cartailhac and Breuil's *La Caverne d'Altamira* (1906).

**ARTIFICIAL CAVES.**—Many primitive tribes are or have been cave-dwellers. Where natural caves are either of rare occurrence or do not occur at all, certain rock-exposures have been artificially excavated, and occupied either permanently as dwelling-places or occasionally as retreats in times of danger, while others have been used as cells, hermitages, or burial-places. Such caves are not uncommon in the cliffs of Scottish river ravines, as at Hawthornden near Edinburgh, and in the valley of the Jed, Roxburghshire. Caves of this kind occur usually in rocks that are readily dug into, such as soft sandstone. Now and again,

they have been excavated in conglomerate, as in the case of Hobbie Noble's Cave, Roxburghshire. In volcanic regions it is the softer tuffs or ashes that are usually holed, as in the caves of the Canary Islands. There the Guanches have also excavated caves under the lavas, by simply raking out the more or less loose scoriæ and cinders which so commonly occur in that position. Vast areas in Central China are covered with a coherent loam (of the same character as the *Loss* (q.v.) of the valleys of the Rhine and Danube), in which dug-out dwelling-places are of common occurrence. And a similar deposit, exposed along the bluffs of rivers in the far west of North America, has been utilised by some of the early inhabitants in the same way. In Arizona, parts of Colorado, Nevada, Utah, and south-east California, the rocky precipitous walls of deep cañons are in places riddled with human habitations, so as to look like honeycombs. The strata forming the walls of the cañons have been eroded in different degrees, and horizontal caves larger and smaller have been formed. The cliff dwellings are often adobe or stone structures built on the ledges overhung by projecting rock masses; smaller caves have served as dwellings, and been partially completed by adobe walls. Some of these houses are at a height of 700 feet above the level of the valley, and are with difficulty accessible. They seem to have been made as places of refuge and defence by the same ancient races as left the *pueblos* or stone ruins in the valleys, like those occupied by the Pueblos and Moqui Indians now. Some assume them to have been the ancestors of the present Pueblos; others that they were akin to the Aztecs. See Nadaillac's *Prehistoric America* (trans. 1885), U.S. Survey Reports since 1874, and the publications of the U.S. Bureau of Ethnology.

Hermitages, belonging to all ages, some of very simple, others of a more elaborate construction, have in like manner been excavated in rocks of very different kinds; so that we are presented with every variety of artificial rock-excavation, from simple hollows scraped out of some soft yielding material to the richly ornamented grottoes and temples of Ellora, near Daulatabad, which are cut out in red granite. And so again in the matter of rock-tombs we meet with artificial grottoes of all kinds—from mere holes picked out without much trouble in loess, tuff, sandstone, or other yielding substance, to the great rock-cut sepulchres of Egypt, and the no less famous catacombs of Rome. Many caves have been doubtless partly natural, partly artificial—the cells of the monks of the Thebad in Egypt, St Serf's cave at Dysart, St Ninian's at Whithorn. For the cave-dwellers known to the ancients, see TROGLODYTES, PETRA. For the Indian cave-temples, see ELEPHANTA, ELLORA.

**CAVE-ANIMALS.**—Various caverns, both of the Old and New World, are tenanted by animals which are usually more or less blind. From one point of view the eyes have degenerated from disuse and from the absence of the necessary light stimulus; from another point of view they have degenerated because no longer of use, and no longer maintained by that natural selection which through the struggle for existence is supposed by many to be necessary not only for the establishment, but for the maintenance of organs. The fauna of the Mammoth Cave of Kentucky has been most studied, and is catalogued with figures in Putnam and Packard's description of that famous cavern. Leydig has made a special study of the highly developed tactile organs borne by some fishes frequenting German caves. Among the cave-animals may be noticed the amphibian *Proteus* (q.v.) with eyes in an embryonic state; various Blind Fish (q.v.), such as *Amblyopsis* (q.v.), *Typhlichthys*, &c.; hundreds of

blind insects, of which in some cases (*Machmrites*) only the females are blind; blind spiders and myriapods; many Crustaceans (*Niphargus puteanus*, *Titanethes albus*, *Crangomys*, *Asellus sieboldii*, &c.); a few univalves and other forms.

It is noteworthy that the blindness may exist in various degrees, some being totally blind and others possessing rudimentary eyes. It is also to be remembered that not all cave-animals are blind, but forms with well-developed organs of vision also occur. Fish, insects, spiders, myriapods, and crustaceans with well-developed eyes have been recorded from various caves, and the explanation of this persistence of organs in such environment is still to find. See DEGENERATION, ENVIRONMENT; Packard, *Cave Fauna of North America* (1890); Martel, *Les Abîmes* (1894) and *La Spéléologie au XX<sup>e</sup> Siècle* (1907); Knebel, *Hohlenkunde* (1906).

**CAVE BEAR, HYÆNA, LION, &c.**—(1) *Ursus spelæus*, a fossil bear, like those now living, found very abundantly in the Pleistocene caves of Europe. (2) *Hyæna spelæa*, once abundant in Britain and other parts of Europe, and very closely allied to the *H. crocuta* now found in Africa. (3) *Felis spelæa*, a fossil lion, very like the modern form, abundant in caves of England and Europe generally. The prefix cave obviously refers to the fact that in caves the fossil remains of recent animals are well preserved and abundantly found.

**Cave, EDWARD**, the founder of the *Gentleman's Magazine*, was born at Newton, Warwickshire, in 1691; received some schooling at Rugby; and after many vicissitudes, became apprentice to a printer. Obtaining money enough to set up a small printing-office, in 1731 he started the *Gentleman's Magazine*, the earliest literary journal of the kind. Samuel Johnson became its parliamentary reporter in 1740; and with his hand in Johnson's, Cave died on 10th January 1754.

**Cave, WILLIAM**, divine, born at Pickwell, Leicestershire, in 1637, from Oakham school passed to St John's College, Cambridge (1653), and was appointed to the vicarage of Islington (1662), to the rectory of Allhallows the Great, London (1679), and to the vicarage of Isleworth, Middlesex (1690). He died at Windsor, 4th July 1713. Among his twelve works on church history are *Lives of the Apostles*, *Lives of the Fathers*, and *Primitive Christianity*, which once were standard authorities.

**Caveat** is a formal warning, entered in the books of a court or a public office, that no step shall be taken in a particular matter without notice to the person lodging the caveat, so that he may appear and object. Thus, caveats are frequently entered at the Patent Office to prevent the unopposed granting of letters-patent; or at the Probate Court to prevent the unopposed making up a title to the property of deceased persons; or at the Admiralty Court to prevent the unopposed arrestment of a ship. The term is also used in ecclesiastical practice in England; although a caveat—e.g. against an institution to a particular benefice—has not now the high effect attributed to it by the Canon Law. In Scotland the term is confined to such notices as are placed in the Bill Chamber (the summary department of the Supreme Civil Court) or in the Sheriff Courts to prevent any interdict being granted without notice to the person interested. Such caveats require to be renewed every month.

**Cavedoné, GIACOMO**, an Italian artist of the Caracci school, born in 1577 at Sassuolo, assisted Guido Reni at Rome, and finally settled in Bologna, where many of his religious pictures are preserved. He died in poverty in 1660.

**Cavendish**, the surname of the ducal House of Devonshire, a family directly descended from the

chief-justice Sir John Cavendish, who in 1381 was beheaded at Bury St Edmunds by Jack Straw's followers; and from Sir William Cavendish of Cavendish, Suffolk (*circa* 1505-57), a brother of Wolsey's biographer. His third wife, the celebrated 'Bess of Hardwick,' afterwards Countess of Shrewsbury, brought Chatsworth (q.v.) into the family; and William, their second son, was in 1618 made Earl of Devonshire. His great-grandson, William (1640-1707), was, under the last two Stuarts, a steadfast member of the Whig opposition, Russell's friend to the death, and an active promoter of the Habeas Corpus Act. He succeeded as fourth earl in 1684, and, for his services at the Revolution, was in 1694 raised to be Duke of Devonshire and Marquis of Hartington. His great-grandson, William (1720-64) succeeded as fourth duke in 1755, and was prime-minister from November 1756 to the following May. William, fifth duke (1748-1811), was a bit of a poet; but is less remembered than his beautiful duchess, whom Gainsborough and Reynolds painted. William, sixth duke (1790-1858), was chiefly distinguished by his sumptuous embassy to St Petersburg (1826). William, seventh duke (born 1808), had for twenty-four years been Earl Burlington when he succeeded his cousin in the ducal title; he died 21st December 1891, and was succeeded by his eldest son, SPENCER COMPTON CAVENDISH (1833-1908), eighth Duke of Devonshire, for thirty-three years known as the Marquis of Hartington. Educated at Trinity College, Cambridge, he entered parliament in 1857, being first returned for North Lancashire, then in 1869 for the Radnor boroughs, in 1880 for North-east Lancashire, and in 1885 for the Rossendale division of that county. The representative of a great Whig house, he was chosen as early as 1859 to move the vote of want of confidence that overthrew the Derby government, and between 1863 and 1874 held office as a Lord of the Admiralty, Under-secretary for War, War Secretary, Postmaster-general, and, from 1871, Chief-secretary for Ireland. Neither a born statesman nor great orator, he had yet shown an 'infinite capacity for taking pains,' when, in February 1875, on Mr Gladstone's temporary abdication, he was chosen leader of the Liberal opposition. He led it admirably, and in the spring of 1880, on the downfall of the Beaconsfield administration, was invited by the Queen to form a ministry. He rejected the offer, and served under Mr Gladstone, first as Secretary of State for India, and then as War Secretary from 1883 to 1885. Hostile to Irish Home Rule, from 1886 he was head of the Liberal Unionists. From 1895 President of the Council, he left the Unionist government in 1903, as opposed both to Balfour's and Chamberlain's plans of tariff reform.

His younger brother, Lord FREDERICK CAVENDISH, was born 30th November 1836, and was also educated at Trinity, taking his B.A. in 1858. He sat in parliament as Liberal member for the northern division of the West Riding of Yorkshire from 1865 till the spring of 1882, when he succeeded Mr Forster as Chief-secretary for Ireland. Between seven and eight o'clock, on the evening of 6th May, having only that morning reached Dublin, he and Mr Burke, an unpopular subordinate, were stabbed to death in the Phoenix Park. Eight months later, twenty 'Irish Invincibles' were tried for the murder, and, Carey and two others having turned Queen's evidence, five of the rest were hanged, three sentenced to penal servitude for life, and the remaining nine to various terms of imprisonment. Carey himself disappeared; but in July news came from the Cape that he had been shot dead by an Irishman named O'Donnell on an emigrant-ship. See *The Cavendish Family*, by F. Bickley (1911), and *The Life of the eighth duke* by B. Holland (1911).

**Cavendish, GEORGE**, the biographer of Wolsey, was born about 1500, and became Wolsey's gentleman-usher at least as early as 1527. He remained in close attendance upon his great master till the end (November 28, 1530), after which he retired to his house at Glensford, in Suffolk, where he lived quietly with his wife, a niece of Sir Thomas More, till the close of his own life in 1561 or 1562. His affection for the great cardinal was most devoted—he had attached himself to his household, in Wolsey's own words, 'abandoning his own country, wife, and children, his own house and family, his rest and quietness, only to serve me.' He never laid aside his loyalty to his memory, but in the quiet meditation of after-years brooded over his fall, and from it learned for himself 'the blessedness of being little.' Thirty years after he wrote his *Life of Cardinal Wolsey*, one of the most interesting short biographies in the English language. Its pensive wisdom and simple sincerity reflect a pleasing picture of the gentle and refined nature of its author, and enable us to see intimately with our own eyes, but with singular clearness, the outlines of one of the grandest figures in our history. The book, written by a devout Catholic, full of regrets for the past, could not well be printed in Elizabeth's reign, but circulated pretty freely in manuscript copies, as many as twelve of which are still extant. It is almost certain that Shakespeare had read it before writing or collaborating in *Henry VIII.*, as all the redeeming features in the picture of the great cardinal, and the lesson of his fall as a solemn homily upon human ambition, are directly due to the tender and loyal touch of Cavendish. The book was first printed imperfect, for party purposes, in 1641. The best edition is that of S. W. Singer (2 vols. 1815), the text of which was reprinted with a good introduction in Professor Henry Morley's 'Universal Library' (1886).

**Cavendish, HENRY**, natural philosopher, eldest son of Lord Charles Cavendish, and a grandson of the second Duke of Devonshire, was born at Nice, October 10, 1731. From a school at Hackney he passed in 1749 to Peterhouse, Cambridge, but quitted it three years later without a degree; thereafter he devoted the whole of his long life to scientific investigations, a large fortune bequeathed him by an uncle enabling him to follow uninterruptedly his favourite pursuits. A silent, solitary man, he hated so to meet strangers, that he had his library—a magnificent one—in London, four miles from his residence on Clapham Common, so that he might not encounter persons coming to consult it; whilst his female domestics had orders to keep out of his sight, on pain of dismissal. His dinner he ordered daily by a note placed on the hall-table. He died, unmarried, at Clapham, 10th March 1810, leaving more than a million sterling to his relatives. As a philosopher, Cavendish is entitled to the highest rank. To him it may almost be said we owe the foundation of pneumatic chemistry, for prior to his time it had hardly an existence. In 1760 he discovered the extreme levity of inflammable air, now known as hydrogen gas—a discovery which led to balloon experiments and projects for aerial navigation; and later, he ascertained that water resulted from the union of two gases—a discovery which has erroneously been claimed for Watt (q.v.; see also WATER). The famous *Cavendish Experiment* was an ingenious device for estimating the density of the Earth (q.v.). The accuracy and completeness of Cavendish's processes are remarkable. Davy declared that they 'were all of a finished nature, and though many of them were performed in the very infancy of chemical science, yet their accuracy and their beauty have remained unimpaired.' He also wrote on astronomical instruments; and his

*Scientific Papers* were edited by Clerk Maxwell, Larmor, and Thorpe (1921). See *Life* by G. Wilson (1846), and *A History of the Cavendish Laboratory* (1910) founded in his honour at Cambridge.

**Cavendish**, THOMAS, circumnavigator, was born about 1555 at Trimley St Martin, near Ipswich, and, after squandering his patrimony at court, shared in Grenville's expedition to Virginia (1585). On 21st July of the following year he sailed from Plymouth with 122 men and three ships of 40, 60, and 140 tons, and, by Sierra Leone and Brazil, reached the Strait of Magellan, whose passage took seven weeks. During the nine months that he cruised in the Pacific, he burned three Spanish towns and thirteen ships; then, with a rich booty, but only the largest of his three vessels, he returned by way of the Indian Archipelago and the Cape of Good Hope to England, 10th September 1588. Elizabeth knighted him, and he took to his old mode of life, till in August 1591 he sailed on a second expedition, intended to rival the first. It ended in utter disaster, and in 1592 Cavendish died broken-hearted off Ascension.

**Cavendish**, WILLIAM, Duke of Newcastle, son of Sir Charles Cavendish, and nephew of the first Earl of Devonshire, was born in 1592, and educated at St John's College, Cambridge. His learning and winning address made him a favourite at the court of James I., who in 1610 created him Knight of the Bath, and in 1620 Viscount Mansfield. Charles I., who was splendidly entertained by him at Welbeck and Bolsover, in 1628 created him Earl of Newcastle, and in 1638 appointed him governor to his son, afterwards Charles II. His support of the king during the contest with the parliament was munificent. He contributed £10,000 to the treasury, and raised a troop of 200 knights and gentlemen, who served at their own cost. As general of all the forces north of the Trent, he had power to issue declarations, confer knighthood, coin money, and raise men; and the last part of his commission he executed with great zeal. After the battle of Marston Moor (1644), Cavendish retired to the Continent, where he resided, at times in great poverty, till the Restoration. In 1643 he was created Marquis, in 1665 Duke of Newcastle; and he died 25th December 1676. He was author of two works on horsemanship, and of several plays, not of a character to increase any man's reputation for intelligence. See his *Life* (1667) by his second wife, Charles Lamb's favourite, 'the thrice noble, chaste, and virtuous, but, again, somewhat fantastical and original brained,' MARGARET LUCAS (1624-74), the daughter of an Essex house, where 'all the brothers were valiant, and all the sisters virtuous.' She married him in 1645, and was herself the author of a dozen folio volumes of poems, plays, letters, &c.

**Caviare**, the salted roes of the common Sturgeon (q.v.) and other fishes of the same genus. It is chiefly prepared in Russia, where, as in the United States and other countries, it is a favourite delicacy; though the phrase 'caviare to the general' shows that the taste is an acquired one. The species from whose roe it is chiefly prepared inhabit the Caspian and Black Seas and their tributary rivers. Among them are the Bielaga, or Great Sturgeon (*Acipenser huso*), the Osseter (*A. gildenstadti*), the Scherg or Sevruka (*A. stellatus*), and the Sterlet (*A. ruthenus*). The caviare made from the roe of the last-named species is esteemed particularly delicious. Astrakhan is a principal seat of the preparation of caviare. The eggs are more or less roughly separated from the connecting tissue, and, after salting, are packed in small barrels, or the roes may be salted in long troughs, and the eggs passed through a sieve into kegs.

**Cavité**, a seaport of Luzon, in the Philippines, with a large tobacco-factory, is an important United States naval and coaling station, 10 miles SW. of Manila; pop. 20,000.

**Cavour**, COUNT CAMILLO BENSO DI, the restorer of Italian unity and nationality, was born at Turin, August 10, 1810. He was descended from one of the ancient noble families of Piedmont, and being the younger son (of the Marquis Michele Benso di Cavour), was destined for a military career. At the military school he distinguished himself by his mathematical talent, and at an early age was appointed to a post in the engineers. But as his liberal opinions proved unfavourable to his stay in the army, he left it in 1831. His good sense, however, taught him that the deliverance of Italy could not be accomplished by secret conspiracy and spasmodic revolutionary outbreaks. There was nothing for him therefore but to retire into private life. Here he devoted himself to agriculture, introducing great improvements in the cultivation of the family estates; and his efforts generally to raise the economic condition of Piedmont were thorough and enlightened. But he had a further end in view; he saw that economic improvement must be the basis for a better social and political order. And he widened his knowledge of economic and political questions by foreign travel, especially in France and England. Constitutionalism as established and practised in England was on the whole the form of government he most admired. During a residence in England he made himself intimately acquainted with the political organisation of the country, and also with its industrial institutions; knowledge of which he made good use on his return to his own country.

In this way for sixteen years Cavour energetically laboured as a private gentleman. No opportunity presented itself for any effective influence in politics, and he wisely abstained. It was very different when the spirit of freedom and innovation once more awoke towards the revolutionary period of 1848. In conjunction with Count Cesare Balbo, he in 1847 established a newspaper, *Il Risorgimento*, in which he advocated a representative system, somewhat after the pattern of the English constitution, as opposed alike to absolutism on the one hand, and mob rule on the other. On his suggestion, the king was petitioned for a constitution, which was granted in February 1848. In the Chamber of Deputies, during the stormy period which succeeded Charles Albert's declaration of war against Austria in March, Cavour strenuously opposed the ultra-democrats, and counselled an alliance with England as the surest guarantee for the success of the Italian arms. In the Marquis d'Azeglio's ministry, formed soon after the fatal battle of Novara, Cavour was successively Minister of Agriculture and Commerce, Minister of Marine, and Minister of Finance. In 1852 he was appointed to succeed D'Azeglio as premier. From this time until his resignation in 1859, in consequence of the conclusion of the peace of Villafranca, Cavour was the originator as well as the director of the Sardinian policy. Taking upon himself at different times, in addition to the premiership, the duties of the Ministers of Finance, Commerce, and Agriculture, and latterly of Home and Foreign Affairs, he greatly improved the financial condition of the country, introduced measures of free trade, consolidated constitutionalism, weakened clerical influence, and made Sardinia a power of some account in Europe.

Hitherto the work of Cavour had been to reform Piedmont, and place its affairs on a sound basis. The Crimean war afforded him an opportunity to begin the task of restoring the unity and national

independence of Italy. It was through his advice and influence that Sardinia took part in the war, and as a result of this he managed to bring the Italian question before the Congress of Paris in 1856. In 1858 Cavour had with the Emperor Napoleon a secret meeting, at which the programme for driving Austria out of Italy was drawn up, and during the early part of 1859 there followed a diplomatic contest with Austria, which Cavour conducted with masterly tact and astuteness. The peace of Villafranca, coming after the successful war of 1859, and leaving Austria in possession of Venetia, was a bitter disappointment to Cavour. He resigned his office; yet he had no reason for despair, as the power of Austria in the Italian peninsula was now really broken. On returning to office in 1860 he resumed his great undertaking, but by new methods. Popular feeling in central Italy declared itself in favour of union with the north, and thus Parma, Modena, and Tuscany came under the sway of Victor Emmanuel. It was the part of Cavour to guide opinion towards this end, gaining time for it while he negotiated with the great powers; but he had to purchase the acquiescence of France by the surrender of Nice and Savoy. He secretly encouraged the expedition of Garibaldi, which in 1860 achieved the deliverance of Sicily and southern Italy. When a Sardinian army marched southwards and on the plains of Campania met the volunteers of Garibaldi, the unity of Italy was already an accomplished fact. In 1861 an Italian parliament was summoned, and Victor Emmanuel was declared king of Italy. For the completion of Italian unity only Rome and Venetia were wanting; with a little patience they too could be won.

Thus had Cavour achieved the task of his life. But it had not been accomplished without a fearful strain on his health. He had to manage the Sardinian parliament, to meet the artifices, protests, and reproaches of many of the great powers, to prevent revolutionary parties from upsetting the practical mission on which he was engaged, and to direct a great popular and national movement towards a reasonable and attainable goal by methods involving the minimum of delay and violence. For the real power of Sardinia was comparatively limited, and a false step might have been serious. The constant strain was too much for him, and he died June 6, 1861, only a few months after the unity of Italy had been proclaimed. The last words he was heard to utter were those so familiar as expressing an important feature of his policy: 'Brothers, brothers, the free church in the free state.' Cavour is admitted to be the *beau idéal* of a practical and constructive statesman, who, aiming at just and reasonable ends, seeks to achieve them by effectual and legitimate methods. He made a reformed Piedmont the basis for attaining the unity and regeneration of Italy. The ambition of Napoleon, the military gallantry of the king, the enthusiasm of Garibaldi, were all made to co-operate towards his plan for satisfying the national aspirations of Italy under a lasting constitutional rule. Through his early death much of the work necessary for a sound and healthy national life was left unfinished, yet history proves that Cavour had built on a solid foundation. He deserves a place among the greatest statesmen of modern times.

The title is taken from the small Piedmontese town of Cavour, 28 miles SW. of Turin. See De la Rive, *Le Comte de Cavour* (1863; trans. 1877); Bianchi, *La Politique de Cavour* (Turin, 1885); his *Lettere*, ed. Chiala (6 vols. 1883-87); A. J. Whyte, *Early Life and Letters of Cavour, 1810-1848* (1925); Lives by Massari (Turin, 1873), Mazade (1877), Countess Martinengo Cesaresco (1899), Kraus (1902), Cadogan (1908), Thayer (1915), Orsi (1914).

**Cavy** (*Cavia*), a genus of Rodents, best known by the domesticated species (*Cavia cobaya*), the common Guinea-pig (q. v.).

**Cawdor**, a village in Nairnshire, 5½ miles SW. of Nairn. Cawdor Castle, near by, the seat of the Earl of Cawdor, was founded in 1454, but is one of the three places which tradition has assigned as the scene of King Duncan's murder by Macbeth in 1040. A series of papers from the charter-room at Cawdor was edited by Cosmo Innes under the title of *The Book of the Thanes of Cawdor* (1859). See CAMPBELL.

**Cawk**, a popular name for a massive variety of the mineral called Heavy Spar or Sulphate of Baryta. See BARYTA.

**Cawnpore** (*Kanhpur*), a city of the United Provinces of Agra and Oudh, on the right bank of the Ganges, 42 miles SW. of Lucknow and 266 SE. of Delhi. The river in front, varying, according to the season, from 500 yards in width to more than a mile, presents a large and motley assemblage of steam-vessels and native craft; the principal landing-place is the beautiful *Sarsiya ghat*. Cawnpore, at least as a place of note, is of recent origin, being indebted for its growth, besides its commercial facilities, partly to military and political considerations. In 1777, being then an appendage of Oudh, it was assigned by the nawab as the station of a subsidiary force; and in 1801 it became, in name as well as in fact, British property. In 1881 its cantonments, for 7000 troops, contained a population of 31,283, and the city of 120,161, giving a total of 151,444, of whom 113,354 were Hindus; (1911) 178,557; (1921) 213,044. At the outbreak of the mutiny in May 1857, Cawnpore contained about 1000 Europeans, 560 of whom were women and children. The hasty, ill-chosen entrenchments into which they had thrown themselves, were speedily invested by overwhelming numbers of the mutineers, led on by the infamous Nana Sahib. For three weeks the few defenders held gallantly out; but at last they surrendered on promise of a safe-conduct to Allahabad. The sepoys accompanied them to the banks of the Ganges, and scarcely were they embarked on the boats, when a murderous fire was opened upon them, and only four men escaped. The women and children, 125 in number, were reserved for a crueler fate, and were carried back to Cawnpore. Hearing that Havelock was within two days' march of the place, Nana Sahib advanced to meet him. He was driven back, and, smarting under defeat, returned to Cawnpore, and gave orders for the instant massacre of his helpless prisoners, who, dead and dying, were cast into a well. Havelock and his small army arrived on 16th July, only to find to their unutterable horror that they came too late to rescue the women and children. A memorial church, a Romanesque red-brick building, now marks the site of General Wheeler's entrenchment; whilst the scene of the massacre is occupied by the memorial gardens. Over the well itself a mound has been raised, its summit crowned by an octagonal Gothic inclosure, with Marochetti's white marble angel in the centre. According to Forrest's *Indian Mutiny* (1903), Nana Sahib wished to spare the women and children; and there is no evidence that personal indignities or dishonour were inflicted on the unhappy women. See also Sir George Trevelyan's *Cawnpore* (1865).—The district of Cawnpore, with an area of 2370 sq. m., and a population of about 1,300,000, is an alluvial plain of great fertility, watered by the Ganges and Jumna, their tributaries, and the Ganges Canal.

**Caxamarca**. See CAJAMARCA.

**Caxias**, (1) a town of Brazil, in the state of Maranhão, on the Itapicuru, 190 miles from its

mouth; pop. 25,000.—(2) An Italian agricultural colony in the Brazilian state of Fio Grande do Sul, founded in 1875; pop. 15,000.

**Caxton**, WILLIAM, the first English printer, was born in the Weald of Kent about 1422. He was apprenticed in 1438 to Robert Large, a wealthy London mercer, who was Lord Mayor in 1439-40. On his master's death in 1441, he went to Bruges; he prospered in business, and became in 1462 governor of a chartered association of English merchants in the Low Countries. In 1471 he abandoned commerce and attached himself to the household of Margaret, Duchess of Burgundy, the sister of Edward IV.; and apparently towards the end of 1476 he set up his wooden printing-press at the sign of the Red Pale in the Almonry at Westminster. The art of printing he had acquired during his sojourn in Bruges, doubtless from Colard Mansion, a well-known printer of that city; and in 1474 he put through the press at Bruges the first book printed in the English tongue, the *Recuyell of the Histories of Troye*, a translation of Raoul Lefevre's work. The *Game and Playe of the Chesse* was another of Caxton's earliest publications; but the *Dictes and Sayings of the Philosophers*, published in 1477, is the first book which can with certainty be maintained to have been printed in England. All the eight founts of type from which Caxton printed may be called Black Letter. Of the ninety-nine known distinct productions of his press, no less than thirty-eight survive in unique copies or in fragments only. His books have no title-pages, although many have prologues and colophons. Some have no points at all; others the full-stop and colon alone. The semicolon never occurs; the comma is usually marked by short (,) or by long (:) lines. The pages are not numbered and have no catchwords. (For Caxton's imprint, see article BOOK.) Caxton enjoyed the patronage and friendship of some of the chief men of his time. He was diligent in the exercise of his craft or in translation till within a few hours of his death, which seems to have happened about the close of the year 1491. Gibbon denounces Caxton's choice of books, and complains that 'the world is not indebted to England for one first edition of a classic author;' but it should be remembered that Caxton had to make his printing business pay, and that he could therefore supply only books for which there was a demand. Nor can it be said that a printer had no regard for pure literature who produced editions of Chaucer, Lydgate, Gower, Sir Thomas Malory's *Morte d'Arthur*, and translations of Cicero's *De Senectute* and *De Amicitia*. Caxton's industry was marvellous. An accomplished linguist, his own translations fill more than 4500 printed pages, while the total produce of his press, exclusive of the books printed at Bruges, reaches to above 18,000, nearly all folio. At the Osterley Park sale in 1885 ten Caxtons were sold, the *Chesse* bringing £1950. In 1897 his *Jason* fetched £2100, in 1902 the *Ryall Book* £2225, in 1916 the *Chesse* £2500, in 1926 Gower's *Confessio Amantis* £4000.

See Knight, *The Old Printer and the New Press* (1854); Gordon Duff, *English 15th Century Books* (1918); and two books on Caxton and his work by Blades (1861-82); also the articles PRINTING and TYPES, and books there named.

**Cayenne**, a fortified seaport, capital of French Guiana, on an island at the mouth of a river of the same name. The harbour is the best on the coast, but insecure and shallow. Cayenne, the entrepôt of all the trade of the colony, was from the middle of the 19th century a great French penal settlement, but (though the Île du Diable, one of three islets 27 miles NNW., is still used in this way, as in the case of Dreyfus), transportation to Cayenne has ceased, as the climate is extremely unwholesome for

Europeans, large numbers of the convicts having been carried off by various malignant fevers. The French took possession of the island in 1604, and again, after it had been held by the English and Dutch, in 1677. The name of the capital is sometimes used for the whole of French Guiana (q.v.). Pop. about 13,500.

**Cayenne Cherry**. See EUGENIA.

**Cayenne Pepper** consists of the powder of the dried pods, and more especially of the dried seeds of species of *Capsicum* (q.v.).

**Cayes**, or AUX CAYES, a seaport of Hayti, on the south-west coast, 95 miles WSW. of Port-au-Prince; pop. 25,000.

**Cayley**, ARTHUR, mathematician, was born at Richmond, Surrey, in 1821. He was educated at King's College, London, and Trinity College, Cambridge, and graduated as senior wrangler and first Smith's prizeman in 1842. He was called to the bar at Lincoln's Inn in 1849, and established a practice as a conveyancer. In 1863 he was elected first Sadlerian Professor of pure Mathematics at Cambridge, and in 1875 to a fellowship of Trinity College; and he received honorary degrees from Oxford, Dublin, and Leyden. He was president of the Royal Astronomical Society (1872-73), and of the British Association at its Southport meeting in 1883, where his address on the ultimate possibilities of mathematics attracted much attention. In 1882 he lectured at the Johns Hopkins University, Baltimore, and received the Copley medal of the Royal Society. His chief book is an *Elementary Treatise on Elliptic Functions* (1876); a collected edition of his Mathematical Papers appeared in 1889 et seq. He died 26th January 1895.

**Caylus**, ANNE CLAUDE PHILIPPE DE TUBIÈRES, COMTE DE, archaeologist, was born in Paris in 1692. After serving in the Spanish War of Succession, he travelled in Greece and the East, returning to Paris in 1717 to devote himself to the study of antiquities, and the promotion of the fine arts. If his industry sometimes outran his intelligence, it is still true that he did vast service to archaeology. He died at Paris in 1765. His chief work is his *Recueil d'Antiquités égyptiennes, étrusques, grecques, romaines, et gauloises* (7 vols. 1752-67). His copperplate engravings have had a longer life than his stories of Eastern life.

**Cayman**, a local name loosely applied to various species of alligator—e.g. to *Alligator mississippiensis*, the single species of the United States, or more frequently to other species found in tropical or subtropical America. The name has also been used, to all appearance unnecessarily, as the scientific title of a genus, and as such has been most frequently applied to *A. palpebrosus* and *A. trigonatus*. It seems more reasonable to regard all the alligators as within the limits of a single genus. See ALLIGATOR.

**Caymans**, three fertile coral islands of the Caribbean Sea, 165 miles NW. of Jamaica, of which they form a dependency. Discovered by Columbus, they were by him called Tortugas, from the abundance of turtle, still a staple production of the group. Area, 225 sq. m.; pop. 5500, mostly in the largest island, Grand Cayman.

**Cazalla de la Sierra**, a town of the Spanish province of Seville, 38 miles ENE. of Seville city, on the southern slope of the Sierra Morena, with important mines, and a trade in olives and wine; pop. 10,000.

**Cazembé**, the title of an African prince, whose territory, also called Cazembé, extended between the Moero and Bangweolo lakes, west of 30° E. long. The people are industrious and skilful husbandmen and smiths, and carry on a brisk trade

in ivory, copper, &c. It was in the Cazembé's territory, mainly now included in the Northern Province of Rhodesia, that Dr Livingstone died in 1873.

**Cazorla**, a town of Andalusia, Spain, 40 miles ENE. of Jaén; pop. 10,000.

**Ceano'thus**. See RED ROOT.

**Ceará**, a state of Brazil, on the north coast, with an area of 40,000 sq. m., and about 1,500,000 inhabitants. The interior presents a succession of wooded hills and wide plateaus; cattle-raising is an important industry; cotton, coffee, rubber, tobacco, and sugar are largely grown; and iron and gold are found. The capital, Fortaleza or Ceará, had formerly only an open roadstead, but extensive harbour improvements have been carried out. It is the terminus of a railway to Baturité and Icó, and has a large trade in rubber. Pop. 70,000.

**Cebadilla**. See SABADILLA.

**Ce'bes**, a Theban, disciple and friend of Socrates, and reputed author of the *Pinax*, or 'votive tablet,' a philosophical dialogue, representing allegorically the temptations of this life, and teaching that True Learning can alone make for happiness. In spite of its pure Attic, and its truly Socratic tendency, modern criticism now assigns the work to the 2d century A.D. It was extremely popular in the middle ages, a sort of 'Pilgrim's Progress' indeed; and was translated into all the languages of Europe, as well as Arabic, which latter version, made possibly in the 9th century, is our sole record of the close of the dialogue. See Jerram's *Cebetis Tabula* (Oxf. Clar. Press, 1878).

**Cebu**, or ZEBU, is one of the Philippine Islands (q.v.), the largest in respect of area.

**Ce'bus** (Gr., 'an ape' or 'monkey'), a genus of South American monkeys, characterised by a round head and short muzzle, a facial angle of about 60°, long thumbs, and a long prehensile tail entirely covered with hair. The body is covered with short, thick hair. Their voice is soft and pitiful. The species are numerous, all of very lively disposition and gregarious arboreal habits, living in trees. They feed chiefly on fruits, but also on insects, worms, and molluscs. Various species are often seen in zoological gardens and menageries. They are included under the popular designation Sapajou in its wider sense, and some of them are the monkeys to which this name is sometimes more strictly appropriated. The names Saijou and Sai or Cai are also given to some of them, and some are called Capuchin (q.v.) Monkeys. One of the most common species in Guiana is the Weeper Monkey, or Weeper Sapajou (*C. apella*). Some of the species are adorned with beards. The term Cebidæ is often used as a family designation for all the broad-nosed New-World Monkeys (Platyrrhini) with prehensile tails, in contrast to the Pitheciidæ, in which the tail is not so adapted. In this family are included the Howling Monkeys (Mycetes), the Spider Monkeys (Ateles), and other genera. See MONKEYS.

**Cecidomyia** (Gr. *kekidion*, 'a gall-nut,' and *myia*, 'a fly' or 'gnat'), a genus of dipterous (two-winged) insects in the Tipularia (gnat and mosquito) division. They have beautiful, delicate, downy wings, which have three nervures, and are horizontal when at rest; antennæ as long as the body, with bead-like joints, and whorls of hairs at the joints; long legs, and the first joint of the tarsi very short. The species are numerous; nearly thirty in Britain, and sixty in Europe. All are of small size, but some of them are very important on account of the ravages which their minute maggots effect in grain-crops. *C. cerealis*, sometimes called the Barley Midge, a brownish-red fly with silvery

wings, of which the maggot is vermilion coloured, is often very destructive to crops of barley and spelt in Germany. The little maggots live in families between the stalk and the sheath of the leaf, abstracting the juice of the plant.—The Wheat-fly (q.v.) and the Hessian Fly (q.v.) belong to this genus. Some of the species of *Cecidomyia* deposit their eggs on the young buds of trees, which the larvæ transform into galls.

While forms like the Hessian fly are of great economic importance, another *Cecidomyia* is, on account of its extraordinary mode of reproduction, of great scientific interest. According to Wagner, the female lays her eggs under tree-bark or the like; these develop in winter into larvæ. The larvæ, still immature, become reproductive and parthenogenetic. The ovaries rupture, the eggs fall into the body-cavity, where the stimulus of fertilisation is somehow replaced, for the ova develop into larvæ. These eat their parent larva, and after finishing the viscera, leave the empty skin. The nemesis of reproduction overtakes them also, for within them again, though likewise only larvæ, a fresh batch of larvæ develops in similar fashion. After several generations of this immature and fatal reproduction, the final set of larvæ metamorphose in summer into sexual winged insects. See REPRODUCTION.

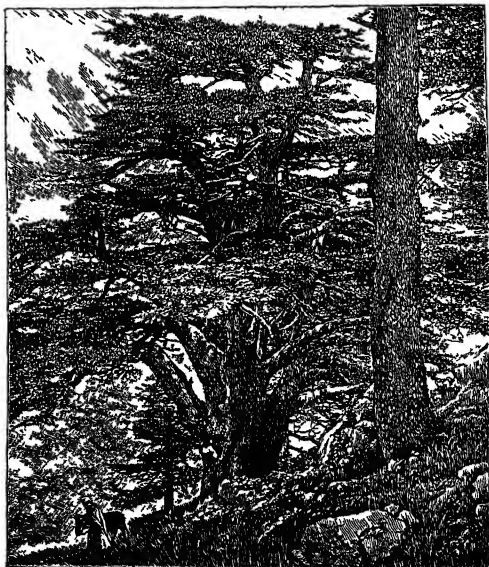
**Cecil**. See BURGHLEY and SALISBURY.

**Cecilia**, St, the patroness of music, especially church music, is said to have suffered martyrdom in 230 A.D. Her heathen parents belonged to a noble Roman family, and betrothed their daughter, already a secret convert to Christianity, to a heathen youth named Valelian, who also was soon converted, and ere long suffered martyrdom together with his brother Tiberius. Cecilia, when commanded to sacrifice to idols, firmly refused, and was condemned to death. She was first thrown into a boiling bath, from which she emerged unhurt; next the executioner struck three blows upon her neck with a sword, then fled in horror. Three days later his victim died of her wounds, and received the martyr's crown. She was buried by Pope Urban in the catacombs of Callistus. As early as the 5th century, there is mention of a church dedicated to St Cecilia at Rome; and in 821, by order of the Pope Paschal, her bones were deposited there. St Cecilia is regarded as the inventor of the organ, and in the Roman Catholic Church her festival-day, November 22, is celebrated with splendid music. Some of our greatest poets, as Chaucer, Dryden, and Pope, have laid poetic tributes on the shrine of St Cecilia—the greatest is Dryden's splendid ode. The most famous paintings of St Cecilia are those of Raphael at Bologna, Carlo Dolce in the Dresden Gallery, Domenichino in the Louvre, and Rubens in the Berlin Museum.—Another St Cecilia was born in Africa, and suffered martyrdom by starvation under Diocletian. Her festival falls on the 11th of February.

**Cecro'pia**, a genus of Moraceæ. *C. peltata*, the Trumpet-tree of the West Indies and South America, has a hollow stem and branches, exhibiting merely membranous partitions at the nodes. The branches, these partitions being removed, are made into water-pipes and wind-instruments. The wood is very light, and is used to make floats for nets, and by the Indians in kindling fires by friction against a harder piece of wood. The bast yields a cordage fibre, and the outer bark is astringent, the fruit resembles a raspberry, the buds furnish a potherb, while the juice hardens into caoutchouc. The leaves and fruit are largely consumed by sloths. The hollow stem is largely inhabited by ants.

**Cecrops**, a Pelasgic hero, the first king of Attica, sometimes represented as half man and half dragon. He divided Attica into twelve communities, founded Athens, the citadel of which, at first called Cecropia, commemorated his name, instituted marriage and the worship of the gods, and introduced agriculture, navigation, and commerce. Late writers explained Cecrops as the leader of a colony from Sais in Egypt.

**Cedar** (*Cedrus*), a genus of the Abietinæ tribe of the natural order Coniferae, has, like pines, spruces, and silver firs, persistent foliage; but, like larch, its young long shoots have scattered leaves, while upon older shoots leaves grow in large tufts at the ends of short spurs (arrested branchlets). Its leaves are linear, persistent for three to five years, and darker and stiffer than those of the larch, from which it is easily distinguished by its evergreen foliage. The stem-bark is rough and much fissured, and the boughs are not definitely arranged in whorls. Isolated trees are apt, when old and especially in exposed positions, to have a flattened tabular crown. The yellowish-to-reddish-brown heartwood, aromatic from essential oil (contained in wood cells in the heartwood), is very durable, and is highly prized where cedars are indigenous; but they are of no importance for timber in Britain. Both male



Cedars of Lebanon.

and female flowers appear in early autumn, mostly on the same tree in solitary catkins at the end of the dwarf spurs; and the cones ripen in two years (in *Deodar* thirteen months). The cones are 3 to 5 inches long and 2 to 3 inches thick, and shed their scales, leaving the bare spindle erect. Three species (see below) have been introduced into Britain for ornamental planting only, the Cedar of Lebanon about 1650 (England) and in 1683 (Scotland), the *Deodar* or Himalayan Cedar in 1822, and the Atlantic, Algerian, or Mount Atlas Cedar in 1843, all of which are hardy in our climate. By some botanists they are considered to be more probably mere climatic and local varieties than truly different species, though they grow true from seed.

The CEDAR OF LEBANON (*C. Libani*) grows chiefly on the mountains of Syria and Asia Minor at 4000 to 6000 feet elevation, and in Cyprus, where it often grows along with Corsican pine. Its

most southern locality is the celebrated grove at the head of the Kedisha valley of Lebanon at about 6300 to 6400 feet. This last remnant of the famous ancient forests of Lebanon, so often referred to in the Old Testament, was visited by Hooker in 1860, and found to consist only of about 375 trees,



Branch of Cedar of Lebanon.

growing in nine groups. Five of the oldest trees girthed 30 feet or above, and were estimated to be about 2500 years old, while the youngest trees seemed to be nearly 100 years old. It was introduced into France in 1549, into England probably before the publication of Evelyn's *Sylva* (1664), while the first specimens in Scotland were planted in the Edinburgh Physic Garden in 1683. Its characteristic form of growth is to throw out long, strong side-branches, which often divide the bole unless the stem be drawn up by surrounding trees; but as an isolated ornamental tree on lawns it generally forms a somewhat bent and irregular stem, and broadens out with wide-spreading branches, with a rounded contour and often an almost flat tabular top. The foliage is somewhat shorter than in the other two species, and the extremities of the branches are stiff. The largest specimen in Britain reported to the Board of Agriculture in 1903 was 109 feet high and 12 ft. 2 in. in girth, in Bucks (estate not named); but one growing on a lawn at Little Durnford, Salisbury, girthed 19 ft. 9 in. in 1900. One of the finest avenues of Cedars of Lebanon in Britain consists of 170 trees planted at Dropmore, Bucks, about 100 years ago, at a distance of 25 feet apart, in two rows 50 feet apart whose crowns completely overshadow the roadway.

The DEODAR or HIMALAYAN CEDAR (*C. Deodara*) is indigenous to Afghanistan, Chitral, and the western Himalaya, where it is found at from 4000 to 10,000 feet elevation, but most commonly at 6000 to 8000 feet. It is the most important, valuable, and durable of the Himalayan timber-trees, reaching its finest development in Kashmir, the Punjab, and the western mountains in the United Provinces of India, chiefly on the northern and western slopes of the ridges and within the region of the S.W. monsoon. It grows gregariously in clumps scattered among other trees (chiefly spruces, pines, and oaks), but is occasionally met with forming pure woods, usually forming sacred groves, for it is a much-venerated tree, as its name implies (a corruption of *Devadara*, 'God's tree'). The tallest specimen yet found was 240 feet high (Sutlej valley), and the largest girth was 44 feet at 2 feet up and 36 feet at 6 feet up (at Kúarsi, Ravi valley). A stem-section in the Imperial Forest College, Dehra Dûn, India, girthed 23 feet, shows 665 annual rings. But as a timber-tree it is probably at its best, in good localities, at about 12 feet in girth, when it is estimated that an

average tree gives 50 railway-sleepers (6' x 8" x 4½"). It seems to grow best on gneiss, granite, or limestone. It is easily distinguished from the Cedar of Lebanon by its drooping branches, its lighter and lower foliage, and its more pyramidal shape when young. At Kew it is the first of the three cedars to flush its new foliage in spring, the Lebanon usually being a fortnight later, and the Atlas a few days after this. The male and female flowers of the Deodar are found, as a rule, on separate trees; but monœcious trees are often found. The cylindrical catkins appear singly at the ends of arrested branchlets in autumn, and the female cones increase but little in size till the following spring, while the mature cones (about 4 to 5 in. long and 3 to 4 in. in diameter) break up and discharge their winged seeds during October and November, about thirteen months after the flowering. Two well-marked varieties are recognisable in the Himalayan forests, one having dark-green and the other silvery foliage, the latter being found chiefly in ravines at a comparatively low level. The yellowish-brown, strongly scented, very durable timber is in India chiefly used for sleepers, bridge-work, and building (beams, doors, window-frames), but is rather brittle to work, and does not take paint or varnish readily. It floats well, and when seasoned weighs about 35 pounds per cubic foot. Resin can be extracted from wounds in the bark, and the essential oil obtained from the wood by distillation is used for veterinary purposes and for waterproofing leather, and is said to be a good antiseptic. In 1903 the tallest specimen in Britain was said to be 102 ft. high by 8 ft. 5 in. in girth (Bucks, sixty-three years old), and the thickest 73 ft. high by 10 ft. 9 in. in girth (Kent, sixty-two years).

The ATLANTIC, ALGERIAN, or MOUNT ATLAS CEDAR (*C. Atlantica*), indigenous to the Atlas range and other mountains in Barbary at 7000 to 8000 feet elevation, can easily be distinguished from the other two species by its silvery foliage, its more upright habit of growth, and its fewer branches (not pendulous as in the Deodar), the stiff extremities of the boughs generally inclining sharply upwards, and the leading shoot remaining erect. It does not stand transplanting well.

There are several nurserymen's varieties of the cedars (weeping, columnar, &c.), but the ordinary kinds are more ornamental. The trade name of 'cedar' is given to the timber of many other kinds of foreign trees, mostly North American, which are not really cedars.

**Cedar**, BARBADOS, is strictly speaking *Juniperus barbadensis*, but a more important tree is that called Bastard Barbados Cedar (*Cedrela odorata*), of the Cedrelaceæ. Its wood has an agreeable fragrance, and being soft and light, is used for canoes and shingles. Havana cigar-boxes are very generally made of it, and in France lead-pencils.

**Cedar-bergen**, a mountain-range in the Cape Province, stretches north and south on the east side of Olifant River Valley, and is the only locality for the Cape cedar (*Widdringtonia juniperoides*), now being fast destroyed. Sneeuwkop (6335 feet) is the highest point.

**Cedar Bird**. See WAXWING.

**Cedar Creek** is a river of Virginia, U.S., which gives name to a battle fought 19th October 1864, when the Federals under Sheridan defeated the Confederates under Early.

**Cedar Rapids**, a city of Linn county, Iowa, on the Red Cedar River, 79 miles SW. of Dubuque. It is an important railway centre. Pop. 45,600.

**Cedilla**. The Spanish pronunciation of the letter C before e and i is identical with that of Z

(= English *th* in *thin*). In early Spanish writing C was often used (primarily for etymological reasons) to express this sound before a, o, u, where according to the general rule it would have had the value of k. To obviate the resulting ambiguity, a 'little Z' (called *cedilla*, *cedilla*, a diminutive of *zeda*, the name of the letter Z) was placed under the C (thus, Ç) to indicate that it was to be pronounced 'soft' in a position in which the 'hard' sound was normal. In Spanish the name of the subscript mark was often altered into *cerilla*. Modern Spanish orthography has discarded the cedilla, Z being substituted for Ç; but it was adopted in Portuguese (*cedilha*) and in French (*cedille*) to indicate that C is to be pronounced as s before a, o, u; and in those languages it is still used. In the transliteration of Oriental alphabets Ç is sometimes employed to render the strong dental sibilant of the Semitic languages (Hebrew צ, Arabic ص), and the palatal sibilant of Indian languages (Sanskrit ञ).

**Cedrate**. See CITRUS.

**Cedrelaceæ**, a sub-family of Meliaceæ (q.v.); see MAHOGANY, CEDAR (BARBADOS), &c.

**Cefalu**, a town of Sicily, on the north coast, 40 miles ESE. of Palermo. It is situated at the foot of a lofty promontory (1235 feet), with old Greek and Saracenic remains. It has a cathedral, a port, and 15,000 inhabitants, chiefly engaged in marble-quarrying and fishing.

**Ceglie**, a town in Italy, 21 miles NE. of Taranto, trading in grain, oil, and fruit; pop. 20,000.

**Ceiling** (Fr. *ciel*; Lat. *caelum*, 'heaven'). This term seems to have been suggested by the use of arched coverings for churches, and even for rooms, which prevailed in the middle ages, and were frequently painted blue and decorated with stars. Arched ceilings among the Romans were known by the name of *cameræ*, and were formed by semi-circular beams of wood, at small distances from each other, over which was placed a coating of lath and plaster. But the ceilings most commonly in use amongst the Romans were flat, the beams, as in modern times, having been at first visible, and afterwards covered with planks and plaster. Sometimes hollow spaces were left between the beams, which were frequently covered with gold and ivory, or paintings or 'pateræ'—large flowers—such, for instance, as are used in the panels of the vault of the Pantheon. The oldest flat ceiling in existence is believed to be that of Peterborough Cathedral. Like that at St Albans Abbey, it is made of wood. Ceilings of churches in the middle ages were generally painted and gilded in the most brilliant manner; and many existing ceilings still exhibit the traces of early decoration of this kind. In French churches the ceilings are generally vaulted, but in England they are more usually of wood. The older ceilings generally follow the line of the timbers of the roof, which, in the Early English and Decorated, are often arranged so as to give the shape of a barrel vault. In ceilings of this description there seldom are many ribs, often only a single one along the top. In the Perpendicular style, the ceiling often consists of a series of flat surfaces or cants, formed on the timbers of the roof. Though sometimes altogether destitute of ornament, they are more frequently enriched with ribs, dividing them into square panels, with Bosses (q.v.) or flowers at the intersections. Wooden ceilings are sometimes formed in imitation of stone-groining, with ribs and bosses, examples of which will be found at York, Winchester, and Lincoln. In the Elizabethan age ceilings were generally of plaster, but they were ornamented with ribs having bosses or

small pendants at the intersections. It is not unusual for the ceiling immediately over the altar, or the roodloft, to be richly ornamented, whilst the rest is plain. See ROOF.

**Čelakovský**, (1) FRANZ LADISLAUS, Bohemian poet, born in Strakonitz, 7th March 1799, died at Prague, professor of Slavonic Philology, 5th August 1852. His principal works are *Echoes of Russian and Bohemian Folk-songs* (1833-40), and a cycle of love-songs and didactic and political poems (1840). He also translated the works of Herder, Goethe, and Scott.—(2) His son, LADISLAUS (1834-1902), born in Prague, was appointed professor of Botany there in 1880. Besides several monographs on particular genera, he published a general book on the Bohemian flora (3 parts, 1867-75) and an elucidation of the Darwinian theory.

**Celandine** is the popular name (and corruption) of *Chelidonium majus*, a perennial papavera-



Celandine (*Chelidonium majus*):  
a, a flower.

aceous herb, which, although not uncommon in Britain, is doubtfully indigenous.



Lesser Celandine  
(*Ranunculus Ficaria*).

to be a specific for jaundice, apparently on no better warrant, however, than that drawn from its colour by the 'doctrine of signatures.' Its old English name Swallow-wort, which appears to be almost a translation of the botanical one, seems founded on a supposed association between the beginning and ending of its flowering time and the arrival and departure of the swallows.—It is, however, the LESSER CELANDINE which is more familiar to general readers, at least since Wordsworth devoted no fewer than three poems to its honour. This is *Ranunculus Ficaria*, also known as the common fig-wort or pile-wort, a quite unre-

Its pretty foliage and umbels of small yellow flowers, which bloom from May to August, might alone attract attention, but its ancient repute among herbalists is due to its yellow milky juice, which is very acrid and poisonous. Externally it was applied to warts and ulcers, and internally administered, it was supposed

lated ranunculaceous plant, which grows in abundant patches in fields and coppices, and brightens them in early spring with its plentiful golden flowers. Its tuberous roots and swollen separable buds give it additional botanical interest, while it is also noteworthy that these results of peculiarly vegetative habit are associated with a frequent imperfect maturity of the pollen. See REPRODUCTION.

**Celano, LAKE OF.** See FUCINO, LAKE OF.

**Celastraceæ.** See SPINDLE-TREE.

**Celaya**, a town in the Mexican state of Guanajuato, on the Rio Laja, about 150 miles by rail NW. of the city of Mexico, has several fine plazas, handsome churches, and manufactures of cotton and woollen cloths and saddlery. Population, with district, 28,000. The burning of its bull-ring on Easter Sunday 1888 caused considerable loss of life.

**Celebes** (in England usually pronounced *Celebes*), the third largest and the central island of the Eastern Archipelago, from 1° 45' N. to 5° 37' S. lat., and from 118° 49' to 125° 5' E. long.; about 800 miles long by 200 broad; total area estimated at 72,000 to 76,260 sq. m. It is a Dutch possession, though there are numerous small native states. In configuration, it consists of a central nucleus whence radiate four long mountainous limbs, respectively E., NE., SE., and S., inclosing the three gulfs of Gorontalo, running in nearly 200 miles, Tolo 150 miles, and Boni about 200 miles. The gulfs, as also the north and west coasts, are studded with islands, rocks and shoals, and larger outlying islands. Of the central nucleus and the two inner limbs little is known. The east end of the eastern peninsula (north end of island), Minahassa district, is subject to earthquakes, and contains 11 volcanoes, some of them active, such as Mount Sapotan (5938 feet), and, farther east, Mount Klabat (6559 feet), which has now, however, long been quiescent, besides numerous hot springs and sulphur lakes. The mountains of the south peninsula, essentially a limestone formation, seldom rise above 2000 feet. In the extreme south, however, are Maros (4225 feet) and Bonthain (9994 feet). The uplands of the south peninsula are well wooded, but its vegetation is much less luxuriant than that of the east peninsula. Between the hills and coast of the south peninsula are extensive grassy plains, affording pasture for large herds of cattle, and for the horses for which the district is famous.

Celebes is rich in lakes, among them, Posso, in the central nucleus, 35 miles by 25 miles, and Tondano, nearly 2000 feet above the sea. There are numerous streams, but Celebes, no part of which is more than 50 miles from the sea, offers no space for the formation of large rivers. The Sadang, rising near lake Posso, flows due south for nearly 120 miles.

Thanks to the elevation of the land and its sea-exposure, Celebes enjoys a comparatively cool and healthy climate. The vegetation includes rice, maize, coffee, sugar, tobacco, indigo, areca, betel, pepper, clove and nutmeg growing wild; the tree yielding macassar oil, oak, teak, cedar, ebony, sandalwood, bamboos; also the *upas*. Minahassa, the most highly cultivated district, 60 by 20 miles, has coffee plantations, producing coffee of a remarkably fine flavour, entirely in the hands of the government. There alone the old 'culture system' was applied in its integrity from 1822. Many animals, birds, and insects are wholly peculiar to Celebes—a tailless baboon, two kinds of cuscus, the 'babiroussa', and Sapi-utan, three kinds of starlings, two magpies, &c. Gold is obtained from surface washings, principally in Minahassa and Gorontalo districts; iron in the districts bordering the Gulf

of Tolo. Salt is also abundant. Tin and copper are likewise worked.

The population of the island of Celebes is given at 3,000,000, who may all be regarded as belonging to various Malay stocks, except a few thousand Chinese and Europeans, and the Toalas, a primitive people apparently akin to the Veddas and the Australian blacks, perhaps 'Caucasian.' The Bugis (see BONI) and Mangkassars of the south peninsula, tall, shapely, and comparatively fair, are the dominant native race, much disposed to trading and seafaring. The 'Alfuros,' a collective name for the other native tribes, are at a very low grade of culture. Celebes was first visited in 1525 by a Portuguese expedition from the Moluccas. In 1607 the Dutch began to trade with Celebes, and now hold the whole island, which they have divided into the residencies of Macassar and Menado, a third division round the north and west of the Gulf of Tolo being included in Ternate residency. There were some native revolts in 1906-8. The women weave the sarang, or national garment, which, together with variegated mats, is largely exported. A 'high-road' skirts the coast of the south peninsula from Mandale, 30 miles N. of Macassar, to Balang-Nifra, on the Gulf of Boni; elsewhere are only ordinary roads and footpaths. The chief town is Macassar, with a sea-frontage of nearly 2½ miles. See, besides Russel Wallace's *Malay Archipelago*, books on the island by Lahure (French, 1879), Hickson (1889), Staden der Brink (Dutch, 1884), and the brothers Sarasin (German, 1905); and Paulus, *Encyclopædie van Nederlandsch-Indië* (1917).

**Celery** (*Apium*), a widely distributed genus of Umbelliferae. The common celery (*A. graveolens*) is found wild in Britain and most parts of Europe, in ditches, brooks, &c., especially near the sea and in saline soils, and is acrid and uneatable. In cultivation, however, abundant nutrition has greatly mollified its properties, and two principal forms have arisen—one in which an abundant development of parenchyma has taken place in the leaf-stalks; the other in which it affects the root—while these again possess their sub-varieties. The former sort is the common celery of British gardens, where the familiar long blanched succulent stalks are produced by transplanting the seedlings into richly manured trenches, which are filled up as the plants grow, and finally raised into ridges over which little more than the tops of the leaves appear; and a supply is thus insured throughout the whole winter. The other form is the turnip-rooted celery, or celeriac, and is now largely cultivated on the Continent. Both forms are eaten uncooked alone, or in salads, or in soups, or as a boiled or stewed vegetable, and are pleasant and wholesome, although when used too freely or frequently they are diuretic and aphrodisiac. Some authorities identify celery, instead of the closely related Parsley (q.v.), as the *Apium* with which victors in the Isthmian and other games were crowned, and of which the Greeks were also wont to twine their sepulchral garlands.

**Celeste**, MADAME, dancer, was born in Paris 6th August 1814 (by her own account), more probably three or four years earlier. A pupil at the Conservatoire, she early showed remarkable talent. She made her début in 1827 at New York, and during her residence in America married one Elliott, who died early. At Liverpool in 1830 she played Fenella in *Masaniello*; in 1831-33 she became extremely popular in London. Her second visit to America (1834-37) is said to have brought her £40,000. After her return she took part successively in the management of the Theatre Royal, Liverpool, and the Adelphi and Lyceum in London. Her imperfect English long confined her to non-

speaking parts. She retired from the stage in 1874, and died at Paris, 12th February 1882.

**Celestine**, a mineral bearing the same relation to Strontia (q.v.) that heavy spar bears to baryta. It is essentially sulphate of strontia, SrOSO<sub>4</sub>, with occasional admixture of sulphate of baryta, carbonate of lime, oxide of iron, &c., in small proportions. It much resembles heavy spar, but is not quite equal to it in specific gravity; is usually blue, often of a very beautiful indigo-blue; sometimes colourless, more rarely reddish or yellowish. Its crystallisation is rhombic, like that of heavy spar. Most beautiful specimens of crystallised celestine are found in Sicily. Celestine derives its name from its colour. It is the source from which nitrate of strontia, employed in the manufacture of fireworks, is derived.

**Celestine** was the name of five popes, the first of whom filled St Peter's chair in 422-432 (see POPE). The most notable was the Neapolitan Peter di Morrone, who after a long life of ascetic severities was much against his will elected pope as Celestine V. in 1294, when he was nearly eighty years of age. He resigned his office after five months—'the great refusal,' for making which he is placed by Dante at the entrance of hell. He was imprisoned by his successor, Boniface VIII., and died in 1296. He was founder of the Celestines, and was canonised in 1313.

**Celestines**, an order of hermits of St Damianus, founded by Peter di Morrone about 1254, and confirmed as a monkish order by Urban IV. in 1264 and by Gregory X. in 1274. They called themselves Celestines when their founder ascended the papal chair. They follow the rule of St Benedict, wear a white garment with black hood and scapulary, and live a purely contemplative life. In the 13th and 14th centuries the order spread rapidly through France, Italy, and Germany, but subsequently decayed, and is now almost extinct. The French Celestines were secularised by order of Pope Pius VI. in 1776-78; so also were the Neapolitan Celestines.

**Celibacy** (from *celebs*, 'unmarried'), a state opposed to the first and strongest natural law (Gen. i. 28), has from a variety of causes come to be regarded in certain religious systems as a condition of the most sublime self-sacrifice. The perpetual celibacy of the priests of Isis, and the chastity of the vestal virgins, are familiar instances. But nowhere was this sentiment so strongly and widely manifested as among the millions devoted to the religion of Buddha. The theories of oriental philosophers and the natural tendency of mystics did not fail to influence the early Christian churches, and led before long to the doctrine that virginity is a state in itself more excellent and more holy than the married life, and to the discipline which, in the Roman Church at least, imposed celibacy upon all priests and sacred ministers. The Old Testament is remarkably free from any tendency to exalt celibacy above matrimony. But although texts may be quoted on either side, the germs of the doctrine in question may be discovered in the New Testament. St Paul affirms it to be 'good for a man not to touch a woman,' and wishes that all men were celibate like himself (1 Cor. vii. 1, 7). Christ himself speaks mysterious words in commendation of those who 'have made themselves eunuchs for the kingdom of heaven's sake;' and the Lamb is followed on Mount Zion by 144,000 virgins, 'first-fruits unto God and unto the Lamb' (Rev. xiv. 1-5).

The apostolic writings, however, while they suggest the excellence of virginity in general, supply no ground for the law of clerical celibacy. In the first epistle to Timothy, the deacon as well as

the bishop is told he must be the husband of one wife, and rule his household and his children well; and 'forbidding to marry' is reckoned among the 'doctrines of devils.' But a remote sanction for the later discipline has been sought for in the regulations of the Jewish priesthood. The Mosaic law forbade priests to marry divorced women or harlots, and enjoined continence upon all when preparing to offer sacrifice. Jerome argues that the Christian priest should offer sacrifice daily, and should therefore be perpetually continent; and Pope Siricius (385 A.D.) insists that marriage was permitted to the priest of the old law only because the sacerdotal order was then limited to the tribe of Levi, but now that the tribal restriction is removed, the license is abrogated also.

The ecclesiastical legislation on celibacy was developed gradually and unequally in the several parts of the church. In the 2d century it became a pious custom to make vows of chastity, and it was thought becoming in the higher clergy to renounce matrimony; and although there are examples of bishops and priests in the first three centuries living with their wives and begetting children, it has been confidently asserted that no instance can be quoted of a marriage contracted at this period after ordination. The obligations of the marriage contract were, however, considered sacred; and the Apostolic Canons impose the penalty of deposition on bishop, priest, or deacon, who should separate from his wife 'under the pretence of piety.' At the end of the 3d and beginning of the 4th century, marriage after ordination was prohibited by formal legislation. A further and important step was taken in the year 305 by the Spanish council of Elvira, which decreed that sacred ministers who were already married, should live in continence. At the Council of Nicea an attempt was made to impose this new rule upon the whole church, but it was frustrated by the opposition of a venerable monk, Paphnutius, himself a celibate; and the law to this day has never been accepted in the Eastern Church. In the West, however, a series of synodal enactments and papal decrees established or renewed the more rigorous rule. But in no matter of ecclesiastical discipline must the distinction between theory and practice be more carefully observed. The clergy everywhere resisted the law, and resisted with considerable success. St Patrick, who tells us that his father and grandfather were in holy orders, when laying down rules in one of his Irish synods for the conduct of his clergy, directs that 'their wives should keep their heads covered.' In the province of Milan, indeed, the marriage of priests continued to be perfectly legal. Discipline and usage varied in different countries, but it may be safely said that for many centuries the celibacy of the uncloistered clergy was little more than a pious fiction, until Hildebrand, afterwards Gregory VII., by his great influence and vigorous measures, secured a more strict observance of the rule.

From the 12th century (first and second Lateran Councils) a great change took place in ecclesiastical law. The marriage of priests was now declared to be not only sinful but invalid. It became henceforward difficult for any priest to justify his marriage on the plea that the prohibition of such marriage was abrogated by custom, or not binding under supposed exceptional circumstances. The clerical consorts became no longer wives but concubines; and, further, the priest who went through the marriage ceremony was held to commit a far greater crime than if he had contented himself with simple fornication. Yet in spite of all this the law was to a large extent set at defiance. In many parts of Europe it was a common thing for benefices to pass from father to son. Influential bishops obtained letters of legitimation for their

children, and provided for them out of the property of the church. Avaricious princes and prelates made traffic of the concubinage of the lower clergy by levying a species of blackmail, under the name of fines, on the tacit understanding that the *focaria*, or occupant of the priest's hearth, should not be disturbed. At the time of the Council of Trent, the Emperor Charles, in the expectation that some relaxation would be made in the laws on the subject, permitted in 1548, by the arrangement known as the *Interim*, married priests to retain their wives until the council should come to a decision. The Emperor Ferdinand a little later (1562) urged upon the same council the abrogation of celibacy. But the Catholic reaction was too strong, and the council in November 1563 pronounced, 'If any one shall say that clerks constituted in holy orders, or regulars who have solemnly professed chastity, are able to contract matrimony, or that, being contracted, such matrimony is valid . . . let him be anathema.'

It should be observed, however, that in the United Greek Church Rome tolerates a married clergy—i.e. a man already married may be ordained priest, and continue to live with his wife, though continence is imposed upon him at certain times. It is the custom for the young candidate for orders to leave the seminary for a while to get a wife, and then return for ordination. If he should become a widower, he cannot of course marry again, and no married priest can be made a bishop. The bishops are therefore, as a rule, taken from the monasteries.

Since the Council of Trent, the observance of celibacy has been comparatively well maintained. This is especially true of those countries where the Catholic community is mixed with or surrounded by Protestant neighbours, and watched by a vigilant press. Away from the high-roads of civilisation, in Mexico, Brazil, and other parts, concubinage has again become the rule, less openly perhaps, but quite as obstinately as in the middle ages.

The moral loss or gain to the church from her discipline in this matter is a question of controversy which from time to time has been raised within her own communion. But the attention paid by biologists to the hereditary transmission of human faculties and dispositions has recently exhibited the effects of celibacy in a new light. Sir F. Galton remarked that the Roman Church has acted as if she 'aimed at selecting the rudest portion of the community to be alone the parent of future generations.' The policy which attracts men and women of gentle natures fitted for deeds of charity, meditation, or study to the unfruitful life of the cloister and the priesthood, appears from this point of view to be 'singularly unwise and suicidal,' tending, as it must, though by imperceptible degrees, to the deterioration of the race. To the enforcing of this discipline in Spain, for example (coupled with the cutting off of independent thinkers by the Inquisition), Galton attributed much of the decadence of the country during the last three centuries. In France, where the most promising lads of the village are successively picked out by the parish priest for the bishop's seminary, the process of elimination must in the long run tell upon the general character of the population. In small Catholic communities, again, where the priestly vocation is held in high esteem by the educated, and where mixed marriages are discountenanced, a similar result cannot fail to occur.

The marriage of clerks in minor orders is irregular, but is usually condoned.

The seceding Czechoslovak National Church abandoned celibacy (1920).

See Henry C. Lea, *Sacerdotal Celibacy in the Christian Church* (1867; 3d ed. 1907); also MONACHISM.

**Cell**, a unit-mass of living matter, whether rounded off by itself, as in the simplest plants or animals and in the youngest stage of all organisms, or associated with other cells to form a higher unity. The great majority of the Protozoa and Protophyta are single cells, and almost all other organisms begin at this level. From the double unity resulting from the fusion of two sex-cells the higher plants and animals develop by repeated division, and they may be therefore always resolved into more or less close combinations of variously

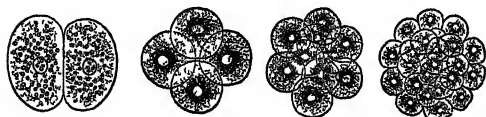


Fig. 1.—Dividing Egg-cell (after Gegenbaur).

modified unit-masses. In most cases these individualities of the simplest order are minute, and their separateness is not to be discerned with the unaided eye, but there are many instances among the simplest plants and animals, as well as in the component elements of higher forms, where the unit-masses are relatively giant-cells and quite visible without the use of the microscope. The giant *Amoeba Pelomyxa*, the common sun-animalcule *Actinosphaerium*, the Alga *Botrydium*, and some of the cells (e.g. bast) of plants may be noted as illustrations of cells with considerable dimensions. In the great majority of cases the body of the cell includes a well-defined centre or nucleus; and the definition may therefore be extended in the statement that a cell is a nucleated unit-mass of living matter or protoplasm.

**I. History.**—In the article BIOLOGY it has been pointed out that a more and more penetrating scrutiny alike of structure and of function led naturalists from organs to tissues, and from tissue to cell. Some of the steps in this gradually deepening analysis deserve fuller record.

**Discovery of Cells.**—In the latter half of the 17th century the simple microscope afforded to Malpighi and Leeuwenhoek, to Hooke and Grew, what was literally a vision of a new world. In applying their rough and simple instruments to the study of the structure of plants and animals they became pioneers in the investigation of the infinitely little. Leeuwenhoek (Phil. Trans. 1674) seems to have been the first to observe, what are now so familiar, single-celled organisms. In the 18th century Swammerdam and others continued with much enthusiasm to describe the minute intricacies which their 'new eyes' revealed; Fontana (1784) observed the kernel of the cell—the nucleus—and some of the elements of the tissues; but the foundation of scientific histology was not laid until the appearance in 1801 of the *Anatomie Générale* of Bichat. In this epoch-making work organs were resolved into their component tissues, and their functions were interpreted as the sum-total of the properties of their constituent elements. Such a conclusion was the utmost that could be reached with the appliances then at command.

Early in the 19th century, however, an improvement in the appliances of observation furnished a fulcrum for a new advance. Fraunhofer discovered the principle of achromatic lenses (see LENS, MICROSCOPE); these were combined into the compound microscope, and a new era began. 'Fibres' and 'globules', 'laminae', 'nuclei', and even 'cells' were described. In 1831 Robert Brown emphasised the normal presence of the nucleus discovered by Fontana, and made the first important advances in the study of the vegetable cell. Isolated discoveries,

such as that of the nucleolus by Valentin (1836), occurred in rapid succession during those years. Dujardin in 1835 described the sarcode or living matter of the Protozoan Foraminifera and of some other cells, and thus emphasised, as Rösel von Rosenhof had done many years before (1755) in regard to the 'Proteus animalcule' or *Amoeba*, the most important element to be considered in forming a true conception of the cell. The importance of his description, of which he was apparently himself unconscious, had for some time the same fate as that of his predecessor of almost a century before. Observations had in fact to accumulate before any generalisation became possible. The first definite steps towards a co-ordination of results was probably that of Johannes Müller, who in 1835 pointed out the resemblance between the cells of the vertebrate notochord and the elements observed in plants. The cellular nature of the epidermis and the presence of nuclei therein was next ascertained, and similar discoveries were made in regard to several other tissues. Up to 1838 there was in fact a period of research in which cells were observed rather than understood.

**Establishment of the Cell-theory.**—As early as 1826 Turpin had maintained that plants were formed by an agglomeration of cells. Professor M'Kendrick well points out, what one would of course expect, that for some years before 1838 botanists were beginning generally to recognise the cellular composition and origin of plants. The conclusion known as the 'cell-theory' was doubtless vaguely present in many minds. Its definite statement was still awaiting. In 1838, however, Schleiden proved that a nucleated cell is the only original component of a plant embryo, and that the development of all tissues might be referred to such cells. In the following year Schwann published at Berlin his famous *Microscopic Investigations on the Accordance in the Structure and Growth of Plants and Animals* (Trans. Sydenham Society, 1847). In this classic work it was shown that all organisms, plants and animals alike, are made up of cells, and spring from cells. In composition and in origin there is unity. The generalisation familiarly known as the cell-theory was thus clearly established, and though now a commonplace and postulate of histology, it may fairly be described in Agassiz's words as 'the greatest discovery in the natural sciences in modern times.' Following up the generalisations of Schwann and Schleiden, came a host of researches by which the essential advance contained in the 'cell-theory' was more and more fully confirmed. Cells were not only observed, their import was recognised.

**New Conception of the Cell.**—When the cell-theory was established, the general conception of the cell was far from being either accurate or complete. It was usually described as a vesicle closed by a solid membrane, containing a liquid in which float a nucleus and granular bodies. It was also the general opinion that such cells originated within a structureless ground substance. In two ways these notions were speedily corrected. On the one hand as regards the origin of cells, Prevost and Dumas (1824), Martin Barry (1838-9), Reichert (1840), Henle (1841), Kölliker (1846), Remak (1852), showed that in the case of the egg-cell, and in the growth of tissues, each new cell arose by division from a predecessor. This important conclusion was most firmly established by Goodsir in 1845, and Virchow in 1858, who proved that in all cases, normal and pathological alike, cells arose from pre-existing cells, a fact expressed in the axiom *omnis cellula e cellula*. In the second place it gradually became apparent that too much importance had been attached to the cell-wall and too little to the contained substance. Referring details to the

article PROTOPLASM, we may note some of the important steps. Dujardin (1835) described the 'sarcode' of Protozoa and other cells; Purkinje (1839) emphasised the analogy between the 'protoplasm' of the animal embryo and the 'cambium' of plant-cells; Von Mohl (1846) emphasised in the clearest way the importance of the protoplasm in the vegetable cell; Ecker (1849) compared the contractile substance of muscles with that of the amoeba; Donders also referred the contractility from the cell-wall to the contained material; Cohn suspected that the 'sarcode' of animal- and the 'protoplasm' of plant-cells must be 'in the highest degree analogous substances'; and so throughout another decade did botanists and zoologists unite in laying stress rather on the living matter than on the wall of the cell, and in hinting at the existence of one living substance as the physical basis alike of plants and animals. This view found at length definite expression in 1861, when Max Schultze defined the modern conception of the cell as a unit-mass of nucleated protoplasm. Since then the 'protoplasmic movement' has dominated research, and we think not so much of the cell containing protoplasm as of the protoplasm which constitutes and gives form to the cell.

II. *Structure of the Cell.*—While it is impossible to isolate the static from the dynamic aspects of the cell, it will be convenient to discuss the two separately, and to consider the cell at rest and dead, apart from the cell active and alive. In other words, the form, structure, or morphology may be studied for literary clearness apart from the functions, life, and physiology.

(a) *General Form.*—The typical and primitive form of the cell is spherical. This is illustrated by many of the simplest plants and animals which live freely, and by young cells such as ova. But the typical form is in many, indeed in most cases, lost; and the forms assumed are as diverse as the internal and external conditions of life. The cell may be irregular and protean, as in Amoebæ, white blood-corpuscles, and many young eggs; or squeezed into rectangular shape, as in much of the substance of a leaf; or flattened into thinness, as in the outer lining of the lips; or oval and pointed, as in swiftly moving Infusorians and Bacteria; or much branched, as in multipolar ganglion cells of animals or the latex-containing cells of some plants. The typical spherical and self-contained form is that which would naturally be assumed by a complex coherent substance situated in a medium different from itself. The other forms are responses to internal and external conditions. Under the heading *Cell-cycle* below it will be shown how the relative activity and passivity of the cell naturally expresses itself in such extremes as a long-drawn-out Infusorian and a rounded-off Gregarine, or in a highly nourished ovum and a mobile spermatozoon. Further, cells, like entire animals, often show a tendency to become two-ended, to have poles very different from one another. Just as an animal may have a highly nourished head and a scantily nourished tail, so a cell may become distinctly bipolar in form. In other cases the cell is altogether plastic, expressing every impulse of internal change and every impact of external influence in some modification of form. Or the state of nutrition of the living matter may cause alteration in the adhesion of the substance all over, or in particular places, and thus condition an outflowing, regular or irregular, in given directions. Furthermore, external pressure and limitation of growth may square off the cell into a parallelogram, or restrict it to grow like a bast fibre in length alone and not in breadth. In fact the conditions are most manifold, and the resultant forms likewise.

(b) *General Substance of the Cell.*—The cell is much more than a mass of highly complex chemical substance: it has an organised structure. (1) The protoplasm or living matter in the strictest sense is generally supposed to be an intimate mixture of complex and highly unstable chemical compounds. Inspection under a microscope of such cells as amoebæ, white blood-corpuscles, ova, simple algæ, or such as are readily seen in thin slices of growing plant-shoots, in root-hairs, and transparent parts, will at once furnish an impression of the general aspect of the substance of the cell. Not all that one sees can of course deserve the name of protoplasm, for apart from definite inclosures like starch-grains and fat-globules, much of the remaining slightly clouded substance is hardly to be strictly called protoplasm, but rather represents steps in the ceaseless making and unmaking which form the fundamental rhythm of life. Keeping the definite inclosures and products for the moment aside, we may briefly notice in general outline what has been with most conclusiveness observed as to the structure of the general cell-substance or 'cytoplasm' as it is now frequently termed. All observers agree that the structure is far removed from the homogeneous, though there is much difference of opinion as to the nature of the heterogeneity. In a large number of cases at least the substance of the cell has been resolved into two distinct portions—the one an intricate network, knotted and interlaced in a manner baffling description; the other a clear substance, filling up the interstices or meshes of the living net. The cytoplasm has sometimes the appearance of numerous coils of fibrils, sometimes of a fine emulsion. It is probably different at different times and in different cells. In addition to the general intricacy and the diverse passive inclusions (metaplasm), there is often a further complication due to intrusions of the nuclear substance into the cytoplasm. These chromidia, as they are called, often exhibit a definite and persistent architecture.

But besides the real substance of the cell there are to be seen products of various kinds formed from the living matter. The cell may be packed with starch, or laden with fat, or expanded with mucus; it may contain colouring matter in various forms, as in the familiar chlorophyll bodies of many plant-cells; its structure may include, as in some Protozoa, definitely formed fibrils or yet firmer formations of chitin and the like; and again there are concretions of retained waste and reserve products, sometimes in the form of crystals. Not to be overlooked either is the fine 'dust-cloud' of minute granules which are seen suspended in the clearer matrix, and which apparently represent aggregations of diverse chemical substances formed in the building up and breaking down of the protoplasm. As the outside of any mass is bound to be in different conditions from the inside, it is natural to find the appearance of distinct physical and chemical zones in the cell-substance. Thus in many Protozoa the outer portion, needlessly termed 'ectoplasm,' is often denser and more refractive than the more fluid and internal stratum of the 'endoplasm.' Or this may go further, and we may have a sweated-off limiting cuticle, or a definitely organised wall of cellulose in vegetable cells. The cuticle may be further substantiated with secretions of horny, flinty, limy, and other material. Even within the cell a stratified structure may be frequently observed. Indeed, Berthold and others have emphasised the existence of layers, each characterised by particular deposits. Formed bodies of special significance in the cytoplasm are called plastosomes.

Worthy of notice, too, are the various kinds of bubbles or vacuoles which occur in the cell-substance. These may be simply indefinite spaces,

containing some liquid not protoplasm, and including salts and other substances in solution. In many Protozoa they are 'food-vacuoles,' formed by the

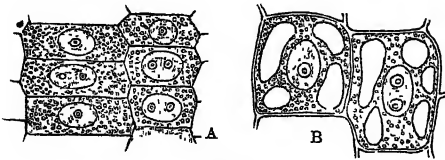


Fig. 2.

A, Embryonic cells from growing point of a root; B, older cells becoming vacuolated. (After Sachs.)

bubbles of water engulfed along with the food-particles, round which the protoplasm, shrinking from contact, often forms a definite contour. In other cases they are more permanent, and represent minute reservoirs of secreted substance, cisterns of by-products in the vital manufacture of the cell. Finally they may be seats of special activity, where, perhaps, under the stimulus of irritant waste-products, the protoplasm exhibits spasmodic contractions and expansions, and forms the so-called 'contractile vacuoles,' which in alternate dilatation and bursting often seem to serve to remove fluid from the living matter to the exterior.

(c) *Nucleus*.—In the great majority of cells a central body of definite composition and structure is present which appears to be essential to the life and reproduction of the unit-mass. In many cases the nucleus is well concealed, but as more skilful staining has revealed its presence in many cells which used to be described as non-nucleated, it is rash to conclude too certainly as to its absence in any particular case. Thus some of the Monera, which were formerly defined as the simplest of simple animal organisms without even a nucleus, have been shown to be nucleated. Furthermore, the researches of Gruber have shown that in some of the higher Protozoa (ciliated Infusorians) where the nucleus seems entirely absent, dexterous staining proves its diffused presence in the form of numerous granules which take on the characteristic nuclear dye. Yet in some cases, such as the young spores of some Protozoa, the greatest care has not yet been successful in proving the presence of the nucleus. In contrast with these cases, many cells exist in which the nucleus is represented not by one, but by many bodies—the so-called polynuclear state.

In the *form* also of the nucleus numerous modifications occur. In the majority of cases, indeed, it is more or less spherical, but it may be elongated, curved, horseshoe-shaped, necklace-like, and even branched. In the young stages of some ova it is like the entire cell, somewhat plastic. In special conditions, furthermore, the nucleus may exhibit peculiar deformations. It is in fact a peculiarly sensitive and all-important part of the cell, suffering with it in degeneration, changing with it in growth and division.

In *position* the nucleus is typically central, where as the presiding genius of the cell it shares and perhaps controls the general protoplasmic life. But it frequently suffers displacement both of a passive and active nature. In accordance with the growth of the cell it may occupy a position distinctly nearer one of the poles. Accumulations of fat or mucus may push it passively to the side. Or it may actively change in response to hidden forces of attraction between it and the surrounding protoplasm, in the case of some ova exhibiting a peculiar rotation, or else distinctly shifting its ground from the centre towards the periphery.

*Structure*.—In many cases, as Leydig especially

has shown, the nucleus seems to lie in a nest of its own, in a clear space within the surrounding cell-substance. Nor is it in many cases at least definitely insulated from the surrounding protoplasm, but is moored to the latter by strands which have intimate relations with both. As of the entire cell, so of the nucleus it must be said that in the great majority of cases it is very far from being homogeneous. The nucleus is a little world in itself, and full of intricacy. The following parts have to be distinguished: the framework or reticulum—partly the readily stainable chromatin and partly the more elusive not readily stainable achromatin or linin; the ground substance or matrix; various enclosures known as 'nucleoli,' &c.; and a nuclear membrane. These may be briefly referred to in order.

The framework or reticulum traversing the ground-substance or matrix of the nucleus consists of a

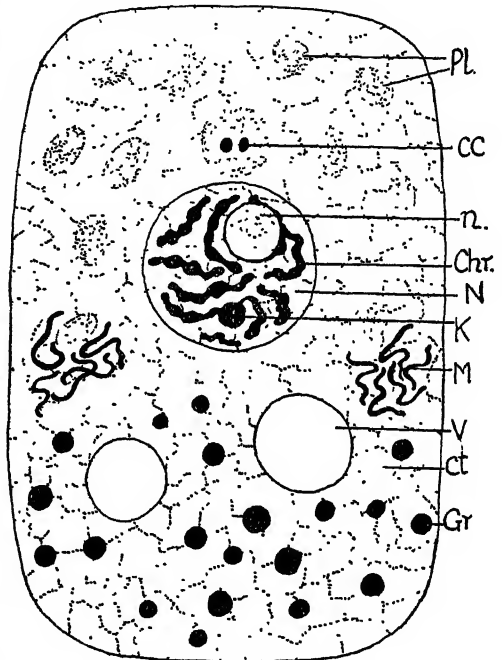


Fig. 3.—Diagram of a Cell, showing:

Ct., the cytoplasm with a network structure; Gr., granules; V., a vacuole; M., chromidial apparatus or mitochondria; K., a chromatin knot or karyosome in the nucleus (N.); Chr., chromosomes; n., a nucleolus; CC., a paired centrosome surrounded by dense archoplasm; Pl., formed bodies or plastids in the cytoplasm.

threadwork of 'linin' (taking acid stains, but not readily stainable), which bears and perhaps secretes another substance called 'chromatin' (staining with a basic rather than with an acid dye). The linin and chromatin may form a network, or a coil, or a definite number of rods or loops, called 'chromosomes.' For each species the number of these chromosomes is definite. The chromatin often appears, under very high magnification, like beads strung on the linin thread. It is chemically a nuclein—a combination of albumin and nucleic acid. The spaces between the framework are filled with an intermediate matrix of variable consistence, usually viscous, without apparent structure, and either clear or slightly granular. The term 'nucleoli' is applied to diverse small bodies within the nucleus. Some of these are masses of chromatin more or less

definitely connected with the linin framework and taking a basic stain. Other bodies which take on an acid stain are also called nucleoli, and are probably transient nuclear accumulations of a heterogeneous character. A delicate membrane bounding the nucleus is generally but not universally present. It always disappears during the process of cell-division.

*Centrosomes, Plastids, and Chromidia.*—The more the cell is studied the more intricate it appears. Besides the nucleus the cytoplasm usually contains a minute definite body, in most cases paired, known as the centrosome. In certain plants the presence

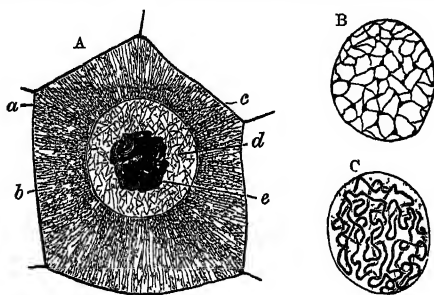


Fig. 4.—(After Carnoy.)

A, Cell and typical nucleus: *a*, slight membrane; *b*, radiating protoplasmic network; *c*, wall of nucleus; *d*, plasma of nucleus; *e*, nuclear coil.  
B, Nucleus at rest, showing network.  
C, Nucleus before division, showing coiled filament.

of centrosomes has not been proved, but with this exception they are practically universal in cells. They play an important part in cell-division. The area of cytoplasm around a centrosome is often condensed (the 'archoplasm') or marked by a halo of fine radiations. Formed bodies, such as the chlorophyll corpuscles in the cells of green plants, are known as 'plastids.' They multiply by division, and pass from one cell generation to another. In not a few cases, especially in highly active cells like those of glands and ganglia, there is extranuclear chromatin, forming what is called the chromidial apparatus, and there are many other complexities in cell-structure.

The question of the best terminology for the parts of the cell is difficult. E. van Beneden proposed the term 'plasson' for the hypothetically primitive condition of living matter before a nucleus was differentiated. The word protoplasm may be retained, in its original usage, to denote the viscid contents of the cell, including the nucleus. It might be subdivided into the general cell-substance or cytoplasm and the nuclear substance or nucleoplasm. According to Sir Ray Lankester, a better term for the extra-nuclear substance of the protoplasmic corpuscle or cell would be periplasm. There is no doubt that the word protoplasm is often used in quite a different way—in a chemical rather than in a structural sense—to signify the critical chemical body which undoubtedly is present in living protoplasm and is the apex of the pyramid or the top of the fountain, to which a variety of chemical bodies are leading and from which another series of chemical bodies are receding at every moment of the chemical activity of living protoplasm. For this chemical body Sir Ray Lankester proposed the term 'plasmogen.'

(*d*) *The Cell-wall.*—In the older conception of the cell, which was practically that of a closed bag, the wall of the cell figured very prominently. But Nägeli showed, (1845) that some vegetable cells were destitute of walls, Leydig (1857) defined the cell in respect to its substance, Schultze

and others described naked Protozoa, and the progress of the 'protoplasmic movement' led to the abandonment of the position that the wall was a necessary or important part of the cell. In many cells, indeed, a limiting layer is very clearly present, and a sheath or cyst is especially characteristic of passive cells. Plant-cells are almost always distinguished by the possession of a limiting wall, of definite chemical composition, consisting of what is known as cellulose. An analogous wall occasionally occurs round animal cells. In the latter, however, the membrane is usually a comparatively slight thing, and may arise (1) from an aggregation of the threads and knots of the framework; (2) as a cuticle or capsule formed from the matrix or ground substance; (3) from a combination of both these elements. Leydig has shown that in a very wide series of animal cells the membrane, such as it is, is penetrated by small but definite pores. It is very important further to remember that both in plants and animals the cells are in a great number of cases connected with one another by intercellular bridges of protoplasm, and are in nowise to be thought of as closed bags. The cell-wall of plants, which, be it again noted, is a definite chemical substance, grows in extent and thickness by an intricate organic process, in the course of which new infinitesimal elements form apparently as intercalations between the old. The growth is in very many cases far from uniform; pits, ridges, and manifold kinds of sculpturing thus appear, and give rise to numerous detailed variations. The formation of new boundaries when a cell divides is a question of much difficulty; but in plant, and apparently in some animal, cells the formation of a 'cellular plate' is one of the last events in the dividing process.

III. *Physiology of the Cell.*—When the entire organism is simply a cell, as in most of the Protozoa and Protophyta, all the vital processes which in higher forms have their seat in special sets of cells, known as tissues and organs, are of course discharged by the unit-mass. Thus a unicellular organism like the *Amoeba* takes in potential energy in nutrition, changes its food into available form in digestion, and expends energy in internal movements and in locomotion. As in any higher organism the oxygen required for the oxidative splitting up of organic molecules, the air for the vital flame, is taken in by the absorption known as respiration, and the waste carbonic acid gas is in an essentially similar way got rid of. Further, more solid 'ashes' of the vital combustion are formed in the *Amoeba* and in other actively living cells, and may pass out in excretion along with the refuse of unusable food-material. The absence of a circulating fluid, of digestive glands, nerves, sense-organs, lungs, kidneys, and the like, does not in any way restrict the vital functions of a unicellular organism. All goes on as usual, only with greater chemical complexity, since all the different processes have but a unit-mass of protoplasm in which they occur. The physiology of independent cells, instead of being very simple, must be very complex, just because structure or differentiation is all but absent. It is, however, possible to express the manifold processes in a comparatively simple way by remembering what Claude Bernard was one of the first clearly to emphasise, that vital processes must be really only twofold—building up and breaking down of living matter. On the one hand the protoplasm or real living matter (probably a mixture of proteids) is being by a series of chemical processes built up; on the other hand, in activity it is breaking down. The income of food or energy is, at the expense of the cellular organism, gradually raised into

more and more complex and unstable compounds, until the genuine most complex and most unstable living matter itself is reached. On the opposite side, with liberation of energy in the form of work, this living matter breaks down into simpler and simpler substances, until only the work, the waste products, and heat remain as the equivalent of the income of energy or food on the other side of the life-equation. On the one hand there are constructive processes, on the other destructive; chemical synthesis and chemical dissolution is another expression of the contrast; while the two sets of processes are in more modern language respectively termed anabolism and katabolism (see PROTOPLASM).

But only a few cells, comparatively speaking, live a free and independent life. The majority are component elements in higher unities. In these the original many-sidedness of function is more or less lost, or at any rate in abeyance, and that exactly in proportion to their degree of subordination. Even in individual cells there is a tendency, obviously within narrow limits, towards differentiation—that is, to the restriction and specialisation of certain parts for certain functions. But when the cells form elements of a larger whole, the division of labour finds full effect. From position and other conditions the cells cease to be uniform or metaphorically many-sided. Certain sets predominate in contractility, others in irritability, others in secretion, others again in storage, and so on. In such cases one function predominates over the others, which are subordinate or only dormant possibilities. Thus arise muscle-cells, nerve-cells, glandular cells, fat-cells, and the like. Compared with *Amœbæ*, those cells must have a simpler physiology; they may have gained in complexity of structure, but have lost in manifoldness of function. The aggregation of similar cells, usually with one predominant habit or function, results in the formation of tissues (see BIOLOGY, EMBRYOLOGY, FUNCTION, PHYSIOLOGY, REPRODUCTION, and cognate articles in this work).

One general physiological fact may, however, be referred to which will greatly assist in understanding the life both of independent cells and of those which form the elements of tissues. A survey, of the unit-organisms, both among plants and animals, reveals the existence of three well-marked phases. Some cells are emphatically active, equipped with motile lashes (cilia or flagella), and obviously liberal in their expenditure of energy. Others are just the reverse of this, emphatically passive, wrapped up in themselves and without motile processes, obviously economical in their expenditure, conservative of

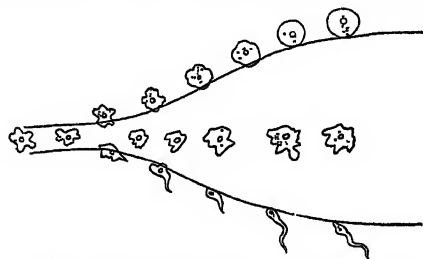


Fig. 5.—Phases of Cell-life. (After Geddes.)  
Development of passive or resting, intermediate (*amœboid*), and active (motile) states.

their income. A third set form a mean between these two extremes, are neither encysted like the latter nor lashed like the former, but furnished with the relatively slow moving processes characteristic of *Amœbæ*, and living in a *via media* be-

tween activity and passivity. These three types may be termed respectively ciliated, encysted, and *amœboid*, or active, passive, and moderate. That these types generally correspond to the three great divisions of the Protozoa shows that they represent the three main possibilities of cellular life. Now in the very simplest forms all the three phases occur in one life-history; no step has, as it were, been taken in any one of the three directions; the primitive cells are in a state of physiological indifference. What has happened in the higher classes of Protozoa—Infusorians, Gregarins, Rhizopods—is that one phase has been accentuated to the more or less marked subordination of the others. Not that the emphatic adoption of one line of cell-life excludes the others; they may in fact occur as temporary stages, or as pathological deviations.

But while simple observation is sufficient to establish the existence of a cycle of phases in the life of primitive cellular organisms, such as *Protomyxa*, and the existence of three main lines of specialisation among the Protozoa, the importance of this conception of a 'cell-cycle' becomes increased and justified when the facts are considered physiologically. If we start from a simple cell, such as an *Amœba*, it is evident enough, from what has been already said as to the twofold nature of all vital processes, that the principal physiological possibilities are the three phases above indicated. On the one hand, with preponderance of income over expenditure, of constructive over destructive changes, of anabolism

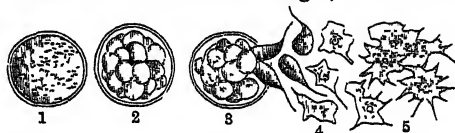


Fig. 6.—*Protomyxa*:

1, encysted; 2, dividing; 3, spores escaping as ciliated bodies passing into 4, amœboid state; 5, 'plasmodium' forming from fusion of amœboid cells.

over katabolism, the cell must tend to become larger in size, more weighted with stored material, more sluggish or passive in habit, and more rounded in form. But if the reverse takes place, the cell will tend to become less bulky, more active or locomotor in habit, and more elongated in form. The sweated-off cyst of the former, the motile processes of the latter, are expressions of exactly opposite constitutions and conditions. A third physiological possibility remains—that, namely, of continuing in a position of average equilibrium between income and expenditure, between anabolism and katabolism, in a middle way between the fitful fever of extreme ciliated activity and the sluggish sleep of encysted passivity.

Now if we take these two facts—the existence of a primitive cycle through which cells tend to



Fig. 7.—The Cycle of Cell-life:

a, encysted; b, ciliated; c, amœboid; d, plasmodial.

pass, and the existence of three main physiological possibilities which lie behind the cycle—we are in a better position to understand both the changes exhibited in normal and pathological conditions by individual cells, and the various forms of cells as they occur in the tissues of the higher organisms. Thus lashed cells such as those of the windpipe of mammals, the skin of many lower worms, the

inside of a Hydra, the male elements of most animals and many lower plants, emphasise one phase in the cycle, and it is not surprising to find that in certain conditions they may sink down into the amoeboid type. Or, again, the amoeboid character of young ova, preceding the more passive and encysted condition of the mature cells, is in view of the 'cell-cycle' a most natural procedure. In many cases artificial stimulus of various kinds has been shown to make cells pass from one phase to another of the primitive life-cycle theoretically possible to all. In the same way the preponderance of cellulose in cells encysted is a natural character of the passive plants, and the insheathed cells of many animal tissues may be similarly expressed as an exhibition of the same passive phase. But it is enough here to point out the possibility of classifying and interpreting the various cells composing the tissues of higher organisms in terms of an original life-cycle, or deeper still in terms of those twofold protoplasmic possibilities which lie behind all forms and phases whether of cells, tissues, or organisms themselves. This conception of a cell-cycle is due to Geddes (see *Bibliography* at end of article).

The activity or metabolism of the cell is manifold, like that of the organism as a whole. There is upbuilding and down-breaking, oxidation and reduction, secretion and excretion, and so forth. All-important is the complicated unending series of fermentative changes. In all this intra-cellular activity there are active inter-relations between cytoplasm and nucleoplasm, which co-operate like the members of a firm. It has been experimentally proved that the nucleus is in some cases at least quite indispensable; it plays an important part in the nutrition and respiration of the cell; it sometimes seems to act like a controlling centre.

**Cell-division.**—When the vital processes are so related that income and upbuilding exceed expenditure and dissimulation, the cell must obviously accumulate capital and increase in size. In some cases the cell may expand into relatively gigantic proportions, as in the alga *Botrydium* and in many eggs. Growth, however, brings a nemesis with it, this namely, that the mass to be kept alive increases more rapidly than the surface through which the vital processes are accomplished. In

much less rapid rate. A limit of growth is thus reached. The cell must stop growing, or go on growing at an increasing risk, or in some way restore the balance between mass and surface. This last course is the one most frequently exhibited—the cell divides. However this may be effected, the result is in all cases the same—namely, the reduction of mass, and corresponding increase of surface. Like other organisms, the cell-organism reproduces at its limit of growth. This rationale of cell-division, due especially to Herbert Spencer, is obviously clearest in reference to free-living cells like Protozoa, Protophyta, blood-corpuscles, reproductive cells, and the like, but the general principle holds good throughout.

It is evident, however, that such considerations as the above go to justify rather than to explain cell-division. They show why the cell ought to divide, not how it does. The physiological cause of cell-division is unknown. In its very simplest expressions, indeed, the riddle may be partly read. In a simple and primitive Protozoon like *Schizogones*, the protoplasm seems literally to break. Irregular fissures appear, as well they might if a condition of unstable vital equilibrium has been reached, and portions of the substance are cleft apart from the main mass. From such a case to the separation of multiple buds, which are little more than overflows of too large a cell, or to the commoner occurrence of simple budding, is no great step. The difficulty begins, however, when we consider the ordinary cell-division, which appears in most cases as an intricate and orderly process, including a well-defined series of nuclear changes.

**Modes of Cell-division.**—After abstracting the rare occurrence of almost mechanical ruptures and of overflow buds, various modes of orderly division remain to be noticed. (a) The cell may give off a bud, usually smaller than itself. With this a portion of the nucleus is usually associated, as in many Protozoa; or the process may occur apart from demonstrable nucleus. (b) Division into two is by far the most frequent mode of multiplication, and occurs all but universally. In a small minority of cases the division is accomplished without any intricate nuclear change, the cell being in an apparently simple way divided into two, with half of the nucleus in each daughter-cell. Such divisions are said to be 'direct.' In most cases the nucleus, apparently taking the initiative, undergoes a striking series of orderly changes before the division is perfect. This is the commonly observed condition, and such divisions are termed 'indirect.' (c) But in many cases the division occurs in a very different way, being not single but multiple. From one cell more than two daughter-cells arise simultaneously, and that not by external cleavage, but by internal multiplication. Such a mode of multiplication is termed endogenous division or 'free' cell-formation, and is well seen in many Fungi and Alga. It may be compared with the ordinary process by defining it as division taking place in limited space and time, since the daughter-cells arise within the mother-cell, and simultaneously, not successively. It is, in many cases at least, preceded by the rapid division of the nuclei, to form centres round each of which protoplasmic material then becomes aggregated.

**Karyokinesis.**—One of the most beautiful results of modern histology is the demonstration of the general unity of process which obtains in the division of all kinds of cells. Whether the subject of investigation be the pollen-cells of a plant, the skin of a tadpole, the developing ovum, or the growth of any organ, the same process of ordinary indirect division may be observed to take place along essentially similar lines. This, though but

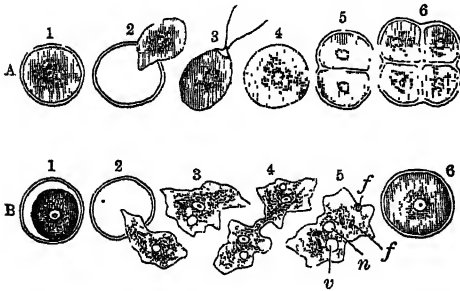


Fig. 8.

- A, Life-history of unicellular plant (*Protococcus*): 1, encysted; 2, quitting its cell; 3, ciliated; 4, quiescent; 5 and 6, dividing.  
B, Life-history of Amoeba: 1, encysted; 2, escaping; 3, free; 4, dividing; 5, free half with vacuole *v*, nucleus *n*, and food-particles *f*; 6, encysting anew. 4 and 5 may also represent the union of two Amoebae (conjugation).

spherical cells the former increases as the cube, the latter as the square of the radius. The bigger the cell gets, the more difficult do its conditions of life become. The supplies of food and oxygen, the means of accomplishing purification and the like, cannot keep pace with the growth of the living mass if the surface increase only at a

a natural consequence of common descent and similar conditions, is not without its marvel when the complexity of the process (see below) receives due consideration. Even in detail there is in structural as well as in physiological changes a deep-seated unity of process. But while the essential similarity of all cases of simple 'indirect' division must be allowed, it is necessary to recognise that in minor details very manifold variations occur.

The eventful changes in ordinary cell-division are as follows. The nuclear membrane disappears, the chromatin reticulum becomes a coil (a spireme thread), the coil takes the form of a definite number of chromatin elements or chromosomes (twenty-four in man, salamander, and lily). These become disposed in a star, lying flat at the equator

father and farther from one another towards the opposite poles, remaining connected, however, by delicate achromatin threads. The rethiing to the poles is called the *anaphase*.

Each daughter-star is reconstituted into a coil or reticulum for each daughter-cell, for the cell-substance has been constricted meanwhile at right angles to the transverse axis of the nuclear spindle. A double cell-plate is sometimes laid down at the equator. Each daughter-nucleus passes into the normal vegetative phase; the spindle disappears,

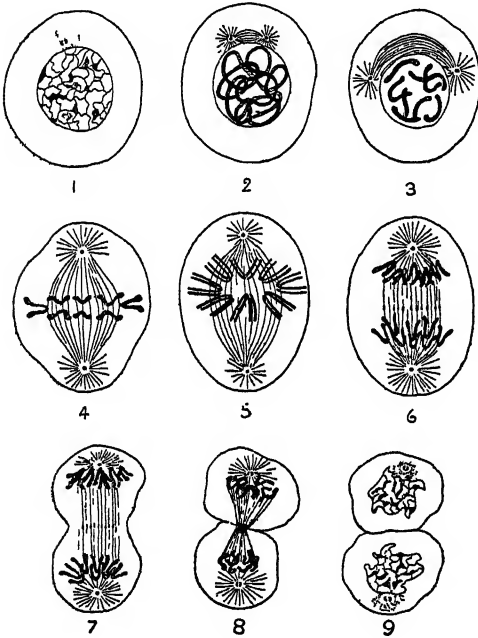


Fig. 9.—Diagram of Cell-division.

The dark bodies are the readily stained chromosomes; the small bodies are the two centrosomes which play an important part in the nuclear division or karyokinesis. 1, The resting nucleus with the chromatin in a network. 2, The chromatin in a skein or spireme. The centrosome is dividing. 3, The chromatin has divided into chromosomes, in this case eight. 4, The chromosomes form an equatorial plate; a spindle of fine threads is formed. 5, Each chromosome splits into two. 6, The U-shaped halves pass to the opposite poles. 7, The chromosomes reach the poles. 8, The cell divides into two across the equator of the spindle. 9, There is nuclear reconstruction in each of the two daughter-cells.

of the cell, and are often seen as U-shaped loops with the free ends turned outwards.

Meanwhile the centrosome has divided into two, and one lies at each pole of the cell. Fine achromatin threads run from centrosome to centrosome (spindle-fibres) and from centrosomes to chromosomes (mantle-fibres), and there are also astal rays from each centrosome into the adjacent cytoplasm. The formation of the equatorial plate ends the *prophase*.

Each chromosome becomes cleft longitudinally (the *metaphase*), and each half separates from its neighbour. They lie at first near the equator of the cell, but they are apparently drawn or driven to the opposite poles. The single star thus forms two daughter-stars (diastroid stage), which separate

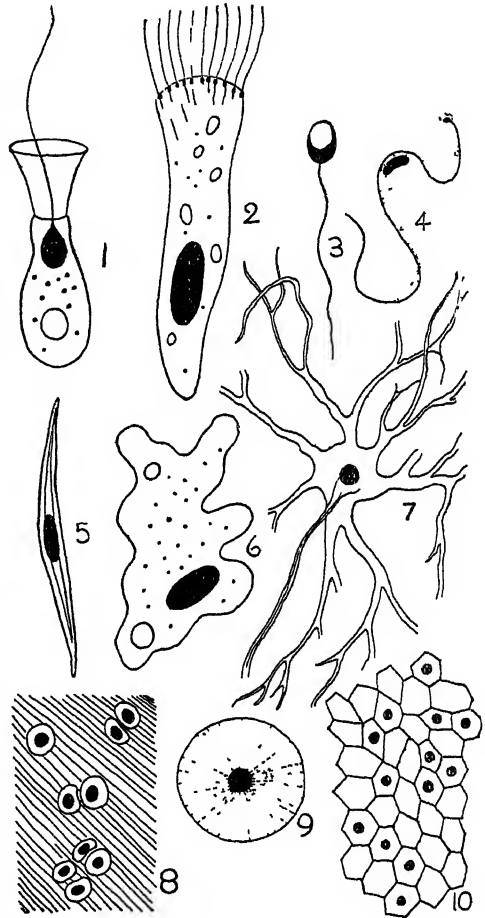


Fig. 10.—Various Types of Cells:

1, A collared flagellate cell from a sponge; 2, a ciliated epithelial cell; 3, a Trypanosome, the cause of sleeping-sickness; 4, a smooth muscle cell; 5, a nerve-cell with many processes; 6, a cartilage cell surrounded by a homogeneous matrix; 7, the egg-cell of a sea-urchin with radial disposition of granules; 8, pavement epithelial cells. The dark body is in all cases the nucleus of the cell.

and the centrosomes may also vanish. The reconstruction is called the *telophase*. The essential fact is the exact halving of the nuclear material between the two daughter-cells, the only exception being the 'meiotic' or reducing division which occurs during the maturation of the ovum and spermatozoon, where the net result is the reduction of the chromosomes to half the normal number.

*Death*.—It seems tolerably certain, as Weismann and others have suggested, that the unicellular Protozoa are in the great majority of cases practically immortal. These simple organisms have

no 'body' to keep up, in their functions they appear to be continually self-recuperative, and except from entirely abnormal conditions such cells probably never die. The pool in which they live may dry up for ever, or other animals may swallow and digest them, but such casualties are very different from natural death. They may indeed lose their individuality by doubling in division, or the whole cell may break up into spores, but where there is nothing to be buried we can hardly speak of death. It seems, in fact, justifiable to say that death began with the formation of a many-celled body. Even there, a certain amount of immortality may be claimed for the reproductive cells, which, becoming separate from the parent organism, proceed to divide into a body which will of course eventually die, but also into reproductive cells, which, as some of them at least will form again fresh organisms and reproductive cells, may be said to be links in a continuous and immortal cellular chain. But leaving aside the really immortal Protozoa, and the logically immortal successful reproductive elements, it must be allowed that cells, like organisms, die. And that not only with the body as a whole, but by themselves. Certain superficial cells are constantly being brushed off and replaced by others; the red blood-corpuscles break up in the fluid; others become hardened in death into the 'mummified' cells of supporting and epidermic structures; others surrender themselves into mucus or in the ejection of lassoes as in the Coelenterates; others practically die away into fat and reserve products, or may in manifold ways degenerate. Many surfaces, especially in secreting regions of the body, exhibit continual death of cells, and regeneration by the division of the survivors.

**Modern Aspect of the Study of the Cell.**—With the improvement of appliances and the perfecting of staining methods, the study of the cell has become at once more accurate and more complex. On the one hand, the labours of the early histologists are being amplified and corroborated with ceaseless industry. The forms of cells in different animals and tissues, the minutiae of their structure, the processes observed in their multiplication, are being each year more and more perfectly investigated. On the other hand, the study of structure is being increasingly supplemented by a study of the associated protoplasmic changes—both physical and chemical.

**Practical Study.**—To gain a preliminary acquaintance with the cell, the student should examine with a good microscope—(1) Free cells as seen in unicellular plants, such as yeast, green mould, simple algae, or in pollen grains, &c.; in unicellular animals like *Amoeba*, *Paramecium*, *Vorticella*; in the elements of the blood; in the ova of animals, as found in spawn of frog, &c. (2) Simple vegetable tissues as seen in root-hairs, transparent leaves, epidermis of plants, and common fresh-water algae like *Spirogyra*; simple animal tissues readily obtained from frog, earthworm, Hydra, and the like. For research in details of structures, staining and section-cutting must be resorted to.

**Literature.**—(1) For history, see BIOLOGY, BOTANY, EMBRYOLOGY, PHYSIOLOGY, PROTOPLASM; McKendrick, *On the Modern Cell-theory* (1888); J. Arthur Thomson, *The Science of Life* (1899). (2) For cell-structure and cell-division, see especially E. B. Wilson, *The Cell in Development and in Inheritance* (1900). (3) For general physiology of the cell, see Verworn, *General Physiology*; O. Hertwig, *General Biology* (1906); P. Geddes, 'Restatement of the Cell-theory', *Proc. Roy. Soc. Edin.* (1883); A. Macfadyen, *The Cell as the Unit of Life* (1908); Doncaster, *An Introduction to the Study of Cytology*, (1920).

**Celle.** See ZELL.

**Cellini**, BENVENUTO, goldsmith, sculptor, and engraver, and author of one of the most interest-

ing autobiographies ever written, was born 3d November 1500 in Florence, a city which he was forced to quit in early life through having taken part in 'an affray.' He then travelled to Rome, where his skill as an artist in metal-work gained him the favour of the highest nobles and popes. By his own account he was as expert with sword and dagger as with his goldsmith's tools, and he had apparently no scruple in murdering or maiming any who endeavoured to thwart him. He states that at the siege of Rome in 1527 it was he who killed the Constable Bourbon, and that he afterwards shot down the Prince of Orange before the castle of St Angelo. He stood high in favour with Pope Clement VII., but was eventually flung into prison for the murder of a rival goldsmith. In 1534 he was pardoned and set free by Paul III., who wished him to engrave dies in the mint; soon afterwards, having spoken contemptuously of the pope's artistic tastes, he was cast into an oubliette of St Angelo. He escaped through his knowledge of the castle's vaults, but was immediately recaptured, and was only saved from the pope's vengeance by the intercession of Cardinal d'Este. For some years he lived alternately in Rome and Florence, Mantua and Naples. In 1537 he was honourably received at the court of Francis I. of France, but soon returned to Florence, where he worked under the patronage of Cosmo de' Medici, and where he executed his famous bronze 'Perseus with the Head of Medusa.' He began to write his autobiography in 1558, and died at Florence 13th February 1571.

The autobiography was translated into German by Goethe (1803), into English by T. Roscoe (1822), J. A. Symonds (1887), Miss Anne Macdonell (1903), and E. H. Cust (1910). See monographs by Eugène Plon (1882) and 'the author of the Life of Sir Kenelm Digby' (1899).

**Celluloid** is an artificial substance largely used as a substitute for ivory, horn, tortoise-shell, and similar natural products. Its discovery is usually attributed to Hyatt of New York, U.S.; but it appears to have been prepared at an earlier date (1885) by Parkes of Birmingham. The raw materials for its preparation consist of camphor and nitrated cotton, commonly termed pyroxylin. Camphor, of course, is a natural product, but pyroxylin is prepared by the nitration of cellulose under proper conditions. Only a certain type of cellulose is suitable for this purpose—namely, the Alpha cellulose, which forms the greater proportion of the material of which the cotton fibre is built up (see CELLULOSE). The cotton fibre may be used in any convenient form, as 'linters' or suitable waste, but this should be free, or almost free, from oil or grease and every kind of foreign body. The clean fibre is then immersed in a mixture of nitric and sulphuric acids which 'nitrates' the cellulose. In this process some of the hydrogen atoms are replaced by the 'nitroxyl' groups, which may be represented by the formula ( $\text{NO}_2$ ), and the properties of the resulting nitrated cotton depend on the extent to which the hydrogen atoms are replaced—that is, on the number of  $\text{NO}_2$  groups introduced. The maximum number will be six, assuming that the cellulose molecule contains twelve carbon atoms. Hence the most highly nitrated cotton consists of the hexanitrate. This substance, although suited for explosive purposes, cannot be used for celluloid, as a somewhat lower degree of nitration is needed if a soluble product is required. Consequently the proportions of nitric and sulphuric acids and time of immersion are so proportioned as to produce a tetra- or pentanitrated cellulose. One receipt gives a mixture of two parts nitric acid and five parts sulphuric acid, in which the cotton is immersed for twenty

minutes at a temperature of about 30° C. The cotton is then removed from the acid, well squeezed, and plunged into a large volume of water. A long washing with fresh supplies of water follows, and when free from the last traces of acid the fibre is dried. The next process consists in making an intimate mixture of the nitrated cotton with the camphor—two or more parts of the former with one of the latter. The mixture of the two substances is facilitated by the addition of a small quantity of a solvent, such as alcohol, and the mixing is carried out by means of mechanical appliances—for instance, the mixing-rolls similar to those used in the paint, inda-rubber, and other industries.

Celluloid is frequently described as an intimate mechanical mixture of nitrated cotton and camphor; but on working together they have the appearance of melting into one another, and the product has a very different appearance and properties from the original constituents. There is certainly no chemical combination, as the camphor can be separated by suitable solvents; on the other hand, modern research has revealed the fact that bodies are frequently more closely associated with one another than in merely mechanical admixture without necessarily being in chemical combination. The camphor in celluloid may be detected by any one taking the trouble to rub a piece of celluloid as smartly as possible on his knee until the surface begins to get hot, when the odour of camphor will be at once apparent. Attempts have been made to substitute some other substance for the camphor, which is the expensive ingredient of celluloid, but without success. Nor can the so-called artificial camphor be used. Celluloid has many valuable properties. It has just that degree of hardness and elasticity which allows it to be cut, turned, polished, and worked in almost any fashion. It can also be moulded or pressed to any shape by simply softening it in hot water. Prepared as above, it is translucent or transparent; but minerals, pigments, and colours may be introduced in the process of manufacture, and by working up together sheets of different colours or different degrees of opacity it is possible to make excellent imitations of the more expensive natural products, more particularly ivory and tortoise-shell. The great drawback attending its use is its inflammability; on the other hand, it is not explosive even under pressure, and can therefore be worked with a hammer or ground between rolls. Various processes suggested for producing a non-inflammable celluloid have resulted in failure; but more success has recently attended efforts to produce other products—e.g. 'galalith,' 'syrolit,' and 'boroid,' which are non-inflammable, and may serve as substitutes for celluloid for certain purposes.

**Cellulon**, a fibre made in Germany direct from wood-pulp during the Great War as a substitute for jute, cotton, and other fibres.

**Cellulose** may be regarded as the basis or framework of the vegetable kingdom (see CELL, LEAF, TISSUES, VEGETABLE PHYSIOLOGY, WOOD). From an economic point of view cellulose is, in one or other of its forms, a substance of world-wide industrial importance. In nature it is either found in an already isolated state as cotton or in association with other organic bodies, from which it has to be separated by chemical or mechanical means, as in the case of flax. In both the above cases pure normal cellulose is the ultimate product. These forms of normal cellulose are two of the chief staples of the textile industries. A further source of pure cellulose, but of a different nature, is derived from the chemical treatment of wood, chiefly conifers (see PAPER).

As a raw product, cellulose may be regarded as existing either as (a) normal cellulose—e.g. cotton; (b) pecto-cellulose—e.g. flax; (c) ligno-cellulose—e.g. wood and jute; and (d) adipo-cellulose—e.g. cork. From the three former, cellulose is in the arts isolated in a pure white state, as (a) bleached cotton goods; (b) bleached linen and (c) bleached wood cellulose respectively. In the jute industry, in the finished goods, the fibres are retained in their unisolated condition as ligno-cellulose. All the vegetable textile fibres of commerce have therefore cellulose as their basis, with or without their encrusting materials.

Cellulose, especially normal cellulose, is an extremely inert substance, and much more so than those substances with which it is associated in the plant; consequently, when vegetable substances are submitted to treatment with boiling alkalies and afterwards treated with hypochlorites, these other associated substances are rendered soluble and removed, and cellulose remains as a residue. In practice this is generally done by treating with solutions of dilute alkalies under pressure, washing and bleaching with or without an intermediate acid treatment. In the laboratory the isolation of cellulose is best performed according to the chlorination method upon the following lines. Five grams of air-dried plant specimen are boiled for one hour in the open in 200 c.c. of a 1 per cent. caustic soda solution. The boiled mass is then squeezed out and exposed for one hour to chlorine gas; after which it is rinsed and immersed in a dilute cold solution of neutral sodium sulphite. If the fibre is lignified, the mass will then turn a magenta colour. The solution is then made distinctly alkaline, with a few drops of strong caustic soda, and is boiled for thirty minutes. The chlorinated derivative of the non-cellulose portion is by this means rendered soluble in the boiled liquid, the cellulose being left behind. If there is still a quantity of unresolved non-cellulose remaining attached to the fibre the chlorination process may be repeated. The residue of cellulose fibres is now, if necessary, immersed in a weak solution of sodium hypochlorite until bleached, and finally washed with cold water containing a trace of acetic acid, dried and weighed, and the weight calculated as a percentage on the original. Cellulose (cotton) treated with boiling 1-2 per cent. solution of sulphuric or hydrochloric acid is converted into a friable white mass of *hydro-cellulose*. The same can be brought about by exposure to the vapours of hydrochloric acid. If a piece of wetted cellulose fabric (cotton) is dusted over with dry bleaching powder and left exposed to moist air for a few days, it becomes 'tendered' and converted into a friable white mass of *oxy-cellulose*. On treatment either with strong nitric acid alone or mixtures of concentrated sulphuric or nitric acids, cellulose is converted into *nitro-cellulose* (see CELLULOID, GUN-COTTON).

On immersion in a 60-80 per cent. cold sulphuric acid solution, cellulose is converted into a gelatinous mass or hydrate which, if poured into a large quantity of cold water immediately after dissolving, is precipitated as *amyloid*. This property is made use of in the manufacture of 'vegetable parchment,' where a web of waterleaf paper is made to pass through a cold bath of 60-80 per cent. sulphuric acid, and is subsequently washed free of acid, and dried. If conducted under proper conditions, and the treatment with sulphuric acid is more prolonged, *glucose* is formed as a final product. This process is largely made use of in commerce.

Zinc chloride has the power of either partially or completely dissolving or gelatinising cellulose in a somewhat similar manner to that of sulphuric acid, only that the solution, if properly prepared, is not

further acted upon by the solvent, and therefore the solvent need not be removed immediately in order to obtain the regenerated product. This reaction, where a partial solution effect only is produced, is extensively used in the manufacture of 'vulcanised fibre,' where a web of cotton paper is passed through a bath of zinc chloride, reeled into several ply to produce the thickness required, and, after the removal of the zinc chloride by prolonged immersion in water, is pressed and dried in the form of sheets and rolls.

One of the early solvents for cellulose, which is extensively used in the arts, is that attributed to Schweitzer, but first noticed by Mercer, and known as 'Schweitzer's reagent.' This can be conveniently prepared by adding just sufficient caustic soda solution to a cold solution of copper sulphate to precipitate the basic salt; after filtering, the residue is dissolved in strong ammonia. This reagent dissolves cellulose to a deep-blue viscous solution. This reagent, or some modification thereof, is applied to woven cloth—such as canvas—so as to produce partial gelatinisation. The ammonia is then allowed to evaporate. The product so obtained is of a green shade, and is rot-proof; in one form it is known as Willesden canvas, and is largely used for hayricks, cart-hoods, &c. The complete cuprammonium solution prepared by dissolving cotton by the above reagent is extensively used in the manufacture of artificial silk and horsehair. See SILK (ARTIFICIAL).

The effect of weak caustic soda solution upon cellulose (cotton), whether hot or cold, is merely to remove the extraneous matter. Mercer, however, discovered that when the alkali exceeded a certain strength a profound change took place, the fibres becoming swollen by imbibing the solution. For some thirty years the discovery of this phenomenon, which was known as 'mercerisation,' after its discoverer, was made no commercial use of. The process of mercerisation is now extensively employed in the finish of textiles. The cloth or thread is impregnated with soda of mercerising strength in such a manner that, when the drying is performed under tension, glossy and lustrous effects are produced. The mercerisation of textiles is now a large industry.

In 1890-91 Cross, Bevan, and Beadle discovered that if cellulose, after mercerisation with caustic soda, is exposed to the vapours of carbon bisulphide, it becomes gelatinous, and finally dissolves in water to a yellow treacly solution, known commercially as 'viscose.' This product is the sodium salt of cellulose thiocarbonic acid. The chief use of this solution is in the manufacture of artificial silk (see SILK, ARTIFICIAL); but it is applied to many other purposes, notably for the production of transparent films. On keeping, *viscose* spontaneously changes into a gelatinous form of *cellulose hydrate*.

*Nitro-cellulose*, already referred to, if suitably prepared can be dissolved in a mixture of ether and alcohol, producing the *collodion* of commerce from which photographic films are produced by the evaporation of the solvent. With other solvents, such as camphor, *nitro-cellulose* forms the basis of *celluloid* (see CELLULOID).

Cellulose can be made to combine with acetic acid to form *cellulose acetate*, which compound is soluble in excess of glacial acetic acid and other organic solvents. If a solution of the above is spread upon glass and immersed in water, the solvent is removed and a film of cellulose acetate is produced, or the film may be produced by the evaporation of the solvent with heat. *Cellulose acetate* films can be made to possess extreme thinness, and are of greater water resistance than those produced from *cuprammonium* or *viscose*. Both the solution and the films are used in the arts in place

of *collodion* and for other industrial purposes. See Cross and Bevan, *Cellulose* (1918).

**Celosia**, a genus of *Amarantaceæ*. See COCKSCOMB.

**Celsius**, ANDERS, Swedish astronomer and physicist, was born at Uppsala, 27th November 1701. He was the grandson of Magnus Celsius (1621-79), professor of astronomy and decipherer of the Helsing runes, and nephew of Olof, or Olaus, Celsius (1670-1756), botanist, professor of theology at Uppsala, author of the *Hierobotanicon*, and an early friend and patron of Linnæus. Anders Celsius became in 1730 professor of astronomy at Uppsala. Two years later he set out on a scientific tour, visiting the observatories of Nuremberg, Rome, and Paris. After his return he published his *De Observationibus pro figura telluris determinanda in Gallia habitis* (Uppsala, 1738). In 1740 he had the satisfaction of seeing a splendid observatory erected at Uppsala, and there he laboured till his death, 25th April 1744. The Transactions of the Swedish Academy contain many papers by Celsius on astronomy and physics. It is, however, as the first constructor (1742) of the thermometer now chiefly used by scientific men, and in some countries generally, that he is best known. In it the space between the freezing-point and the boiling-point of water is divided into one hundred degrees; hence Celsius's thermometer is often called the centigrade or centesimal. See THERMOMETER.—A second Olof Celsius (1716-94), historian and poet, professor of history at Uppsala and bishop of Lund, was a son of the elder Olof.

**Celsus**, a friend of Lucian, a sceptical man of the world rather than a philosopher, Platonist, or Epicurean, who wrote about 176-180, during the persecution of Marcus Aurelius, under the title *Logos Alethēs* ('true word'), the first notable polemic against Christianity. The book itself has perished; but fragments of high interest occur as quotations in Origen's *Contra Celsum*. See Keim, *Celsus' Wahres Wort* (1873); Pélagaud, *Etude sur Celse* (1878); Froude, *Short Studies*, vol. iv.; Dr J. Patrick, *Origen in Reply to Celsus* (1892); and the article in Hauck-Herzog.

**Celsus**, AULUS (or AURELIUS) CORNELIUS (fl. 50 A.D.), a Latin physician, wrote on medicine, rhetoric, history, philosophy, war, and agriculture. His only extant work is the *De Medicinā*, valuable as giving an account of the Alexandrian school of medicine (ed. by Daremberg, 1859; trans. Grieve, 3d ed. 1837).

**Celt**, a name sometimes given to the stone or bronze (rarely iron) axe-heads of the early inhabitants of Europe, derived from what is apparently a misreading of Job, xix. 24, in the Vulgate, where *celte*, understood to mean 'with a chisel,' was read in place of *certe*, 'verily' (corresponding to the 'for ever' of the English Bible). *Celte* or *celtis* is not elsewhere found in Latin. See FLINT IMPLEMENTS, STONE AGE, BRONZE AGE.

**Celtiberi**, a brave and powerful people of ancient Spain, supposed to have sprung from a blending of the aboriginal Iberians with Celtic invaders from Gaul. They inhabited a large inland district of the peninsula, corresponding to the south-west half of Aragon, nearly the whole of Cuenca and Soria, and a great part of Burgos, but the name Celtiberia had often a wider signification, including the country as far south as the sources of the Guadalquivir. The Celtiberi were divided into four tribes, the chief the Arevacæ and Lusones, and were unquestionably one of the bravest and noblest peoples in the peninsula. Their cavalry and infantry were equally excellent. For many years they withstood the efforts of the Romans to subdue them, and it was not till after

the death of Sertorius (72 B.C.) that they began to adopt the Roman language, dress, and manners. The chief cities were Legobriga, the capital; Bilbilis, the birthplace of Martial; and Numantia, destroyed by Scipio Africanus after a desperate ten years' resistance, 133 B.C.

**Celtic Ornament**, a peculiar development of the system of iron-age decoration prevalent in the British Isles. Its history is divided into two periods by the introduction of Christianity, which engrafted on the older style a number of new elements of decoration brought into the country with the manuscripts of the gospels and psalters, and supplied new forms for the display of these elements, such as churches and crosses, shrines, bells, and crossiers. In its pre-Christian stages, ranging approximately from two or three centuries before the Christian era to about the end of the 6th century A.D., it appears principally in connection with the metal mountings of harness and horse-trappings, and on shields, sword-sheaths, mirrors, armlets, and other articles of personal use and ornament. The material is usually bronze, but occasionally silver or gold. The principal characteristics of the pre-Christian style are its preference for elliptical curves and divergent spirals; its use of chased or engraved lines or dots as a diaper in the spaces of the general design in contrast with other spaces left plain; its use of *repoussé* work, sometimes in very high relief, at other times in low relief on thin plates riveted on in their places in the general design; the production of peculiar patterns often in excessively high relief in the casting; and the employment of *champ-levé* enamels of red, yellow, blue, and green, and settings of coloured vitreous pastes. One of the finest examples of such settings occurs in the decoration of an oval shield of bronze, from the bed of the Thames, ornamented with Celtic patterns in relief, enriched by twenty-seven settings of red enamel, kept in their places by small cruciform ornaments of bronze riveted in the centre of each. There are to be seen in the National Museums of London, Edinburgh, and Dublin enamelled shields, sword-sheaths, and ornaments of horse-trappings in bronze, of great beauty and excellence both of design and workmanship, and other articles in bronze, silver, or gold, ornamented in *repoussé* work or in relief, with or without enamel as an enrichment, found in many parts of England, Scotland, and Ireland, in pagan grave-mounds, in crannogs or lake-dwellings, in earth-houses, in the beds of lakes and rivers, or in casual deposits under the soil for concealment. In Kemble's *Horæ Ferales* (1863), Mr A. W. Franks of the British Museum figured in colours many of the best of these remarkable products of the earliest known process of *champ-levé* enamelling, and adduced evidence to show that it and this peculiar style of Celtic ornament which accompanies it were of indigenous origin, and at this early period peculiar to the British Isles. The remarkable development of Celtic ornament which succeeded the introduction of Christianity was characterised by the association of interlaced work and fretwork with the elliptical curves and divergent spirals which up to that time had been the principal elements of Celtic design. To these were occasionally added a step-like pattern, and diapers of the Z and I shaped patterns sometimes seen in Chinese decoration. The interlaced work was elaborated with excessive care into patterns, presenting an infinite variety of combinations pleasing to the eye, and capable of being harmoniously treated in colours. It was sometimes a simple ribbon-like band, which might be plain, or divided in the middle, or divided into three by lines close to the margin; or the inter-

lacing band might be replaced by an elongated animal form with its feet, its tail, and its top-knot drawn out to interlace with each other, and with the corresponding parts of other lacertine forms, the whole forming a diaper of quaintly expressed and complicated construction. The fretwork was also elaborated with much ingenuity into most complicated patterns, a special feature of the style being its partiality for diagonal frets and patterns produced by combinations of oblique lines, in direct contrast to the fretwork of Greek and Roman art, which was essentially rectangular. The elliptical curves and divergent spirals of the older style, which had received their chief expression in the solid forms proper to metal-work, were found to be equally capable of adaptation to the purposes of the illuminator, and by a similar process of combination and elaboration they also produced patterns and diapers of inexhaustible variety and beauty. A special feature of Celtic decoration was its tendency to divide the surface to be decorated into a series of panels, each of which was treated as a separate whole. The finest examples of Celtic ornament are unquestionably to be found in the grandly illuminated pages of manuscript copies of the Gospels, from the 8th to the 10th century. Of these the most famous for the elaborate nature of their ornament and the beauty of their colouring are the Book of Kells in Trinity College, Dublin, and the Lindisfarne Gospels in the British Museum. Of enamelled metal-work in this period there may be mentioned the Ardagh Chalice, perhaps the most elaborate and beautiful of all the products of Celtic art, the Lismore Crosier, and the Monymusk Shrine. Examples of filigree-work, and chasing or engraving in gold and silver of the highest excellence are found in the Tara Brooch, the Ardagh Brooches, the Rogart Brooches, and the Hunterston Brooch, the Shrine of St Patrick's Bell, the Shrine of St Manchan, and the Cross of Cong. The approximate dates of the metal-work of the highest excellence range from the 10th to the 12th century. The incised stone slabs and sculptured crosses of Scotland and Ireland range from the 9th to the 12th century. For illustrations, see BROOCH, CROSS, SCULPTURED STONES. Sir Arthur Evans, Déchelette, and Coffey (*New Grange*, 1912) hold that the spiral ornament spread from Crete to the mainland, along the Moldau and Elbe to the Baltic and Scandinavia, and thence to the British Isles (early in the Bronze Age—not through Spain and France), and from Ireland to Brittany.

See Romilly Allen's *Celtic Art* (1904); Kemble's *Horæ Ferales* (new ed. 1863); Anderson's *Scotland in Early Christian and Pagan Times* (1881-83); Westwood's *Miniatures and Ornaments of Anglo-Saxon and Irish Manuscripts* (1868); O'Neill's *Fine Arts of Ancient Ireland* (1863), and *Sculptured Crosses of Ancient Ireland* (1857); Stuart's *Sculptured Stones of Scotland* (1856 and 1867); and Miss Stokes's *Early Christian Art in Ireland* (1887), and *Six Months in the Apennines* (1892), in which last work Celtic Christian art is largely derived from the Byzantine art of Italy.

**Celts.** The Celtic nations of antiquity had no comprehensive name. Those of the Continent were called *Galli* by the Romans, and less usually *Celtæ*. The Greek equivalents for these terms were *Galatai* or *Galatæ*, and *Keltai* or *Celti*. But neither Greeks nor Romans regarded the British Isles as belonging to the Celtic world. They were situated outside it, and lay over against it in the sea; still it was known to men like Julius Caesar that certain portions of Britain were inhabited by Celts in the sense of *Galli* or *Belgæ*.

Celtic ethnology involves many difficult questions, and we shall speak of them in this article mostly according to the more palpable distinctions of speech;

and in order to proceed as much as possible from the known to the unknown, we begin by classifying their idioms. These, whether dead or still spoken, belong to the Aryan or Indo-European family of languages, and those of them spoken in modern times divide themselves into two groups—viz. Goidelic and Brythonic. (1) The Goidelic group embraces the dialects termed Gaelic, that is to say, Irish Gaelic, or Irish as it is now more frequently and briefly called; Manx Gaelic, or the Gaelic dialect not yet extinct in the Isle of Man; and Scottish Gaelic, or the Gaelic spoken in the Highlands and Islands of Scotland. In ordinary Scottish and English parlance this is what is understood by the word Gaelic when it is used without any qualification. In order to resist one of the delusions to which charlatans are always leading the unwary, it is right to say that the words *Gael* and *Gaelic* have nothing to do with *Galli*. *Gael* is the simplified English spelling of a word which is now written in Scottish and Irish Gaelic *Gaidheal*, with an evanescent *dh*; but the most ancient form known of it was *Goidel*, whence the adjective *Goidelic*, which has been resorted to by Celtic scholars as applicable equally to all three Gaelic subdivisions of the Celtic group here in question. The Celtic languages of this group are sometimes also called *Erse*, a term derived from *Ersch*, a Scots form of the adjective *Irish*. The Goidelic languages constitute an unmistakable group, and are pretty closely related to one another—much more closely than they are to any language of the other Celtic group. It must not be assumed that the peoples who at any time spoke or speak a Goidelic language are of one Goidelic race or are of the same blood, any more than that the Brythons are. Goidels have mixed with Iberians and given them their language; Brythons have Brythonised Goidels in speech. But it is held that the Goidels, the first invaders of Britain speaking an Aryan language, brought with them the culture of the Bronze Age (q.v.), the Brythons—perhaps about 250 B.C.—that of the later Iron Age (q.v.).

(2) The Brythonic group embraces the following languages: Welsh, Breton, and Cornish, which has been practically extinct for about a century. Two of these belong to Great Britain, and one, the Breton or Armorica, to Little Britain on the other side of the English Channel. These three might be collectively termed British or Britannic, but that both these adjectives have connotations which would be misleading, as they tend to confusion; so here, also, a neutral form, *Brythonic*, is used, which is derived from *Brython*, one of the Welsh words for the Welsh and the so-called Ancient Britons, whence their language is sometimes called *Brythoneg* in Welsh. This last was in Cornish *Brethonec*, and in Breton *Brézonek*, meaning respectively the Celtic of Cornwall and of Brittany. *Brython* or *Britto* was the national name of all peoples of this branch, just as Goidel or Gael may be treated as the national name of the other branch.

All this applies only to the neo-Celtic nations, or those among whom Celtic languages are or have been in use in modern times, and a question of much greater difficulty presents itself when one attempts to classify likewise the continental Celts of ancient history. The reason for this is chiefly the fact that the linguistic data become more precarious as one goes back. Thus, for example, the language of the ruling people of ancient Gaul has been left us only in a very few inscriptions, so that our knowledge of it from that source has to be complemented by the study of Gaulish proper names, of which a considerable number is extant in Latin inscriptions and in the writings of Roman and Greek authors. Now, when we apply the

test of some of the most palpable differences that are known to exist between the Goidelic and the Brythonic idioms to the remains of the Gaulish language, we find at once that it is to be ranked with the Brythonic dialects, and not with the Goidelic ones, and our Brythonic group becomes what may be more exactly described as a Gallo-Brythonic one. This further suggests the question whether there was no continental Celtic idiom which partook of the characteristics of the Goidelic branch. The probability is that there was; for one finds Sulpicius Severus, an ecclesiastical writer of the 4th century, distinguishing between Celtic and Gallic or Gaulish, as if both were spoken in his time. (See Dialogue i. 26 in Migne's *Patr. Lat.*, vol. xx. col. 201: 'Tu vero, inquit Postumianus, vel Celtice, aut, si mavis, Gallicæ loquere, dummodo jam Martinum loquaris.') And the use of the two names *Celtæ* and *Galli* would seem to point to the same inference—viz. the existence in Gaul of two Celtic peoples, the one, probably, superimposed on the other, as on a vanquished population, or driving it towards the south and west. Thus, if the Celtic language which Sulpicius Severus distinguished from Gaulish should be ranked with the Goidelic dialects, we should have alongside of a Gallo-Brythonic group another which might be called Celto-Brythonic were it not inconvenient to use the words *Celt* and *Celtic* in two senses. For while the modern usage applies them indifferently to the whole family, Sulpicius indicates a narrower sense; and so, in fact, had Cæsar done centuries before, when he wrote that one of the three peoples of Gaul was called *Celtæ* in their own tongue. He states that these *Celtæ* proper, so to say, were separated by the Garonne from the Aquitani, and by the Seine and the Marne from the Belgæ. In other words, their country extended from the Garonne to the Seine and Marne, and other Roman writers give it the name of *Celtica*; and Dionysius of Halicarnassus had heard of a river *Celtus*, from which *Celtica* was supposed to derive its name. From this narrower *Celtica*, in the sense which Roman writers gave it, one might form the adjective *Celtican*, to apply to its people, in order to avoid the confusion which must arise from calling them Celts, whilst using that word also of the whole family.

In order to show the philological reasons for this classification, it would be necessary to go into a variety of details; but let one of these suffice for the present. The Gallo-Brythonic dialects used *p* where the others would have *qu*. Take, for example, the early inscriptions of Irish for the genitive of the word for 'son'; it was *maqvī*, corresponding to a nominative which appears as *macc* or *mac* in the oldest manuscript Irish; and *mac* is still the word for 'boy' or 'son' in all the Goidelic dialects. Now the early Brythonic form of this genitive would have been *mapi*, while in the oldest manuscript Welsh may have *map*, and in later Welsh *māb*, 'boy' or 'son.' From this word was formed another, *mabon*, a 'boy' or 'youth'; and this in its old form appears in Latin inscriptions as *maponus* in Roman inscriptions found in Britain in honour of the Celtic god Apollo *Maponus*, so called in reference to his youthfulness. Now from Gaul we have such names as *Eporedorix*, *Parisii*, *Petrocorii*, and many others, with the consonant *p*; but every now and then we have also names with *qu*, such as *Sequana* and *Aquitani*, together with several instances from Spain, where a people of the same Celtic branch as those of *Celtica* had also probably established themselves.

So far, then, as one can get philological data to reason upon, in would seem that the west of Europe had in early times been subjected to two Celtic

invasions; the one is represented by the Celts whose position, geographically speaking, is the farthest from the home of the Aryans. These would be the Celticans of Gaul and Spain, as compared with the Gallic tribes to the east of them towards the Rhine and the Alps; the same relative position is also taken up by the Goidelic Celts of the British Islands, occupying, as we find them doing, the Isle of Man, Ireland, and the Scottish Highlands and Islands. The other, here represented by the Brythons, must have come later and driven out the Goidels, or subdued them, in the rest of this island. This may be supposed, also, to have been the case on the Continent, so that we have to regard the later comers, the Galli, as invaders and conquerors forming another Celtic population. In the eastern portions of Gaul they may have formed the bulk of the population, but in the rest of that country they probably only constituted a ruling class of comparatively small importance in point of numbers. Such a state of things would adequately explain the great dearth of linguistic remains belonging to the older and subjugated people. Roman authors and other strangers would naturally speak most of the ruling classes, and information about the others must reach strangers through the medium of the Gallic rulers and their language, at any rate, so far as concerns the time before Latin became the official tongue of all Gaul. A somewhat similar conclusion has been arrived at by studying the burials and megalithic monuments of France and the neighbouring lands to the east of it. In Central and Western France menhirs, dolmens, and cromlechs prevail, while the eastern side of France shows the prevalence of mounds and barrows, which are here and there found penetrating into the other domain, giving us a sort of rude sketch, as it were, of an invasion advancing irregularly towards the west. The Celts were first heard of in the upper basin of the Danube; part of the stock settled in the valley of the Po, and became apparently the progenitors of the Umbrian people. Before 400 B.C. the Gauls established themselves south of the Alps, so that northern Italy became Gallia Cisalpina. In 391 they besieged and took Rome (see BRENNUS); and from the Danube they made incursions into Greece, overran great part of Asia Minor, and permanently occupied Galatia (q.v.).

The difficult question of Celtic ethnology is considerably more difficult than would appear from what has here been mentioned; for, besides two Celtic sets of invaders, there are also to be taken into account the mixed peoples that previously occupied the countries to which the Celts came. These pre-Celtic populations probably survived in considerable numbers, and one of the effects of a second Celtic invasion may be supposed to have been to force the earlier Celtic settlers to amalgamate with the ancient inhabitants, and to make common cause with them against the new-comers. So it may be expected that the language of the Goidelic Celts will prove to have absorbed a larger non-Aryan element than that of the Brythons. Similarly, one might take for granted that the physical type of the people speaking the Goidelic dialects should prove less consistent; but this is complicated by counter-invasions from Ireland into Wales and other western portions of Britain in historical times. The coming of the Celtic languages to Britain may have been later than has been supposed. Perhaps the late Bronze Age invaders of Britain who used leaf-shaped bronze swords may, as Peake suggests, have introduced the Goidelic speech. Their leaders were probably tall blond long-heads, though their followers may have been broad-heads. On the other hand, the smaller men, with dark hair and black

eyes, which it was the fashion till lately to regard as the genuine and typical Celts, are probably Ivernians or representatives of a pre-Celtic population. Dangerous as it is to make sweeping generalisations about race, character, or national features, it is doubly dangerous to predicate largely about 'the Celtic temperament' in literature or elsewhere. The distinguishing characters of Irish art and music have been held to be pre-Celtic.

For further information on the Celtic peoples, their languages and literatures, see the articles on Brittany, Cornwall, France, Gaelic, Ireland, Wales, also Aryan, Ethnology, Philology, Druidism, Ogarn; and for the culture of the early Goidels and Brythons, the articles on the Bronze Age and the Iron Age. Consult also Bertrand, *Archéologie Celtique*; Becker, *Lösung der Celftenfrage*; Pedersen, *Vergleichende Grammatik der Celtischen Sprachen* (1914); Windisch, 'Keltische Sprachen' in Ersch and Gruber; Dottin, *La Langue Gauloise* (1920); D'Arbois de Jubainville, *Les Celtes*; Elton, *Origins of English History*; Skene, *Celtic Scotland*; Beddoe, *The Races of Britain*; Ridgeway, *The Early Age of Greece* (1901); Sergi, *The Mediterranean Race* (1901); Holmes, *Ancient Britain* (1907); Ripley, *The Races of Europe* (1900); Rhys and Brynmor-Jones, *The Welsh People* (1900); Rhys, *Celtic Britain* (3d ed. 1904), *Celtic Heathendom* (1886), *Celtic Folklore* (1901), *Celts and Galli* (1905); Best, *Bibliography of Irish Philology and of Printed Irish Literature* (1914); Rhys Phillips, *The Celtic Countries* (1915); Peake, *The Bronze Age and the Celtic World* (1922); Fleure, *The Races of England and Wales* (1923).

**Cements** may be roughly divided into (1) the stone cements, as mortar and Roman and Portland cements, used in thickish layers for uniting stone and brick work, and for protective coverings to buildings; (2) substances which form binding joints of much less but still appreciable thickness, such as white lead, red lead, putty; and (3) cements which require to be used in extremely thin coatings, such as glue, isinglass, and dissolved rubber.

*Ordinary Mortar* is a mixture of slaked lime and sand made into a paste with water. Generally one part of lime to three or four of sand is used, but the proportions vary according to the purity of the lime. Very pure or fat lime, such as is made from white chalk or white marble, does not make so good a mortar as lime got from less pure limestones. The more thoroughly the mixing, the more complete will be the subsequent hardening of the mortar. As commonly laid, mortar sets fast enough to allow building operations to proceed from day to day with occasional longer intervals, but it takes years—perhaps often centuries—to reach its maximum hardness.

*Puzzolana* or *Pozzuolana*, a loosely coherent volcanic sand found at Pozzuoli, near Naples, has been long celebrated for its property of forming a hydraulic cement when mixed with ordinary lime. It is composed of silica, with a little magnesia and potash or soda, alumina, lime, and oxide of iron.

*Roman Cement*.—Certain natural mixtures of lime and clay are called cement-stones. The clays of some of the newer geological formations in the south of England, for example, contain courses of septarian nodules (see SEPTARIA), which have been in great request for making the best kinds of Roman cement. They are concretions of impure calcareous matter, many of them having this analysis: Carbonate of lime, 66; silica, 18; alumina, 7; and protoxide of iron, 6; or consist of these substances in nearly that proportion. Cement-stones are carefully calcined in kilns, and afterwards ground and sifted. Good Roman cement should set in about 15 minutes, and this quick-setting property makes it valuable for work which requires to be executed between tides and for other purposes where the cement used must harden quickly. It is at best of but medium strength. Some natural

cements are slow-setting, and these do not contain more than 22 per cent. of clay. They set under water when half their weight consists of clay. The proportion of sand used with Roman cement should not much exceed that of the cement. When employed for external coatings of buildings it is apt to effloresce and become unsightly.

**Portland Cement.**—This is considered by far the most important of the stone cements. It is an artificial product, named from its resemblance to Portland Stone, but is much more largely used than Roman cement. In the manufacture of Portland cement on the banks of the Thames and the Medway by the wet process, three parts of white chalk are mixed with one part of clay or mud from the lower reaches of these rivers. The two substances, along with water, are placed in a 'wash mill' in which strong revolving knives or cutters reduce the whole to a creamy 'slurry' or slip. The slurry then passes by gravitation to backs or reservoirs. There it is allowed to settle for some weeks, when the superfluous water is removed by decantation. The mixture is next dried on heated iron plates or on the floor of a heated chamber, and then burned in kilns. Finally it is ground to a fine powder. Modifications of the wet process have in recent years in great measure superseded the use of the large reservoirs. In other parts of the country Portland cement is manufactured by the dry process from the hard limestones of other formations than the chalk, along with clay or shale. These limestones are crushed small, mixed in the proper proportion with clay or shale, then roughly burned, and ground to powder. This powder slightly moistened is passed through a pug-mill, and then made into bricks, which are afterwards burned in kilns and reduced to powder. Portland cement is slow in setting compared with most varieties of Roman cement. Both Portland and Roman cement form *hydraulic mortars*—that is, they set under water. No mortar will do this which contains less than 10 per cent. of silica.

Till close on 1840 Portland cement was hardly known, but its use has extended rapidly. Its most important application is in the construction of docks and harbours, many of which are partly or wholly built of it, mixed with sand and broken stones, in the form of a concrete. In this state, or simply mixed with sand, it is also much employed for other purposes where strength and durability are required. Owing to the nature of some of the extensive engineering works in which Portland cement is largely used, it is plainly of great consequence that its properties should be thoroughly understood. Numerous failures have taken place. Sea-water has a deleterious action upon it. Objects made of unmixed Portland cement from the works of some of the best makers will sometimes keep good for nearly twenty years, and then crumble to pieces even when not exposed out of doors at all. These failures are generally attributed to carelessness in manufacture, or in selection of materials. Thus they have been explained by engineers as due to the presence of magnesium. But if they occur, as they have done, with cements that have stood very well the ordinary mechanical tests, how can any cement of this kind be entirely depended upon for durability? Twenty, thirty, or even fifty years is far too short a time to test the lasting property of a building material of this nature. The use of Portland cement in pavements and for architectural ornaments is not attended with much risk. The British Engineering Standards Committee requires that Portland cement conform to certain tests. Tests of strength are carried out at the end of seven and of twenty-eight days, on briquettes of a specified shape, and of one inch thickness throughout, which, except on the first day, have been

continuously submerged in fresh water. At the end of seven days the tensile strength of neat cement must be not less than 450 lb. per square inch of section; that of a mixture of cement and sand, in the proportion of one part by weight of cement to three parts by weight of standard sand, not less than 200 lb. per sq. in. After twenty-eight days both cements must show an increase in strength which depends on their strength at seven days. Roman cement is about one-third of the strength of Portland cement. American cements come largely from Ulster County, N. Y., and Louisville, Kentucky.

**High-alumina Cement, Ciment Fondu, or Ciment Électrique,** is a late invention. In France bauxite, schist, limestone, and slag are mixed, melted, run off, cooled, and powdered. This cement greatly exceeds Portland cement in tensile and crushing strength, especially in the earlier stages of hardening, does not decompose in contact with sea-water or sulphates, and, whilst setting very slowly, hardens with great rapidity.

**Scott's Selenic Cement** consists of burnt limestone mixed with about 5 per cent. of sulphate of lime in the form of plaster of Paris, and ground to powder. The presence of the sulphate arrests the slaking action of the lime, causes the cement to set more quickly, and admits of more sand being used with it than ordinary lime does. This cement has been a good deal used for plastering, and to some extent also for mortar.

**Plaster of Paris** (see ALABASTER and GYPSUM).—This material is used for cementing marble and alabaster in much the same way as mortar is in brick-work. It is also employed for uniting the separately moulded pieces of any large object cast in the same material. Sometimes it is selected for fixing metal mounts to glass.

**Keene's Cement** is made by saturating plaster of Paris in small lumps with alum and recalcining it. It then forms a hard plaster for the projecting portions of halls and rooms, such as pilasters, columns, and skirtings. It is capable of taking a high polish.

**Parian or Keating's Cement** somewhat resembles Keene's. In its manufacture borax as well as alum is added to the plaster of Paris.

**Martin's Cement** is another kind, with plaster of Paris for its basis, but instead of borax, carbonate of potash is added, and sometimes hydrochloric acid as well. With the exception of Scott's, these plaster of Paris cements are only used in plastering or other internal work—not for mortars.

**Mastic Cement**, consisting of a mixture of burnt clay or limestone in a powdered state, with boiled oil and litharge, was more in use formerly than now; but though expensive, it is an excellent material for preventing the admission of rain-water at certain joints about buildings, such as where wood and stone work come together at windows. It was also used for covering external mouldings.

**Rust or Iron Cement.**—Joints in iron-work, such as those for hot-water pipes, are filled up with a cement of iron borings or turnings, mixed with at least 2 per cent. of sal-ammoniac. Sometimes sulphur in powder is added. The iron oxidises and forms a firm joint.

**Sulphur Cement.**—For jointing earthenware pipes, and occasionally for fixing bars of iron into stone, a cement is made of sulphur, resin, and brick-dust. It is a cheap but not a strong cement where metal is concerned.

**Water-glass Cements.**—For furnaces one kind consists of burnt and unburnt fireclay made plastic with silicate of soda or water-glass. Another cement, capable of standing a high heat, is formed of asbestos powder made into a paste with silicate of soda. The same silicate mixed with ground glass makes an acid-proof cement.

*White and Red Lead Cements.*—Either white lead or red lead by itself, or a mixture of both, is much in request as a cement for the joints of slate or glass cisterns, such as aquariums. These are also employed for the joints of gas-pipes, for cementing metal mounts to glass tubes, and other chemical and electrical purposes. White and red lead cements are made up with boiled linseed-oil, and sometimes gold size is added. Mixed white and red lead make a very hard and firm cement. A cement of these two substances and ground plumbago in equal parts, mixed with oil, is said to stand a great heat in steam-joints.

*Shell-lac Cements.*—An excellent cement is made by digesting 4 oz. of the finest shell-lac in 3 oz. of methylated spirit in a warm place. It should be made into a consistency like thick syrup. This makes a firm cement for mending pieces of glass, china, ornamental stones, and ivory. It is not soluble in water. A cheaper, but still very serviceable cement can be formed by dissolving shell-lac in wood naphtha. For some purposes shell-lac itself is used as cement by simply melting it.

*Marine Glue* is a mixture of shell-lac in a solution of india-rubber. It is made into thin sheets, and melted when required for use in shipbuilding, &c.

*Gelatin and Isinglass Cements.*—Fish-glue, gelatin, or Isinglass (q.v.), made up with dilute acetic acid and other bodies into a jelly or thick liquid, produces a cement slightly varying in its nature, for mending china, glass, ivory, bone, and other substances. Foulke's cement and liquid fish-glue are cements of this class. These can be obtained in a convenient form for use in hardware or druggists' shops. They are more or less soluble in water, so that articles mended with them must be quickly washed. Cement of mixed glue and glycerine, sometimes with tannin added, is occasionally used for leather and cloth.

*Armenian or Diamond Cement.*—The following is the reputed formula for preparing the cement used by the Armenian jewellers for attaching diamonds, &c., without any metallic setting: 'Dissolve five or six bits of gum-mastic, each the size of a large pea, in as much rectified spirit of wine as will suffice to render it liquid; and in another vessel dissolve as much isinglass, previously a little softened in water—though none of the water must be used—in French brandy, or good rum, as will make a 2-ounce phial of very strong glue, adding two very small bits of galbanum or ammoniacum, which must be rubbed or ground till they are dissolved. Then mix the whole with a sufficient heat. Keep the glue in a phial closely stopped, and when it is to be used, set the phial in boiling water.'

*Elastic Cements.*—One part of caoutchouc dissolved in 3 parts of chloroform; also, 5 parts of caoutchouc in 3 parts of chloroform, with 1 part of powdered gum-mastic added. Benzole is sometimes used instead of chloroform as the solvent. Another elastic cement can be made by a mixture of gutta-percha and caoutchouc dissolved in bisulphide of carbon. The solvents of these cements must not be exposed to any but a gentle heat.

*Resin Cements.*—There are a great number of cements partly formed of ordinary resin. One kind consists of resin 4, beeswax 1, and whiting 1 part. The proportions of these ingredients in the same order for another are 15, 1, and 4. Another is made from resin 4, and plaster of Paris 1 part. These cements are used to fix pieces of stone, glass, &c. to handles when grinding them. Resin, pitch, beeswax, and plaster of Paris or brick-dust are made up in various proportions into cements.

*Cutlery's Cement*, used for fixing knives and forks

in handles, is made of equal weights of resin and brick-dust melted together; or, for a superior quality, 4 parts of resin, 1 of beeswax, and 1 of brick-dust.

Copal varnish, mastic varnish, Canada balsam, and gold size are each useful occasionally for cementing substances like two pieces of glass together.

**Cement-stone**, a somewhat argillaceous and ferruginous limestone, generally compact, which is occasionally employed for making hydraulic mortar or cement. The *Cement-stone Series* is the name of a group of strata occurring in the Carboniferous System of Scotland. See CARBONIFEROUS SYSTEM.

**Cemetery** (from the Greek *koimētērion*, literally 'a sleeping-place') may mean any graveyard, or other place of deposit for the dead; but it has lately acquired a special meaning, applicable to those extensive ornamental burial-grounds which have recently come into use as the practice of burying within and around churches was gradually abandoned (see BURIAL). The fine burial-grounds of the Turks, extending over large tracts adorned by cedars and other trees, may have suggested the plan to western Europeans. Those round Constantinople are famous, and are dense forests of cypresses. A Moslem grave is never reopened, and a cypress is usually planted after every interment. Of western cities, Paris took the lead in this respect; and in Britain there are now no considerable towns near which there is not at least one cemetery, and the legislation mentioned under the head of BURIAL has rendered their establishment, to a certain extent, a legal necessity. There was at first a natural feeling of regret at the prospect of deserting places of deposit for the dead so hallowed by ancient use and recent associations as the church and the churchyard. On the other hand, the new places of interment began to become attractive in virtue of their trees and flowers, natural scenery, and works of monumental art. The new cemeteries are in many instances cheerful open places, and in them the place of rest for the dead has rather tended to improve than to undermine the health of the living. One of the first and most celebrated of modern European cemeteries is that of Pere la Chaise (q.v.), near Paris, the arrangements of which have been generally followed in the cemeteries of London and other English cities. It was laid out in 1804, and is now within the *enceinte* of the city. The *Campo Santo* of Pisa (1228-83), the pantheon of the Pisans, has been the model of many Italian cemeteries. It is an oblong court, surrounded by lofty arcades of marble, and adorned with famous frescoes and works of art. In the centre is a mass of earth brought from the Holy Land. The Genoese *Campo Santo* contains an enormous wealth of sculpture. One Neapolitan cemetery (the *Campo Santo Vecchio*) differs widely from most others. It contains 366 deep pits, one of which is opened each day, and in it all the interments of the day take place. At night a funeral service is performed, and the pit is filled with earth and lime, not to be reopened till the year after. The Sicilian catacombs are also a kind of cemetery. Kensal Green Cemetery dates from 1832; other well-known London cemeteries are those of Highgate and Woking (1855), near Guildford, 7000 acres in area, with a crematory. The Dean Cemetery at Edinburgh, and the Necropolis of Glasgow, are notable; that of Glasnevin, outside of Dublin, is the most celebrated in Ireland. English cemeteries are usually divided into two portions—one consecrated for the burials of members of the Established Church, over whose remains the funeral service is read, and one unconsecrated, for the

burials of dissenters. In the United States great pials are bestowed on the adornment of cemeteries. The most famous are Mount Auburn, near Boston, Greenwood in Brooklyn, and Laurel Hill, near Philadelphia. See BURIAL.

**Cenci**, BEATRICE, 'the beautiful parricide,' was the daughter of Francesco Cenci, a Roman nobleman of colossal wealth. According to Muratori (*Annales*, lib. x.), Francesco was twice married, Beatrice being the youngest of twelve children by the first wife. After his second marriage, he treated the children of his first wife in a revolting manner, and was even accused of hiring bandits to murder two of his sons. The beauty of Beatrice inspired him with incestuous desire; with mingled lust and hate he persecuted her, until circumstances enabled him to consummate his brutality. The unfortunate girl besought the help of her relatives, and of Pope Clement VIII. (Aldobrandini), but in vain; whereupon, in company with her step-mother and her brother, Giacomo, she planned the murder of her unnatural parent, into whose brain two hired assassins drove a large nail (9th September 1598). The crime was discovered, and both she and Giacomo were put to the torture; Giacomo confessed, but Beatrice persisted in declaring her innocence. All, however, were condemned and beheaded (10th September 1599). Such is Muratori's narrative. Others allege that Beatrice was the guiltless victim of an infernal plot. It would appear, however, from the historical researches of Bertolotti, Marion Crawford, Ricci, that the actual facts of the Cenci tragedy scarcely warrant the romantic guise in which Beatrice has figured in literature, most notably in Shelley's *Cenci* (1819). Francesco was violent, profligate, chargeable even with bestiality, but not, apparently, guilty of incest. Beatrice, far from beautiful, as it seems, was moved to murder not alone by the harsh treatment of her father, but as much by her intrigue with Olimpio, Francesco's castellan, by whom she had later a son. And the sweet and mournful countenance, that treasure of the Barberini Palace, though it may be from Guido's hand, cannot possibly be a portrait of Beatrice, since Guido did not paint in Rome till nine years after Beatrice's death. See works by Bertolotti (2d ed., Florence, 1879), and Ricci (2 vols., Milan and London, 1923); Marion Crawford in the *Century Magazine* (Jan. 1908), and Swinburne's *Studies* (1894).

**Cenis**. See MONT CENIS.

**Cenobites**. See MONACHISM.

**Cenomanian**, the name given by French geologists to the Lower Chalk of English geologists.

**Cenotaph** (Gr. *kenotaphion*; *kenos*, 'empty,' and *taphos*, 'a tomb'), a monument which does not contain the remains of the deceased. They were originally erected for those whose bones could not be found, as for those who had perished at sea. Later the name was applied to tombs built by a man during his lifetime for himself and the members of his family. The memorials in Westminster Abbey to Franklin and Gordon are cenotaphs. The war cenotaph at Whitehall is by Sir E. Lutyens.

**Censer** (Fr. *encensoir*, from Lat. *incendo*, 'I burn'), a vase, or other sacred vessel, used for burning incense (q.v.). Censers were used in the Hebrew service of the temple. The ordinary censer, called also a *thurible* (Lat. *thuribulum*, from *thus*, 'frankincense'), used in Catholic services, is a metallic vessel for holding burning charcoal, of brass or latten, silver, silver-plated, or even of gold. It is shaped like a vase or cup, has a movable cover, usually perforated, and is suspended by chains (generally four in number) so as to be swung to and fro for the readier dispersion

of the smoke of the incense, which is thrown upon the live charcoal.

**Censors**, the name of two Roman officers of state of high dignity, whose duties related to the official registration of the citizens (*census*), the superintendence of public morals (*regimen morum*), and arrangements for the collection of the public revenue and the execution of public works. They were elected in the *comitia centuriata*, presided over by a consul. The term of office at first lasted five years, but was shortly afterwards limited to eighteen months. The censorship was regarded as the highest dignity in the state, except the dictatorship. It was a sacred and irresponsible magistracy, whose powers were vast and undefined, and whose decisions were received with solemn reverence. The census or registration was taken in the Campus Martius, in a building called *Villa Publica*. It was a complete catalogue of the citizens of Rome, stating in detail the age of each, the amount of his property, and the number of his children. Next the censors drew up a list of the equites, entitled to have a horse at the public expense, and made up the roll of senators, supplying the vacancies. The *regimen morum* was the most dreaded and absolute of their powers. It grew naturally out of the exercise of the previous duty, which compelled them to exclude unworthy persons from the lists of citizens. Gradually the superintendence of the censor extended from the public to the private life of citizens. They could inflict disgrace (*ignominia*) on any one whose conduct did not square with their notions of rectitude or duty. For instance, if a man neglected the cultivation of his fields, or carried on a disreputable trade, or refused to marry, or treated his family either too kindly or too harshly, or was extravagant, or guilty of bribery, cowardice, &c., he might be degraded, according to his rank, or otherwise punished. The administration of the finances of the state included the regulation of the *tributum* or property-tax; of the *vectigalia*, such as the tithes paid for the public lands, salt-works, mines, customs, &c., which were usually leased out to speculators for five years; the preparation of the state budget, &c. The office of censor continued to be filled by patricians till 351 B.C., when Censor Marcus Rutilus, a plebeian, was elected. Twelve years later it was enacted that one of the censors (there were always two) must be a plebeian. In 131 B.C. both censors were plebeians.

**Censorship**. See PRESS, INDEX, CHAMBERLAIN, PLAYS.

**Census** means the counting of the people. The word is a Latin one, and was applied to the functions which the Roman Censors (q.v.) performed of periodically enumerating the people, but no records of these enumerations remain, and indeed we have but a few scattered notices of them. In Greece a census was established by Solon at Athens for the double purpose of facilitating taxation and classifying the citizens. Religious prejudice prevented any censuses being taken during the middle ages, and it was not till the 18th century that the necessity for obtaining correct information as to the population of European countries overcame this feeling. The first country to undertake a census on a scientific basis was Sweden in 1749; in France an enumeration was made in 1700, but the first that can be relied upon was taken in 1801. In America the first census was taken in 1790, and in England in 1801. Censuses are now taken in Austria, Belgium, Hungary, Italy, Norway, Sweden, Switzerland, the United States of America, India, and many British dominions and colonies every ten years; in France, Germany, South Africa, New Zealand, and (in part)

Canada every five; in Spain and Russia irregularly. Frequent censuses are required where parliamentary representation has to be adjusted to rapidly changing distribution of population. The International Statistical Congress, which consists of eminent statisticians from all countries, has done much to improve the taking of censuses, and now several countries have statistical bureaus for the purpose, amongst other things, of controlling the taking of the periodical census. In a few countries information as to the religion of the population, and in some cases additional particulars, are obtained, such as the census of 'useful domestic animals' in Norway. Britain has a periodical census of production (since 1907).

In the United Kingdom each census was formerly taken under a special act, which laid down the mode of taking and the questions to be asked. The Census Act of 1920—which does not apply to Ireland—provides that in future in Great Britain or any part thereof a census may be taken, not oftener than once in five years, by Order in Council. The act leaves it to the Minister of Health or the Secretary for Scotland to make regulations as to the division of the country into areas, appointment of registrars and others as enumerators, and the like. The particulars to be asked for are to be determined by the Order in Council, subject to certain conditions. On the application of a local authority a special census may be ordered of its own or an adjoining area.

The enumerators deliver schedules at all houses, requiring particulars concerning every person who is alive at midnight preceding the census day, and on the census day collect them. Account has also to be taken of all persons not dwelling in houses wherever found, and of persons travelling. Persons refusing to answer or wilfully giving false answers are liable to penalties. The census of 1911 showed name, sex, age, profession or occupation, condition as to marriage, relation to head of family, birth-place, infirmities, duration of marriage, number of children to each marriage, number of rooms in each dwelling, whether any spoke Gaelic (in Scotland) or Welsh (in Wales and Monmouthshire), &c. That of 1921 added questions as to divorce, place of employment, and industry in the wider sense. When the schedules have been transmitted to the census office, the work of tabulation is carried out, largely by mechanical devices. The results are presented to parliament in the form of several bulky volumes. Hardly any two countries agree as to the subjects on which information is demanded; thus some census schedules contain inquiries as to whether there are in the household infirm persons, blind, deaf and dumb, idiots, insane persons, persons who have been convicted of crime; how many languages are spoken by the persons entered; how many are at school; how many exercise the franchise; how many rooms and windows there are in the house. In 1851 an attempt was made to obtain religious statistics for the United Kingdom; since then the census shows the religious statistics of Ireland only.

The census of the United States aims at giving a specially full conspectus of the condition of the people, and is illustrated by a large number of maps bearing on almost every branch of the census inquiries. Thus there are maps showing the prevalence of certain diseases, others the area occupied by various crops. The United States census of 1890—the eleventh—extended to 25 volumes; and the laws regulating later censuses secured a more complete organisation, a more perfect method, and more satisfactory results—electric currents being used for tallying data that, tallied by hand, would have required an enormous amount of time.

**Cent and Centime** (Lat. *centum*, 'a hundred'), names of coins. The Dutch cent is a copper coin, the 100th part of the guilder (1s. 8d.);

the United States cent is a bronze coin, the 100th part of the dollar, or nearly one halfpenny English, and the Canadian cent has the same value. The centime, the 100th part of the French franc, and of the value of  $\frac{1}{100}$ th of an English penny, has been adopted in Belgium, and, under other names, in Greece, Italy, Switzerland, and Spain. The *cental*, legalised in 1878 in the United States, and in 1879 in Great Britain, is 100 lb. avoirdupois (cf. CENTNER); it has been used at Liverpool for corn since 1859. See DECIMAL SYSTEM.

**Centaurea**, a palæarctic genus of Compositæ, containing about five hundred species, all herbaceous annual and perennial, of which five or six are natives of Britain. The species most familiar, on account of its beauty, is the blue *C. cyanus* (see CORN-FLOWER), which is sometimes sown as an annual; while its larger perennial ally, *C. montana*, with white or purple ray florets, is a familiar denizen of old-fashioned gardens; *C. americana* is a showy lilac-purple annual (3 or 4 feet); while the oriental Sweet Sultan (*C. moschata*) and Yellow Sultan (*C. ambergæa*) are also not uncommon; the latter two being often sold under the name of Amberboa. Among perennials, the large, downy *C. babylonica*, with yellow flowers, is often cultivated; also *C. ragusina* and *C. candidissima*, of which the silver-white pinnate leaves furnish an admired contrast to bright-coloured bedding-plants. Several species (*C. calcitrapa*, &c.) bear the name of Star-thistle, from their spiny involucre. Some are common wayside weeds, often troublesome in pastures, notably *C. nigra*, the Common or Black Knapweed, also called Horse Knot in Scotland; and the closely allied *C. Scabiosa*. The flowers or roots of several species were formerly used in dyeing, and the astringent roots employed by herbalists.

**Cent'ours** ('bull-killers'), a wild race of men who inhabited, in early times, the forests and mountains of Thessaly, and whose chief occupation was bull-hunting. Homer, the first who mentions them, describes them merely as savage, gigantic, and covered with hair. They do not appear as monsters, half-man and half-horse, until the age of Pindar. The most ancient account of the Hippocentaurs, sometimes considered as distinct, but more often confounded with the Centaurs, is that they were the offspring of Magnesian mares and Centaurus, himself the offspring of Ixion and a cloud. The Centaurs are celebrated in Greek mythology on account of their struggles with the Lapithæ (q.v.), and with Hercules. The most famous was Chiron, the teacher of Achilles and other heroes. In works of art the Centaurs were represented as men from the head to the loins, with the rest of the body that of a horse. It is worth mentioning that the Mexicans, who had no native horses, when they first saw the Spaniards on horseback, believed that the horse and man together made but one animal.

**Cent'oury** (*Erythræa*), a pretty little annual genus of Gentianacæ, with pink or rose-coloured flowers. They possess the tonic and other medicinal virtues of gentian, and the Common Cent'oury (*E. Centaurium*) has especially been esteemed in medicine since the days of Dioscorides and Galen; and although no longer in the pharmacopœia, its flower-tops are still sometimes gathered and dried by country-people in England and the Continent; while the allied *Sabbatia angularis* enjoys similar repute in the United States and Canada. The Yellow Cent'oury (*Chlora perfoliata*) is of the same order; but plants belonging to the wholly distinct composite genus *Centaurea* (q.v.) are also sometimes called Cent'oury.

**Centenarian**. See LONGEVITY.

**Centenary**, consisting of a hundred (Lat. *centum*), a period of a hundred years, is now usually employed to signify a commemoration of an event, as the birth (sometimes the death) of a great man. The centenary of Burns's birth was celebrated in 1859; the bi-centenary of Pope in 1888; the ter-centenary of Shakespeare in 1864. The centenary of American Independence was celebrated by a *Centennial* Exhibition in 1876. The tenth centenary or millenary of King Alfred's death was kept in 1901.

**Centering**, the framework upon which an arch or vault of stone, brick, or iron is supported during its construction. The simplest form of centering is that used by masons and bricklayers for the arches of common windows and doors. This is merely a deal-board of the required shape, upon the curved edge of which the bricks or stones of the arch are supported until they are keyed in. In building bridges or other structures where arches of great span are to be constructed, the centering is usually made of framed timbers, or timbers and iron combined. The arrangement of the timbers should be such that the strain upon each shall be mainly a thrust in the direction of its length, for if the strain were transverse, a comparatively slight force would snap it, and if a longitudinal pull, the whole structure would be no stronger than the joints holding the pieces of timber together. In arches of great span, a longitudinal pulling strain is almost inevitable in some parts, as a beam of great length would bend to some extent under a thrusting strain. In such cases great skill and care are demanded in the designing and construction of the joints. As an arch is built from the piers towards the keystone, the weight upon the haunches during construction tends to push the crown upwards, and therefore the problem of designing a framed centering involves the resistance of this tendency, as well as the supporting of the weight of the materials. Occasionally, when a very great span is required, and the navigation will permit, piers are built on the bed of the river, or piles are driven into it, to support the centering directly, simplifying it, and at the same time facilitating a more rigid disposition than in centering supported only from the sides. See article **BRIDGE** for descriptions and illustrations of three types of centering: (1) that for the bridge over the Dee at Chester, supported directly from the bed of the river; also that for the Ballochmyle Bridge; (2) inclined struts in pairs supported from the sides, as Rennie's for Waterloo Bridge; (3) trussed wooden girders supported from the sides, as Rennie's for London Bridge.

Cupolas, like those of the Pantheon, St Peter's, St Paul's, or the flat domes of the Turkish mosques, require very effective centerings.

**Centigrade**. See **CELSIUS** and **THERMOMETER**.

**Centigramme**, **Centilitre**, **Centime**, **Centimetre**. See **DECIMAL SYSTEM**, **GRAMME**, **LITRE**, **CENT**, **METRE**.

**Centipede**, a general name for the members of one of the orders of the class Myriapoda. Popularly they are sometimes called Galley-worms, technically Chilopoda. Like the Millipedes, which form the most important neighbour order, the Centipedes are segmented animals bearing jointed appendages, having a well-defined head furnished with feelers and jaws, and breathing by means of air-tubes or tracheæ.

**Structure**.—The Centipede is like a primitive insect in its general structure.—(a) *Externals*.—The body is divided into well-marked rings, but the region behind the distinct head is practically uniform, and not divisible into thorax and abdomen. Just behind the head a few rings appear to be fused. The number of rings varies from twelve

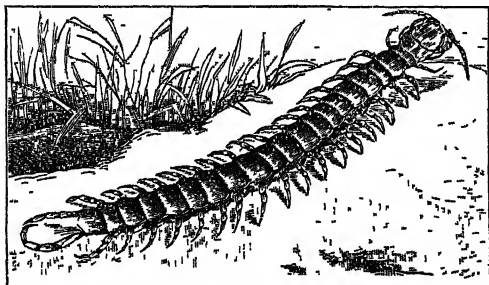
to more than twelve times as many. In counting the rings the ventral surface should be looked to, for the dorsal shields often overlap. The rings are flattened from above downwards, and each bears a pair of appendages. Dorsally and ventrally the skin is hard and horny. Glands occur in various positions. (b) *Appendages*.—The head, which is covered by a flat shield above, bears (1) a pair of antennæ, usually of considerable length, and consisting of from twelve to over one hundred joints; (2) a pair of small, strong, toothed, and bristly mandibles; (3 and 4) two pairs of maxillæ, aiding in mastication, usually with palps. These are followed by a modified pair of legs, the basal pieces of which generally meet in the middle line, while the strong joints terminate in a sharp claw, at which a poison-gland opens. These appendages are obviously of use for seizing and killing the prey. The legs of the other segments are usually seven-jointed, sometimes bear spurs and glands, and are generally clawed. The last pair differ in size and form from the rest, and are turned backwards. (c) *Internal Anatomy*.—The large brain is connected as usual with a ventral chain of ganglia. Compound eyes occur in one family, simple eyes in many, while the feelers, certain bristles, and portions of the skin are also sensory. In some cases there is a special well-defined sense-organ of undecided function in front of the head, or on one of the jaws. The alimentary canal is straight, and has associated with it salivary and digestive glands, and excretory (Malpighian) tubules. The heart is represented by a chambered dorsal vessel. Tracheæ or air-tubes open on the sides of the body, sometimes on each ring, often on alternate segments, ramify throughout the tissues, and are connected together on each side by a longitudinal stem. The reproductive organs are usually tubular, and open on the last ring of the body. A distinct penis is sometimes present.

*Life and Habit*.—Centipedes are darkness-loving animals, nocturnal in their food-hunting, lurking under stones or among rotten wood and the like during the day. Their powers of vision are very poorly developed, and most of the sensory work is tactile. Only in one family (Scutigerridæ) are there compound eyes, in most forms only simple eyes, in many none at all. The recent researches of Plateau and others have shown that these creatures can distinguish light from darkness, but do not need eyes to do this; species with eyes do not apparently get on much better than those without them; those with eyes seem to perceive bright objects reflecting much white light, and in some cases conspicuous movements, but probably in no case the forms of objects. Moving actively about at nights, feeling their way by means of their antennæ, which function as a blind man's staff, they light upon insects, worms, and other small animals, which they seize and kill with their poison-bearing appendages. They are all voracious carnivorous forms, not vegetarian like the Millipedes. Some forms can run with some rapidity, and wriggle about in curious serpent-like fashion.

*Development*.—In some cases the males are said to deposit their reproductive elements in packets (spermatophores) fixed by a web to the ground. In most cases copulation probably occurs. Scolopendra is viviparous, the others lay eggs. The eggs develop into larvæ, which are either miniature adults (Scolopendridæ and Geophilidæ), or differ from the full-grown forms in having only seven pairs of legs (Scutigerridæ and Lithobiidæ).

*Classification and Forms of Interest*.—The order of Centipedes is one of the three or four divisions of Myriopoda (q.v.), and, like the class, generally represents a somewhat low grade of development among animals breathing by air-tubes. The most

evolved centipede is a very uniform and old-fashioned animal when compared with any normal insect or spider. In the order itself we distinguish four families—(1) Scutigera, (2) Lithobiidae, (3) Scolopendridae, (4) Geophilidae. The first of these includes curious forms with compound eyes, very long feelers, eight shields along the back, and fifteen pairs of very long legs. The feelers and the last pair of legs are longer than the body; there are external generative appendages. In Scutigera, and apparently in some other centipedes, there are peculiar 'lung-like' dorsal aggregations of air-tubes opening on the back, and perhaps the beginning of the 'pulmonary chambers' of some arachnids. Scutigera is represented by about a score of species, widely distributed in warm countries, and common in houses. In Lithobiidae, as in the two other families, simple eyes alone are present; there are fifteen pairs of legs, antennae measuring a third or more of the body length, and fifteen dorsal shields. The genus *Lithobius* includes over one hundred species—*L. forficatus* (of a reddish-brown colour, and about an inch long) is very common throughout Europe and America; our most familiar British species, *L. mutabilis*, also very common, has the habit of feigning death. The bite occasions considerable irritation, like that due to nettle-stings.



Giant Centipede (*Scolopendra gigas*).

The Scolopendridae have over a score of legs, short many-jointed antennae, not more than one-fifth of the total length of the body; and simple eyes, not over four pairs in number, or altogether absent. About one hundred species are known, distributed over sixteen genera. They are especially at home in warm countries, where they often attain large size, the *Scolopendra gigas*, for instance, being sometimes a foot long. The poisonous bite of some of the larger forms is really dangerous to man. Scolopendra is the most important genus. Lastly, the Geophilidae are very long, worm-like centipedes, of somewhat sluggish habit, with 31 to 173 pairs of legs, short feelers, and no eyes. Some 22 species and 9 genera have been recorded, especially abundant in warm climates. *Geophilus electricus* and another species, *G. longicornis*, both found in Britain, shine in the dark. This is probably due to a viscid fluid excreted all over the ventral surface. Himantarium, found round the Mediterranean, is the largest form of Geophilidae. Well-developed spinning glands are seen in this family, and their secretion cements together ova and spermatozoa.

**Distribution.**—The centipedes are world-wide, but abound especially in warm regions. Somewhat unsatisfactory fossil remains have been obtained from the American Carboniferous strata; better preserved possible centipedes have been got from the Solenhofen strata, but it cannot yet be said with certainty that centipedes are known before Tertiary times.

**Practical Import.**—The centipedes have some direct practical importance as voracious devourers of injurious insects, larvae, snails, and the like, while some of the large tropical forms are known in a somewhat different connection as animals able to give a painful and poisonous bite. In his *Personal Narrative*, Humboldt says he saw Indian children draw large centipedes out of the ground and eat them.

**Literature.**—Newport, Monograph of the class Myriapoda, order Chilopoda (Trans. Linnæan Society, vol. xix.); Latzel, *Die Myriapoden Oesterreichs* (1880-84); the Cambridge Natural History, vol. v. (1895).

**Centlivre**, SUSANNAH, an English dramatic authoress, was the daughter of a Lincolnshire gentleman named Freeman, of Holbeach, and born (say some authorities) in Ireland about 1667. Her early history is obscure; but such were her wit and beauty that on her arrival in London, though a destitute orphan, and only sixteen years of age, she won the heart of a nephew of Sir Stephen Fox, who died shortly after their marriage. Her second husband, an officer named Carioll, lost his life in a duel. Left in extreme poverty, his widow endeavoured to support herself by writing for the stage, and after producing a tragedy called *The Perjured Husband* (performed first in 1700), made her appearance on the stage at Bath. She afterwards married (1706) Joseph Centlivre, head-cook to Queen Anne, with whom she lived happily until the time of her death, December 1, 1723. Her plays—*The Busybody* (with 'Marplot' for leading character, 1709), and *A Bold Stroke for a Wife* (1717)—are lively in their plots, and have kept their place on the stage. Nineteen in all, they were collected in 3 vols. 1761, with a biography, and reprinted 1872.

**Centner** is, with metallurgists, a weight of 100 lb., and it often has this value in commerce. The German centner is however 50 kilogrammes or 110½ lb. avoirdupois; the metric or doppel centner is 100 kilogrammes. The *cental* of the United States is 100 lb.

**Cento**, a town of Central Italy, 16 miles N. by W. of Bologna, on a fertile plain near the Reno, the birthplace of Guercino (q.v.); pop. 5000.

**Cento**, a name applied to literary trivialities in the form of poems manufactured by putting together distinct verses or passages of one author, or of several authors, so as to make a new meaning. After the decay of genuine poetry among the Greeks, this worthless verse-manufacture came into vogue, as is proved by the *Homero-centones* (ed. by Teucher, Leip. 1793), a patchwork of lines taken from Homer and forming a consecutive history of the fate and redemption of man. It was much more common, however, among the Romans in the later times of the Empire, when Virgil was frequently abused in this fashion, as in the *Cento Nuptialis* of Ausonius, and especially in the *Cento Vergilianus*, constructed in the 4th century by Proba Falconia, wife of the Proconsul Adelfius, and giving, in Virgil's misplaced words, an epitome of sacred history. The cento was a favourite recreation in the middle ages. See Delepierre, *Le Centon* (1875).

**Central Africa.** See NYASALAND, RHODESIA, &c.

**Central America**, a name applied to that part of the American continent which lies between the isthmuses of Tehuantepec and Panamá, but by some extended to embrace Mexico. It includes the republics of Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, and Panamá; the British crown colony of British Honduras; and the Mexican state of Chiapas and peninsula of Yucatan. In 1907 an arbitration treaty was signed by the first five states. Several unsuccessful

experiments in federation have been made, including one by Guatemala, Honduras, and San Salvador in 1921, which failed at the outset. See separate articles; also AMERICA.

**Central City**, the name of several villages in the United States, one of them in Colorado, 40 miles W. of Denver; pop. 2000.

**Central Falls**, a new city in Providence county, Rhode Island, on the Blackstone River, 4 miles from Providence, with numerous woollen and cotton factories; pop. 24,000.

**Central India** is the official term for a group of feudatory states in India, which fall into seven political agencies, but are all under the supervision of the governor-general's agent. The region in which these states lie is to the north of the British 'Central Provinces' of India, and touches Agra and Oudh, Rajputana, and Khandesh in the Bombay Province. The total area is about 77,400 sq. m.; the population, 10,314,787 in 1891, had through the effects of famine fallen in 1901 to 8,501,883, but in 1921 had risen to 9,180,403. The subordinate agencies comprise the Indore, Malwa, Bhopal, Gwalior, Bundelkhand, Southern States, and Baghelkhand agencies. The intrusion of two British districts, those of Jhansi and Lalitpur, belonging to the United Provinces, separates these agencies into two divisions—native Bundelkhand and Baghelkhand on the east, and Central India proper or Malwa on the west; but the whole country lies between the Nerbudda, the Ganges, and the Chambal rivers, and is mostly fertile and well tilled. The Malwa western division is mainly a tableland 2000 feet above the sea; but its rich black soil produces fine wheat and much opium. The climate of Malwa is on the whole mild and equable; but the northern part of Central India is torrid, and unhealthy during the rainy season. The mineral wealth of Central India is great: iron, coal, copper, and lime are plentiful, and diamonds are found in some parts of Bundelkhand. The inhabitants are very diverse in origin, comprising Mahrattas (the ruling race), Rajputs, Bundelas, Baghelas, Jats, Kols, and hill-tribes such as the Gonds and Bhils. The population is mainly Hindu in religion, only about half a million being Mohammedans. The agent to the governor-general of India, whose headquarters are at Indore, has very high and very various duties and powers. He is the adviser of all the native chiefs, and their guardian during minority; exercises the functions of a court of appeal; has at his command large bodies of troops; as 'opium-agent' supervises the opium-tax throughout the agency; and he is of course the medium of communication between the imperial government and the native authorities. The principal states and agencies have separate articles. See INDORE, BAGHELKHAND, &c. The Central Provinces (q.v.) are to be distinguished.

**Centralisation**, a term which has come into general use for expressing a tendency to administer by the sovereign or the central government matters which would otherwise be under local management. The centralising tendency has been a feature in most of the great states recorded in history, though not in all of them. The oriental empires admitted of a large degree of local independence among the subject peoples. The Roman empire was one of the most remarkable instances of centralisation the world has ever seen. That empire grew out of the subjugation of all the states round the Mediterranean by the city of Rome, and the control of it passed by the inevitable tendency of events into the hands of a single chief, whose power rested on the army, and

who centred in himself all the great functions of government. In the later days of the empire the tendency increased, until the system broke down with the power that wielded it. Amid the chaos that followed the downfall of Rome various systems arose for the restoration of order, political or religious, or both. Of these the greatest is still the Papacy; the greatest in bygone history was the empire of Charlemagne. In those times of struggle, the natural method was centralisation based on military supremacy.

Modern attempts to found a great monarchy in Europe on the model of the Roman empire have failed. There have grown up instead a group of powerful states, in the history of which the centralising tendency is strongly marked. Centralisation was necessary, for in the great struggles which have incessantly been going on, success or even self-preservation could be secured only through a strong organisation repressing internal division, and through large and efficient armies. As an adequate revenue was required for these objects, there was further involved a strong control by the central power of the economic and industrial functions of the state. Thus it will be seen that centralisation is more or less inevitable in the struggle for existence on the European continent. The most notable examples of the opposite tendency at present are apparent in the colonial empire of Great Britain, and in the United States, where we find extensive groups of self-governing communities with only a limited measure of control by the central government. Such control is most limited of all in the British colonies.

On the other hand, in the French commune and in the Russian *mir* we see, under governments otherwise strongly centralised, a form of local activity which had been long extinct in Britain. The municipal reform of 1835 has done much to revive local action in the town life of England. The aim of the reform of local government begun in 1888 is to revive, extend, and systematise local responsibility and freedom of action, particularly in rural districts. It is now recognised that efficiency in the central government can be best secured by transferring local interests to local management by decentralisation. A wise decentralisation may be subservient to an effective centralisation; but no absolute rules can be laid down for marking off the respective provinces of the central and local powers. Each country must solve the problem in its own way, as its interests and circumstances require. Overmuch decentralisation has its own peculiar disadvantages.

**Central Provinces**, a province of India, with which in 1903 Berar (q.v.), with its six divisions, was incorporated. The surface is broken by straggling ranges of hills even in the level portions. In the north extend the Vindhyan and Satpura (2000 feet) tablelands, with the Nerbudda between; south of these stretches the great Nagpur plain, with the Chatisgarh plain to the east, and a wild forest-region beyond, reaching almost to the Godavari. Besides the two mentioned, the chief rivers of the province are the Wardha and Wainganga; all four are rapid streams, with their crystal waters leaping from point to point, and rushing headlong through the narrow mountain-gorges of their upper course. The climate is hot and dry, except during the south-west monsoon, from June to September, when 41 of the mean annual 45 inches of rain fall. Wheat is grown chiefly in the Nerbudda valley, rice in the Nagpur plain; these are the principal crops, but oil-seeds, cotton, and tobacco are also raised. Manufactures of note are silk and cotton weaving and the smelting and working of iron ores. Iron is abundant, especially in the south, and there are also large coalfields, but the coal

is of a very inferior quality. Manganese ore is found in several districts, and an important mining industry in this metal has sprung up in recent years. There is considerable trade, but its progress is retarded by the want of means of communication; this drawback, however, is being removed, roads are being made, and the railway system steadily pushed forward. Of the population, three-fourths are Hindus, and one-seventh belong to the so-called aboriginal or non-Aryan tribes, who have found a refuge in the Satpura plateau, and still adhere to their primitive faiths (see GONDS). From these hill-tribes the Hindus throughout the province have contracted beliefs and habits which they have grafted upon the usual worship of their sect; adoration of the dead, worship of the goddess of smallpox, and belief in witchcraft are universal. Area (including Berar), 130,977 sq. m. Population, almost entirely rural, 16,000,000 (2,000,000 in native states). Nagpur (150,000) and Jubbulpore or Jabalpur (109,000) are the largest towns. Central India (q.v.) is a term of quite distinct meaning.

### Centre and Central Forces.—CENTRE OF INERTIA (MASS).—

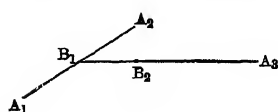


Fig. 1.

If  $m_1$  and  $m_2$  be the masses of two particles placed at the points  $A_1$  and  $A_2$ , and if the right line  $A_1A_2$  be divided in  $B_1$ , so that

$$m_1A_1B_1 = m_2A_2B_1,$$

the point  $B_1$  is called the *centre of inertia*, or *centre of mass*, of the two particles. If  $m_3$  be a third mass at  $A_3$ , and if  $B_1A_3$  be divided in  $B_2$ , so that

$$(m_1 + m_2)B_1B_2 = m_3A_3B_2,$$

$B_2$  is called the centre of inertia of the three particles. In general, if there be any number of particles, a continuation of the above process will enable us to find their centre of inertia. Every body may be supposed to be made up of a multitude of particles connected by cohesion. From this it is obvious that the centre of inertia is a definite point for every piece of matter.

In general, the determination of the centre of inertia requires the use of the integral calculus. In the case of some bodies, such as those which have a simple geometrical form and are of uniform density, elementary mathematical methods will generally be sufficient. Any straight line or plane that divides a homogeneous body symmetrically must contain its centre of inertia. For the particles of the body may be arranged in pairs of equal mass and at equal distances from the straight line or plane; and, since the centre of inertia of each pair lies in the line or plane, the centre of inertia of the whole must also lie in the same line or plane. For example, the centre of inertia of a uniform thin straight rod is its middle point; that of a uniform thin rod bent in the form of a parallelogram, the point of intersection of its diagonals; that of a lamina, uniform in thickness and density and in form a circle, ellipse, or parallelogram, its centre of figure; that of a uniform spherical shell, its centre; that of a homogeneous sphere, its centre; that of a parallelopiped, the intersection of its diagonals; that of a circular cylinder with parallel ends, the middle point of its axis.

An important case is that of a uniformly thin triangular plate. Let ABC be the plate. Bisect AB in P and join CP. Let the triangle be divided by right lines parallel to AB into an indefinitely great number of indefinitely narrow strips. The centre of inertia of each strip is its middle point.

But all the middle points lie on CP. The centre of inertia of the whole plate must therefore lie on CP.

Again, if BC be bisected in Q, and AQ be joined, the centre of inertia of the whole plate must lie in AQ. The centre of inertia must therefore be O, the point of intersection of CP and AQ. It is easily proved by elementary geometry that OP = one-third of CP. Hence, the centre of inertia of a triangular plate is obtained by joining a vertex to the middle point of the opposite side and taking the point two-thirds of this line measured from the vertex. By a similar method the centre of inertia of other plane figures may be obtained.

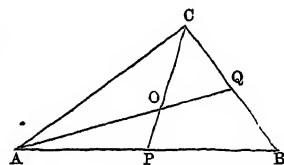


Fig. 2.

By a similar method the centre of inertia of other plane figures may be obtained.

**CENTRE OF GRAVITY.**—If a body be sufficiently small, relatively to the earth, the weights of its particles may be considered as constituting a system of parallel forces acting on the body. Now, the magnitude of the weight of a particle is proportional to its mass. Hence, the line of action of the resultant of the parallel forces will approximately pass through the centre of inertia. For this reason such bodies are said to have a *centre of gravity*. Strictly speaking, there is no such point of necessity for every body, since the directions of the forces acting on the body are not accurately parallel. Hence, it is only approximately that we can say of a body that it has a centre of gravity. On the other hand, every piece of matter has, as is shown above, a centre of inertia. For all heavy bodies of moderate dimensions it is, however, sufficiently accurate to assume that the centre of inertia and gravity coincide. For example, the centre of gravity of a uniform homogeneous cylinder with parallel ends is the middle point of its axis, that of a uniformly thin circular lamina its centre, and so on.

The centre of gravity of a body of moderate dimensions may be approximately determined by suspending it by a single cord in two different positions, and finding the single point in the body which, in both positions, is intersected by the axis of the cord.

The term centre of gravity is also used in a stricter sense than the one just explained. Thus, if a body attracts and is attracted by all other gravitating matter as if its whole mass were concentrated in one point, it is said to have a true centre of gravity at that point, and the body itself is called a *centrobaric* body. A spherical shell of uniform gravitating matter attracts an external particle as if its whole mass were condensed at its centre. Such a body has a true centre of gravity. When such a point exists, it necessarily coincides with the centre of inertia.

**CENTRE OF OSCILLATION.**—A heavy particle suspended from a point by a light inextensible string constitutes what is called a simple or mathematical pendulum. For such a pendulum it is easily proved that the time of an oscillation from side to side of the vertical is proportional to the square root of its length for any small arc of vibration. A simple pendulum is, however, a thing of theory, as in all physical problems we have to deal with a rigid mass, and not a particle, oscillating about a horizontal axis. In a pendulum of this kind the time of oscillation will not vary as the square root of the length of the string, for it is obvious that those particles of the body which are nearest the point of suspension will have a tendency to vibrate more rapidly than those more

remote. The former are therefore retarded by the latter, while the latter are accelerated by the former. There is thus one particle which will be accelerated and retarded to an equal amount, and which will therefore move as if it were a simple pendulum unconnected with the rest of the body. The point in the body occupied by this particle is called the *centre of oscillation*.

As all the particles of the body are rigidly connected, they all vibrate in the same time. Hence it follows that the time of vibration of the rigid body will be the same as that of a simple pendulum, called the equivalent or isochronous simple pendulum, whose length is equal to the distance between the centres of suspension and oscillation.

The determination of the centre of oscillation of a body requires the aid of the calculus. It may be stated, however, that it is always farther from the axis of suspension than the centre of inertia, and is always in the line joining the centres of suspension and oscillation. Let A be the centre of suspension, B the centre of inertia, and C the centre of oscillation, and let AB be equal to  $h$ , and  $k$  be the radius of gyration of the body about an axis through B parallel to the fixed axis, then it is easily shown that

$$AC = \frac{(h^2 + k^2)}{h}.$$

Fig. 3. From this there follows the important proposition that the centres of oscillation and suspension are convertible, a proposition which was taken advantage of by Kater for the practical determination of the force of gravity at any station.

**CENTRE OF PERCUSSION.**—If a body receive a blow which makes it begin to rotate about a fixed axis without causing any pressure on the axis, the point in which the direction of the blow intersects the plane in which the fixed axis and the centre of inertia lie is called the *centre of percussion*. That such a point must exist is easily shown by suspending a straight rod by a long string attached to one end, and striking it with a hammer in different points. If the rod is struck near the top the foot will move in one direction, and if the blow be applied near the foot the top will move in the opposite direction. It is thus evident that there must be some point which does not move at all at the instant of the blow. If a line through this point be regarded as an axis of rotation, the point at which the body was struck is the centre of percussion, since no pressure is produced on the axis. It is easily proved by means of higher mathematics that the centre of percussion with respect to any axis is the same point as the centre of oscillation.

From what has been said it is obvious that in order that no jar may be felt on the hand a cricket ball must be hit in the centre of percussion of the bat with respect to an axis through the hand.

There are, it may be mentioned, many positions which the axis may have in which there will be no centre of percussion. For example, there is no centre of percussion when the axis is a principal axis through the centre of inertia.

**CENTRE OF PRESSURE.**—When a plane surface is immersed in a fluid at rest, and held in any position, the pressures at different points of the surface are perpendicular to the surface. These pressures may therefore be looked upon as constituting a system of parallel forces whose resultant is the whole pressure. The point at which this resultant acts is called the *centre of pressure*, and may be defined as the point at which the direction of the single force which is equivalent to the fluid pressures on the plane surface meets the surface. The resultant action of fluids on a curved surface is not always reducible to a single force. The defini-

tion given above is, therefore, limited to plane surfaces. In the case of a heavy fluid it is clear that the centre of pressure of a horizontal area corresponds with the centre of gravity. When, however, the plane is inclined at any angle to the surface of the fluid, the pressure is not the same at all points, being greater as the depth increases; since in the same liquid the pressure varies with the depth. In general, the centre of pressure will be below the centre of gravity. The determination of the centre of pressure requires the use of the integral calculus, but special cases may be treated by ordinary algebra. In the case of a parallelogram, one edge of which is in the surface of the fluid, the centre of pressure is at a distance of one-third up the middle line from the base. In the case of a triangle, having one side in the surface of the fluid, the centre of pressure is at the middle point of the median corresponding to the vertex immersed; while in the case of a triangle, with its apex in the surface, and the base horizontal, the centre of pressure is on the median corresponding to the vertex and at a distance of three-fourths of the median from the vertex.

**CENTRE OF BUOYANCY.**—The pressures which act on every point of a surface immersed in a fluid can be resolved into horizontal and vertical components. The former balance one another. The resultant pressure must therefore be vertical; and, as the pressure increases with the depth, it is clear that the upward pressures must be greater than the downward. Hence the resultant pressure on an immersed body must be a force acting vertically upwards. Now it is easily shown that the magnitude of this pressure is equal to the weight of the fluid displaced. The point in the displaced fluid at which the resultant vertical pressure may be supposed to act is called the *centre of buoyancy*, or *centre of displacement*. Hence, we see that when a body floats in a fluid, it is kept at rest by two forces, the weight of the body acting downwards through its centre of gravity, and the weight of the fluid acting vertically upwards through its centre of gravity, or centre of buoyancy. The relative positions of the centre of gravity and the centre of buoyancy have an important bearing on the safety of ships at sea. If the centre of buoyancy be above the centre of gravity, the equilibrium is stable; in other words, if the ship is displaced, it will tend to return to its original position. If, on the other hand, the centre of buoyancy be below the centre of gravity, the equilibrium will generally be unstable, although a body may float in stable equilibrium even if the centre of buoyancy be below the centre of gravity, as will be explained under the head **HYDROSTATICS**.

**CENTRAL FORCES.**—Central forces are forces whose action is to cause a moving body to tend towards a fixed point called the centre of force. By Newton's first law of motion we know that 'every body continues in its state of rest or of uniform motion in a straight line, except in so far as it is compelled by forces to change that state.' From this we learn that, if the speed of a body changes, or if the line of motion be not straight, whether the speed be unaltered or not, some force must be acting. In the latter case the forces acting are called central forces. The doctrine of central forces considers the paths which bodies will describe round centres of force, and the varying velocity with which they will pass along these paths. It investigates the law of the force in order that a given curve may be described, and many other problems which can only be solved by mathematical methods. Gravity affords the simplest illustration of a central force. If a stone be slung from a string, gravity deflects it from the rectilinear path which it would otherwise pursue, and makes it move in a

curve called a parabola. Again, the moon is held in her orbit round the earth by the action of gravity, which is constantly preventing her from going off in the line of the tangent to her path at any instant.

In connection with this subject we have to make some remarks on what is called *centrifugal force*. We have seen that force must always be applied to make a body move in a curved path. Such a force is called a centrifugal force, the old erroneous notion being that bodies have a tendency to fly outwards from the centre about which they are revolving. The use of the term will, however, cause no inconvenience, provided we interpret it merely as indicating that, to keep a body moving in a curve instead of in its natural straight line, a force directed towards the centre of curvature is always required.

Many familiar illustrations of the action of the so-called centrifugal force will occur to the reader. A ball fastened to the end of a string, and whirled round, will, if the motion is sufficiently rapid, at last break the string, and fly off in a tangential path. This is due to the fact that the cohesion of the particles of the string is no longer able to supply the force necessary to keep the ball moving in its circular path. For a similar reason a fly-wheel or a grindstone bursts when it is made to rotate too rapidly. It is found that at a curve on a railway it is the outer of the two rails which is most worn. This is due to the fact that the outer rail has to supply the force necessary to keep the trains moving in curved paths. A glass of water may be whirled so rapidly that, even when the mouth is downwards, the excess of the centrifugal force over the weight of the water is sufficient to prevent the water from falling out. The centrifugal force increases with the velocity. As a matter of fact, it can be shown that when a body moves in a circle of radius  $r$ , with velocity  $v$ , its centrifugal force is  $\frac{mv^2}{r}$ . By means of this formula

it can be proved that about  $\frac{1}{177}$  of its weight is required merely to keep a body on the earth's surface at the equator. By this amount the weight of a body is diminished. Now 289 is equal to  $17^2$ . Hence it follows that if the earth were to rotate seventeen times as fast as it does now, the attraction of gravitation would only just be able at the equator to keep bodies from flying off its surface. If the rotating body be plastic, it will swell out in all directions perpendicular to the axis of rotation, and assume the form of an oblate spheroid. For the same reason the earth itself has assumed the form of an oblate spheroid, a result which is seen on a greater scale in the case of Jupiter and Saturn on account of their larger size and more rapid rotation.

**Centre-board.** See YACHT.

**Centrifugal and Centripetal** are terms used in Botany to designate two different kinds of leaf development or inflorescence, the former term being applied when the development proceeds from the apex towards the base of the axis or leaf, and the latter when it is from the base upwards towards the apex. See LEAF, INFLORESCENCE.

**Centrifugal Force.** See CENTRE.

**Centripetal Force.** See CENTRE.

**Centumviri** ('a hundred men'), a college of justice in ancient Rome, which had jurisdiction in civil cases. It has been supposed that the body was originally made up of three delegates from each of the thirty-five tribes. There were 180 members in the time of Augustus, and under the emperors it increased in importance, as it became the only scene left for the display of judicial eloquence and of legal knowledge.

**Centurion** (Lat. *centurio*, from *centum*, 'a hundred'), a Roman officer commanding a century or company of foot-soldiers. There were sixty centurions in a Legion (q.v.).

**Ceorl**, a word which occurs frequently in the laws before the Norman Conquest under somewhat varying senses, but substantially meaning an ordinary freeman not of noble birth. His position gradually sank in social status until it hardly differed from that of the serf, save that the ceorl had the right of choosing his own master in accordance with the law of Athelstan, which required every landless man to find himself a lord. He still remained 'law-worthy,' and paid his *wer-gild* of two hundred shillings; but part of his freedom had disappeared, and ultimately his condition developed into the complete *villanage* characteristic of feudalism. On the other hand, ceorls who possessed land often contrived to force their way into a higher social class, that of the *thegns*, a kind of nobility of service who may be roughly put as equivalent to the *knights* of the period after the Conquest. A ceorl with 5 hides (600 acres) of land was 'thegn-worthy.' The name ceorl does not occur in Domesday—the very degradation of the meaning of the word *churl* in modern usage is but a part of the historical degradation of the social class which it denoted.

**Ceos** (sometimes called by the Italianised name of *Zea* or *Izaa*), one of the Cyclades, in the *Ægean* Sea, 14 miles off the Attic coast. It is 13 miles long, 8 broad, and 39 sq. m. in area. The central and culminating point is Mount Elias, 1863 feet high. It is fairly fertile, raising fruit, wine, honey, and valonia. There are iron-mines. Pop. 4000, mostly in the capital, Zea or Ceos. In ancient times Ceos was noted as the birthplace of the poets Simonides and Bacchylides, and the physician Erasistratus; and the Cean laws were famous for their excellence.

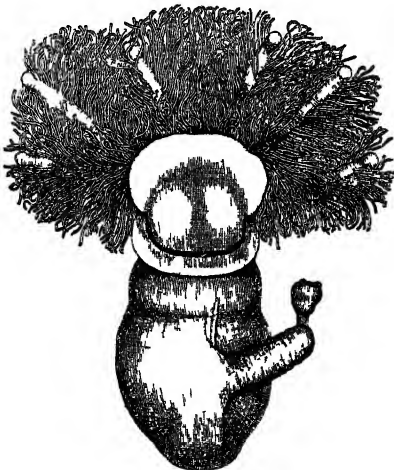
**Cephalaspis**, a genus of fossil Ganoid fishes, of which six species have been described, two belonging to the Upper Silurian, and four to the Devonian measures. The head was protected by a large ganoid plate, sculptured externally with circular radiating markings. The shield was produced into a horn at each posterior corner, and bore a median and posterior dorsal spine. Agassiz gave the name cephalaspis ('buckler-headed') from this extraordinary covering, which has very much the appearance of, and was formerly supposed to be, the cephalic shield of an Asaphus or Trilobite. The body was covered with rhomboidal enamelled scales, and furnished with dorsal and pectoral fins: it terminated in a large unsymmetrical tail. In a graphic description of this fossil in his *Old Red Sandstone*, Miller thus sketches the general appearance of the animal: 'Has the reader ever seen a saddler's cutting-knife—a tool with a crescent-shaped blade, and the handle fixed transversely in the centre of its concave side? In general outline, the cephalaspis resembles this tool; the crescent-shaped blade representing the head, the transverse handle the body.' The endo-skeleton was mainly cartilaginous, retaining the notochord through life. The flexible body, assisted by the large tail and the fins, would give the cephalaspis the power of moving rapidly through the water. Being a predaceous fish, it must have been a formidable enemy to its associates in the Palæozoic seas, for, besides its power of rapid motion, the sharp margin of its shield probably did the work of a vigorously hurled javelin, as in the sword-fish. Pteraspis, Asterolepis (20 to 30 feet in length), Scaphaspis, Auchenaspis, and a number of other genera, are united in the same family as Cephalaspis.

**Cephalic Index.** See SKULL.

**Cephalenia** (Gr. *Kephallēnia*). See CEPHALONIA.

**Cephalochorda**. See AMPHIOXUS.

**Cephalodiscus**, one of the most curious and interesting organisms dredged by the *Challenger* expedition. It was found in the Strait of Magellan, was first supposed to be a compound Ascidian, was monographed (1887) by Professor McIntosh as one of the Polyzoa (section Aspidophora), but is regarded by Mr Harmer as closely allied to that marvellous vertebrate-like worm, *Balanoglossus* (q.v.). The organisms form a spreading seaweed-like brownish colony, measuring in some cases 9 inches by 6, and including a great number of little individuals, protected by a membranous, flexible investment or house. Each individual resembles *Balanoglossus* (and also in part backboneed animals) in many important points, such as (a) the presence of gill-slits; (b) the existence of a notochord as a dorsal outgrowth from the gut, growing forwards into the anterior region or proboscis; and (c) the possession of a dorsal central nervous system, most richly developed in the middle region (or collar), but extending on to the proboscis. As another



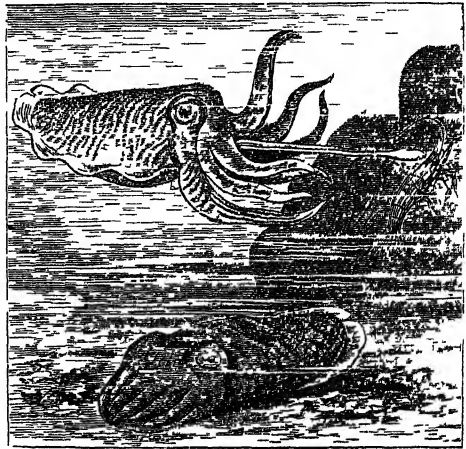
Cephalodiscus.

apparent connecting link between invertebrates and vertebrates, *Cephalodiscus* is of the greatest zoological interest.

**Cephalonia** (anc. *Cephallenia*; Homeric *Samē*), the largest of the seven Ionian Islands (q.v.), lies opposite the entrance of the Gulf of Lepanto or Corinth. It is irregular in shape, with a maximum length of 30 miles, and an area of 302 sq. m.; pop. 65,000. The surface is mountainous, in one point attaining 5310 feet; the soil for the most part thin, and water scarce. The inhabitants, however, have planted vineyards wherever the grape will grow, and currants and olive-oil are also produced for export. The capital is Argostoli (q.v.).

**Cephalopoda** (Gr., 'head-footed'), the highest class of molluscs, and in some respects the highest invertebrates. They are usually large animals, exclusively marine, with well-developed head-region, but (as the quaint name suggests) with the 'foot' or ventral surface grown round the mouth, and split up into 'arms,' which (with one exception) bear suckers. Another part of the foot is modified to form a funnel through which water is squirted. Two or four gills are present in the usual mantle-cavity. While the ancient forms lived in

shells, the Pearly Nautilus alone remains in this state, the shell being in all other cases internal and degenerate. The eyes are peculiarly large, and



Cuttle-fish (*Sepia officinalis*), swimming and at rest.

their ferocious aspect has earned for many common forms the title of 'devil-fish.' The mouth in the midst of the 'arms' is equipped with parrot-like teeth, and with a rasping ribbon on the tongue. The central nervous system, with its closely associated ganglia, is surrounded by a protective cartilaginous sheath, analogous, though in no way homologous, with a vertebrate brain-box. The sexes are separate. The structure and life of these animals will be discussed under the more familiar title CUTTLEFISH; only the general characters, classification, and distribution are here noticed.

**Classification.**—The Cephalopoda include two distinct orders, one represented by the Pearly Nautilus, the other by all the other living forms, which are again divided into Octopoda and Decapoda, according to the number of the 'arms.'

DIBRANCHIATA.	TETRABRANCHIATA.
Two gills, kidneys, auricles	Four gills, kidneys, auricles.
Eight or ten sucker-bearing arms	Numerous, without suckers.
Shell rudimentary or absent, never external, in one case chambered.	Shell well developed, external, chambered.
An ink-bag.	No ink-bag.
A completely closed funnel.	A split funnel.

**Distribution.**—Most species occur in warm and temperate seas, but those found in the colder waters seem much more prolific. The Tetrabranchiata are the older forms, and begin in the Silurian, whereas the Dibranchiata first appear in Triassic times. The Ammonoites (q.v.) are the most familiar representatives of the former, the Belemnites (q.v.) of the latter.

**Cephaloptera**, a name formerly used for a genus of rays. See RAY.

**Cephalotaceæ**, a family of dicotyledons included by some in the Saxifragaceæ, has a free apocarpous ovary and basal ovules. It consists of one species, the Western Australian *Cephalotus follicularis*, an insectivorous marsh plant with pitchers.

**Cephiſsus**, one of the two rivers which water the Athenian plain. It rises on the western slope of Mount Pentelcus and the southern side of Mount Parnes, and flows past Athens on the west into the Saronic Gulf near Phaleum. Several other rivers bore the name, including one (the Maviopotamo) in Phocis and Boeotia, flowing into Lake Copais. See BGEOTIA.

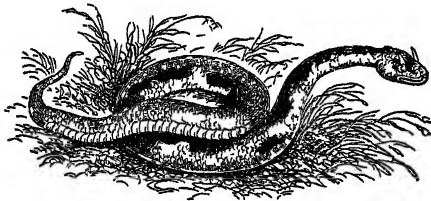
**Cepola.** See BANDFISH.

**Ceram'** (SERANG), the largest island of the southern Moluccas, lies NE. of Amboyna, to which Dutch residency it belongs, and is divided into Great and Little Ceram by the Isthmus of Taruno. Area, 6605 sq. m.; pop. 100,000. The island is one of the least explored in the archipelago, and comparatively little is known of the interior, which is, moreover, but scantily populated, the great mass of the people, mostly native Alfuros and immigrant Malays, inhabiting the coast villages. Much of the island is very fertile. A mountain-chain runs through the country, reaching in Nusa Keli some 11,000 feet. The chief exports are sago, iron, timber, earthenware, birds of Paradise, dried fish, edible nests, &c.

**Ceramics** (Gr. *keramos*, 'potter's clay'), a term used to designate the department of plastic art which comprises all objects made of clay, such as vases, cups, bassi-rilievi, cornices, and the like. See POTTERY.

**Cerargyrite**, or HORN-SILVER (AgCl), an ore of Silver (q.v.).

**Cerastes**, or HORNED VIPER, a genus of serpents of the family Viperidae, distinguished by a broad depressed heart-shaped head, the scales of which are similar to those of the back, and particularly remarkable for the development of one of the scales of each eyelid into a spine or horn, often of considerable length. The tail is very distinct

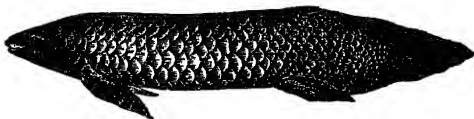


Horned Viper (*Cerastes vulgaris*).

from the body. This genus is exclusively African, and very venomous. There is probably only one species, *Cerastes ægyptiacus* or *cornutus*, the Horned Viper of the north of Africa, called Cerastes by the ancients, the name being derived from the Greek *keras*, 'a horn.' It was correctly described by the traveller Bruce, but his description was for some time regarded with incredulity.

**Cerate** (Lat. *cera*, 'wax'), a compound of wax with other oily and medicinal substances in such proportions as to have the consistence of an Ointment (q.v.). Simple cerate is made by melting together 6 parts of olive-oil, 3 of white wax, and 1 of spermaceti.

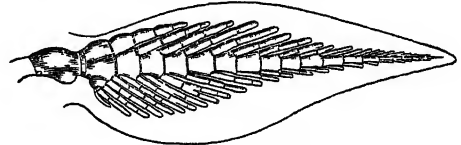
**Ceratodus**, the Queensland mud-fish, one of the remarkable sub-class of double breathers or *Dipnoi*. The name was originally used for the fossil possessors of certain tooth-plates found in



Ceratodus.

the Triassic and Jurassic strata, and to this genus the Queensland survivor, which has similar dental arrangements, was referred when discovered in 1870. *Barra munda* is the local name, but this is also given to one of the bony fishes, Scleropages, in the

family Osteoglossidæ. The modern scientific title of the Queensland mudfish is *Neoceratodus forsteri*. There is only one species, confined to the Burnett and Mary rivers, and found especially in water-holes rich in aquatic vegetation, where another ancient animal, the Platypus, also occurs. The body is elongated and compressed laterally, occasionally attaining a length of 5 or 6 feet. There are large thin scales; the trowel-like paired fins have a central jointed axis and a biserial arrangement of rays; the tail is quite symmetrical. The



Limb of Ceratodus.

swim-bladder functions as a lung, especially when the water is foul and respiration by the gills consequently difficult. *Ceratodus* comes to the surface to take gulps of air, making a grunting noise, but it never leaves the water. It lives on fresh-water crustaceans, worms, and molluscs, for the sake of which it crops the water-plants. Eggs are laid singly among the weeds, and the early development is somewhat amphibian-like. See MUD-FISHES.

**Ceratonia.** See CAROB.

**Ceratophyllaceæ**, an order of aquatic dicotyledons, consisting of the cosmopolitan genus *Ceratophyllum*, or hornwort. The plants are rootless and submerged, and multiply by the separation of branches as the older parts of the stem decay away. The whorled leaves are much divided. Minute monœcious flowers are found in their axils. The anthesis break off and rise to the surface, and the pollen drifts about till it reaches a stigma.

**Ceratopteris**, an aquatic fern of the order Polypodiaceæ. It is widely distributed in the tropics. The fronds are eaten in the Malay Archipelago.

**Cerberus**, in Greek Mythology, the many-headed dog—according to Hesiod, the offspring of Typhaon and Echidna—who guarded the portal of the infernal regions. Later writers describe him as only three-headed, with the tail and mane composed of serpents, though the poets sometimes encumber him with a hundred heads. Orpheus charmed him by the magic of his lyre, and Herakles overcame him by strength and dragged him to the upper world.

**Cercaria**, the technical term for a stage in the life-history of a fluke or Trematode. In those Trematodes which require two hosts, and are therefore called digenetic, the eggs formed and fertilised by the adult parasite pass out from its host, and the liberated larvæ enter another and different host. There they may give rise asexually to a succession of larval forms, e.g. those known as rediæ, ending in the production of cercariæ or immature flukes. These may be eaten by the host of the adult parasite, or they may migrate into a second intermediate host, which is eaten by the final host. See FLUKE.

**Cercis.** See JUDAS' TREE.

**Cercopithecus** (Gr., 'tail-ape'), a genus of Monkeys (q.v.).

**Cerdic.** See WESSEX.

**Cere.** See BILL.

**Cerealia.** See FESTIVALS.

**Cereals** are, in strictness, all the species of grasses (Gramineæ) cultivated for the sake of their seed as an article of food. They are also called Corn-plants or Bread-plants; but in a wide

popular sense the term cereal ceases to have any botanical limits, and includes plants of wholly distinct orders, notably Buckwheat (natural order, Polygonaceæ), and Quinoa (Chenopodiaceæ), &c.; even the Lotus of the Nile, the *Victoria regia*, and other species of water-lilies might thus be added to the list.

The cereals proper do not belong to any particular tribe of the great order of grasses, but the employment of particular species as bread-plants seems to have been determined chiefly by the superior size of the seed, or by the facility of procuring it in sufficient quantity, and of freeing it from its unedible envelopes. The most extensively cultivated grains are Wheat (*Triticum*), Barley (*Hordeum*), Rye (*Secale*), Oats (*Avena*), Rice (*Oryza*), Maize or Indian Corn (*Zea*), different kinds of Millet (*Setaria*, Panicum, Paspalum, Pennisetum, and *Penicillaria*), and Durra or Guinea Corn (*Sorghum* or *Andropogon*). These have all been cultivated from time immemorial, and there is great uncertainty as to the number of species to which the many existing varieties belong; their original forms and native countries often cannot confidently be determined. Barley, oats, and rye are the grains of the coldest regions, the cultivation of the former two extending even within the arctic circle. Wheat is next to these, and in the warmer regions of the temperate zone its cultivation is associated with that of maize and rice, which are extensively cultivated within the tropics. The millets belong to warm climates, and durra is tropical or sub-tropical. Rice is the food of a greater number of the human race than any other kind of grain. See CORN, BARLEY, MAIZE, MILLET, RICE, WHEAT, and other separate articles.

**Cerebellum.** See BRAIN.

**Cerebrals**, a class of consonants in Sanskrit and other Indian languages produced by applying the tongue to the palate.

**Cerebro-spinal Fluid** is a clear, colourless fluid contained within the ventricular system of the brain and the adjoining sub-arachnoid mesh-work. Its alkalinity is similar to that of the blood serum. The specific gravity varies from 1003 to 1009. It contains a small quantity of albumen, glucose (reduces Fehling's solution), chloride, and urea, with less than 5 per c.mm. of lymphocytes. In man under normal conditions there are from 60 to 80 c.c. of fluid, and it is calculated that this is renewed six to seven times a day. The normal pressure in man varies from 50 to 100 mm. of water, but is only regarded usually as pathological when it exceeds 150 mm. The chief functions are (1) to form a water-cushion protecting the brain and spinal cord from any sudden shock; (2) to equalise the pressure within the skull, ebbing away when the brain substance increases, and increasing proportionately when the brain substance shrinks; (3) to wash away the products of tissue metabolism, and it may provide nourishment for the nerve cells. It is formed by the choroid plexuses of the lateral, third and fourth ventricles, either as a secretion or as a product of dialysis from blood serum, the choroid plexus acting as a colloidal membrane, a certain selective action being attributed to its cells. Absorption takes place by two main routes—first, and most important, by the venous route, especially the sub-arachnoid villi, into the larger venous sinuses; and, second, along the perineural lymph spaces, probably the chief path of escape in the spinal theca. Diseases such as diabetes mellitus and nephritis, which alter the blood contents, also affect the cerebro-spinal fluid, but it is altered also in diseases of the brain and spinal cord, such as meningitis, abscess, tumour, syphilis, &c., when its examina-

tion becomes of great importance for accurate diagnosis. It can be easily withdrawn in man by inserting a needle into the spinal canal between the third and fourth lumbar spines. This operation is known as 'lumbar puncture.' Obstruction to the escape of cerebro-spinal fluid from the ventricles results in their distension, and is one of the causes of hydrocephalus, or 'water in the head.' For Cerebro-spinal Meningitis, see MENINGITIS.

**Cerebrum.** See BRAIN.

**Ceremonies**, MASTER OF THE, an officer at court, instituted by James I. for the reception of ambassadors and dignitaries. The same name came to be used for the supreme authority on etiquette at public assemblies at Bath and elsewhere; Beau Nash (q.v.) being the most memorable.

**Cereopsis** (Gr., 'wax-face'), a genus of birds of the family Anatide, to which the New Holland goose (*C. novae hollandiae*) belongs. This bird has been known since the southern shores of Australia were first visited by navigators. There, and on the adjacent islands, they were found in great abundance; and so little were they acquainted with the danger to be apprehended from man, that the earlier navigators easily supplied themselves with fresh provisions by knocking them down with sticks. The flight is slow and heavy, and the bird is naturally becoming less abundant. The cere (see BILL) is remarkably large, whence the name.

**Ceres**, the Roman name of the great Greek goddess Demeter, the protectress of agriculture and the fruits of the earth. Her worship was borrowed by the Romans from Sicily. Her first temple in Rome was vowed by the dictator A. Postumius Albinus (496 B.C.), to avert a famine with which the city was threatened. A great festival, with games, the *Cerealia*, was instituted in her honour, and her worship acquired great importance in the city. The decrees of the senate were deposited in her temple for the inspection of the tribunes of the people. See DEMETER.

**Ceres**, one of the Planetoids (see PLANETS), the first that was discovered. It was first seen by Piazzi at Palermo, January 1, 1801, and is sometimes visible to the naked eye, looking like a star between the seventh and eighth magnitudes.

**Cereus**, a large genus of Cactaceæ (q.v.), containing many of the most imposing forms of the order, both as respects vegetation and flowering. *C. giganteus* reaches a height of 60 feet, often unbranched, its tall pillars giving an extraordinary character to the landscape of New Mexico, while the allied *C. peruvianus* (36 feet) takes its place in Peru. Others have thin snake-like branches (*C. flagelliformis*), while the short obconical *C. senilis* is covered with long silky hairs. Many have splendid flowers, and of these *C. speciosissimus* with scarlet or purplish flowers is often cultivated, while *C. grandiflorus* is the well-known night-flowering cactus. The fruits are often much esteemed. For illustration, see CACTUS.

**Cerignola**, a town of Italy, 22 miles S.E. of Foggia by rail, with manufactures of linen, and a trade in almonds and cotton. The Spaniards' decisive victory over the French here in 1503 established Spain's supremacy in Naples. Pop. 39,000.

**Cerigo**, the southernmost of the seven Ionian Islands (q.v.), now officially known again by its old Greek name of *Cythera*, is separated from the coast of Morea by a narrow strait; area, 107 sq.m.; population, 5000. It is mostly barren, and mountainous in some parts; but corn, wine, and olives and fruits are raised. Capsali is the capital. In ancient times the island was sacred to Aphrodite, as the land that received the goddess when she arose from the sea.

**Cerinthus**, a heretic who lived at the close of the apostolic age, but of whom we have nothing better than uncertain and confused accounts. He is said to have been a native of Alexandria. He passed from Egypt into Asia Minor, and lived in Ephesus contemporaneously (according to the belief of the church) with the aged apostle John. It is related by Irenæus, on the authority of Polycarp, that John held the heretic in such detestation that, on a certain occasion, when he encountered Cerinthus in the baths of Ephesus, he immediately left the baths, saying to those about him, 'Let us fly, lest the bath fall on us, since Cerinthus is within, the enemy of the truth.' It is also said by Irenæus that the Gospel by St John was written in direct opposition to the tenets of Cerinthus. He held that the world was not made by the highest God, but by some angel or power far removed from and ignorant of the Supreme Being. He is also said to have held coarse and sensual millenarian views, to have believed the Jewish ceremonial law to be in part binding upon Christians, and to have taught that the Divine Spirit was first united with the man Jesus in his baptism by John. Cerinthus being, so far as is known, the oldest teacher of Judaic-Gnostic principles, and, according to Neander, 'the intermediate link between the Judaizing and Gnostic sects,' there would naturally be a greater incongruity and want of harmony in his system than in the later developments of Gnosticism (q.v.).

**Cerithium**, a genus of Prosobranchiate Gastropods, and type of a large family, Cerithiadae. The shell is rough, naked, spiral, elongated, with many coils, and with an oval oblique aperture which has a short canal in front. The species of this family are numerous, most of them marine, but many inhabiting estuaries and brackish rather than salt water; some are found in lakes and rivers. A few belong to temperate climates, but most of them are tropical, and in mangrove swamps they particularly abound. The fossil species are very numerous, and almost all limited to the Tertiary formations. *C. vulgatum*, over six inches in height, is often seen in Italian markets.

**Cerium** (sym. Ce, eq. 140.25) is a rare white metal found in cerite, monazite, and a few other minerals. It forms two basic oxides and a numerous class of salts. The dioxide is used in incandescent gas mantles. The nitrate and oxalate of cerium have been employed in the vomiting of pregnancy, their action being somewhat similar to that of the subnitrate of bismuth. The dose is from 2 to 10 grains. Cerite is the silicate of cerium, and is found in Sweden, but the chief supplies are now obtained from monazite in Brazil, which contains the phosphate of cerium, together with thorium.

**Cernauti**, the Rumanian name of Czernowitz (q.v.).

**Ceroxylon**. See WAX, PALM.

**Cerre'to**, a cathedral city of south Italy, on a slope of the Apennines, 14 miles NNW. of Benevento; pop. 5000.

**Cerro de Pasco**, the capital of the Peruvian department of Junin, at an elevation of 14,276 feet, 138 miles NE. of Lima, has rich mines of copper, silver, and coal, and great smelting-works. The climate is cheerless and inclement. Pop. 15,000, mostly Indians and half-breeds.

**Cerro Gordo**, a plateau in Mexico, the most easterly on the route from Vera Cruz to the capital. Here, on 18th April 1847, the Americans totally defeated the Mexicans.

**Cerro Largo**, a department in the NE. of Uruguay, well watered, with large savannahs and forests; area, 5735 sq. m.; population, 60,000,

chiefly engaged in cattle-raising. Capital, Cerro Largo or Melo; pop. 5000.

**Certaldo**, a town of central Italy, 19 miles SW. of Florence. It is noteworthy as the residence of Boccaccio, who was born and died there. His house is still standing, much as it was in the poet's time. Pop. 10,000.

**Certhiida**, a family of birds, generally placed in the great order Passeriformes. They are best known by their most typical representatives the Creepers (q.v.). They are widely distributed birds, absent, however, from the Ethiopian and neotropical regions. They are expert climbers, and feed on insects.

**Certificate**, in the law of England and of the United States, is a written statement by a person having a public or official status concerning some matter within his knowledge and authority. There are a great many classes of such certificates—e.g. certificate of charge upon land; certificate of the chief-clerk in Chancery proceedings, which is practically a report of what the clerk has done; certificate of discharge of a debtor in liquidation; certificate of incorporation under the Companies Acts; certificate of registry of ships under the Merchant Shipping Acts; certificate of naturalisation. In some cases an official certificate is *conclusive* evidence; in other cases it is merely *prima facie* evidence. Thus, under the Companies Act, 1908, the registrar's certificate of incorporation is conclusive evidence that all the requirements incidental to the formation of the company have been complied with; but a certificate under the common seal of a company as to the ownership of shares is merely *prima facie* evidence of the title to the shares specified therein. In the United States the word is commonly applied to any formal statement by a court of anything done therein, or by a public servant in the execution of his duty, as by a collector of taxes, a postmaster, &c. The term is used generally to denote a writing, properly authenticated, testifying to facts. See CHARACTER.

**Certification**, in the law of Scotland, signifies the judicial assurance given to a party of the course to be followed by the judge in case he disobeys the will of a summons, or other writ or order of the court. Reiterated contumacy on the part of the defender was at one time punished with confiscation of his property (1449, chap. 29), but now certification in a summons merely means that if he fails to appear in the usual manner, the judge will decern, or pronounce judgment against him.

**Certiorari** is the writ by which proceedings pending in an inferior court of record are removed into the High Court. The writ issues from the High Court, and is directed to the judge or other officer of the inferior court. It requires that the record of the proceedings shall be transmitted to the High Court to be there dealt with. Certiorari, as a rule, lies only in respect of judicial, as distinguished from ministerial, acts of the inferior court.

The writ may be issued in either civil or criminal proceedings. As the law now stands, the defendant in a civil action in an inferior court may, on application, get a writ of certiorari on satisfying the High Court that it is proper that the case should be dealt with in the High Court. The great majority of civil cases are now commenced in the county courts; and, under the County Courts Acts, any proceedings commenced in a county court may be removed to the High Court by a writ of certiorari or by order, if the defendant can show sufficient cause for such removal. The power of the High Court to grant the writ is discretionary, and the writ may be granted upon such terms as to payment of costs and giving of security as the High Court may think

fit to impose. The most common ground for removing a civil suit from an inferior court to the High Court is that some question of law of more than usual difficulty and importance is likely to arise. The defendant in an action of *Replevin* (q.v.) has a right, on application, to have the case removed from a county court, subject to his giving security. After final judgment in the inferior court, a case cannot be removed by certiorari for any other purpose than execution.

In criminal cases certiorari lies at common law to remove indictments found before inferior courts into the King's Bench Division or the Central Criminal Court for trial. The crown has an absolute right to the writ; but, except where the writ is applied for by the attorney-general on behalf of the crown, it is in the discretion of the King's Bench Division to determine whether sufficient grounds exist for allowing the writ to issue, and, as a rule, the party on whose behalf the writ is applied for must give security. Summary proceedings and convictions before magistrates, not originating in an indictment, may, by writ of certiorari, be brought up before the King's Bench Division for review, and be quashed, if necessary, for some defect of law.

Again, any order of the council of a municipal corporation for the payment of money out of the borough fund, or any order of a county council for payment of money out of the county fund, may be removed into the King's Bench Division by certiorari, and may be partly or wholly disallowed.

In the United States certiorari is generally provided for by statute, but where no such provision is made, or no other mode of review of the proceedings of an inferior court has been provided by statute, any superior court exercising common law jurisdiction has an inherent right to issue this writ. It is used in both civil and criminal cases to bring the whole record of the inferior tribunal before a superior court, to determine whether the former has proceeded within its jurisdiction, and also to enable substantial justice to be done whenever an inferior tribunal has failed to proceed according to the requirements of the law. It does not lie to enable the superior court to revise a decision of the inferior court upon matters of fact, or where the error is formal merely, and not substantial.

**Certo'sa di Pavi'a**, a celebrated Carthusian monastery, 5 miles N. of Pavia, was founded in 1396 by Giovanni Galeazzo Visconti, first Duke of Milan, in atonement for the murder of his uncle. The church is a splendid structure in the form of a Latin cross, the ground-plan being 252 feet long by 177 feet broad. The richly sculptured façade, designed by Borgognone, was commenced in 1473. The building is made up of various styles, but the Pointed prevails in the interior, which is decorated with frescoes, paintings, &c., and contains a gorgeous high-altar, the mausoleum of the founder, and several monuments. After the battle of Pavia (1525), Francis I. was for three days a prisoner at the Certosa, which, since the dissolution of the monasteries, has been constituted a national monument. The name *certosa* is a form of Carthusian (q.v.), and is used of other monasteries of the order, as that to the south of Florence.

**Cerumen** is ear-wax, the yellow waxy matter which is secreted by certain glands lying in the passage that leads from the external opening of the ear to the membrane of the tympanum. It lubricates the passage and entangles particles of dust and small insects, preventing them from getting farther in. See E.A.R.

**Cervantes Saavedra**, MIGUEL DE, the author of *Don Quixote*, was born at Alcalá de Henares in 1547. His birthday is unknown, but

he was baptised on the 9th of October. He was the fourth of seven children born to Rodrigo de Cervantes (died 1585), a poor medical practitioner (son of a petty magistrate of Alcalá), and his wife Leonor de Cortinas (died 1593). Of Cervantes personally we know little beyond what he himself tells us, but of the events of his life there is a tolerably complete record. No authentic portrait of him has been found (the Jáuregui portrait, discovered 1911, and dated 1600, is probably spurious); but Cervantes describes himself at the age of sixty-six as a man of average height, with aquiline features, fairish complexion, bright eyes, smooth forehead, chestnut hair, long moustaches, and silver (once golden) beard (Prologue to *Novelas Exemplares*). Of his youth practically nothing has been ascertained. The story of his having studied at Salamanca is improbable; all we know of his education is that Juan López de Hoyos, a schoolmaster at Madrid, calls him his 'dearly beloved pupil.' The first known productions of his pen appeared in 1569 in a collection of pieces on the death of the queen, edited by this schoolmaster. In the same year we find him in Italy in the service of Cardinal Giulio Acquaviva; but shortly afterwards he enlisted as a soldier under the command, it would appear, of Marc Antony Colonna. At the battle of Lepanto he was in the thick of the fight, and received three severe gunshot wounds, one of which maimed his left hand. After further service against the Turks in Tunis, he was returning to Spain in 1575 with letters of recommendation from Don John of Austria and the Viceroy of Sicily, when the galley he sailed in was captured (September 20th) by Algerine corsairs, and with his brother Rodrigo and several others he was carried into Algiers. He remained in captivity five years, during which he made four daring attempts to escape, and lived in almost daily expectation of death or torture. It was not for himself alone that he sought freedom. No nobler story of unselfish heroism has ever been told than that in the depositions of his fellow-captives at Algiers, where they testify to his self-devotion, his dauntless spirit, and his generosity, and with touching earnestness strive to give expression to their own gratitude, love, and admiration. In 1580 he was ransomed by the efforts of Trinitarian monks, Christian traders of Algiers, and his family, which reduced itself to poverty to provide the sum required. Cervantes reached home in December 1580, and finding no permanent occupation, eventually drifted to Madrid and essayed a literary career, as poet and playwright. His first important work was the *Galatea*, a pastoral romance of the same class as the *Diana* of Montemayor and the *Filida* of his friend Montalvo. It was printed at Alcalá in 1585—not, as is commonly said, Madrid, 1584. For some years he strove to gain a livelihood by writing for the stage. He produced by 1587 between twenty and thirty plays, of which two only, *La Numancia* and the *Los Tratos de Argel*, have survived; but from his own account it is plain that, though not ill received, they failed to attract, and that he was driven to seek some other employment. Meanwhile Cervantes had had an affair with a lady named Ana Franca de Rojas, who became the mother of his illegitimate daughter, Isabel de Saavedra (circa 1585–1652); and on 12th December 1584 he had married Catalina de Salazar y Palacios, a native of Esquivias, who, eighteen years his junior, survived him for ten years. They had no children. In 1587 he migrated to Seville, where he obtained the post of commissary to the fleet, for which he requisitioned grain and oil. After the defeat of the Grand Armada, he in vain petitioned (1590) the king to send him to America. In 1594 he was appointed a collector of revenues for the kingdom

of Granada; but in 1597, failing to make up the sum due to the treasury, he was sent to prison at Seville. He was released, however, on giving security for the balance, but not reinstated; nor can the government be charged with undue harshness, for, though no stain attaches to his integrity, it is clear that as an official and book-keeper he was not faultless. He remained some time longer at Seville, but little is known of his movements for the next few years. Local tradition maintains that he wrote *Don Quixote* in prison at Argamasilla in La Mancha; but it has nothing to support it save that Argamasilla is Don Quixote's village. In 1603, it would seem, he was living at Valladolid; in September 1604 leave was granted to print the first part of *Don Quixote*, and early in January 1605 the book came out at Madrid. It is commonly asserted that its reception was cold; but the truth is that it leaped into popularity at once. Within a month two pirated editions were in the press at Lisbon; by the autumn five editions had been published; and Don Quixote and Sancho Panza paraded the streets as familiar characters in the pageants at Valladolid that spring. By a minority, however, it was not welcomed. Lope de Vega wrote sneeringly of it and its author months before it was printed—for it had a previous circulation in manuscript—and he and his brother-dramatists showed how bitterly they resented the criticism in chapter 48. In 1605, although perfectly innocent, Cervantes and his household were arrested in connection with the death of a gallant called Gaspar de Ezpeleta, who was found mortally wounded at his door. Instead of immediately giving his readers the sequel to *Don Quixote* they asked for, Cervantes busied himself with composing short tales (*Novelas Ejemplares*, 1613) and overhauling plays written at an earlier date (*Ocho Comedias, y Ocho Entremeses Nuevos*, 1615). The *Viage del Parnaso*, a poem of over 3000 lines in *terza rima*, reviewing the poetry and poets of the day, appeared in 1614. In his *Novelas*, however, he promised the second part of *Don Quixote* 'shortly.' But in 1614 a writer, under the pseudonym of Alonso Fernández de Avellaneda, brought out a spurious second part, with an insulting preface, full of coarse personal abuse of Cervantes. It was the work of a dull plagiarist; but it served as the spur Cervantes needed to urge him to the completion of the genuine second part, which was published at the end of the year 1615. It was not too soon; his health was already failing, and he died at Madrid on the 23d of April 1616 (N.S.). He was buried in an untraceable grave beside the convent of Trinitarian nuns in the Calle de Cantarranas. But a short time before his death he finished his romance of *Persiles and Sigismunda* (published early in 1617). There are few pieces of his writing more characteristic of the man than the last two that ever came from his pen—written, indeed, upon his very deathbed—the address to the reader and the dedication to the Conde de Lemos, whose generosity mitigated the poverty which haunted him to the last and drove him to various doubtful transactions; like every glimpse of himself that his pages give us, they make us wish that we knew more of one so full of wisdom, patience, and charity, so bright and so brave.

It is in right of *Don Quixote* that the name of Cervantes has a place here; but his minor works entitle him to an honourable one in the history of Spanish literature. His novels are the best of their kind—a kind Spain excelled in; and though the *Galatea* is doubtless inferior to the *Diana*, its greatest fault is that, like the *Diana*, it belongs to a radically insipid species of romance. The title of poet is commonly denied him; but if a good deal of his poetry is weak, there is much that

only a poet could have written, and not even Garcilaso had a finer sense of melody or a truer touch in verse. It would be unjust to judge of his dramatic powers by the comedies printed in 1615. They were nothing more than a desperate attempt to gain a footing on the stage by a concession to the popular taste. To found a great national drama worthy of his country was the ambition of his life, and the first step was to obtain a hearing. The tragedy of *Numancia*, with all its defects the most powerful and original drama in the language, is a better measure of Cervantes as a dramatist. And if it is impossible to accept his own estimate of the *Persiles and Sigismunda*, no reader will deny its invention and grace of style. His minor works all show signs of the author's care; *Don Quixote*, on the other hand, is the most carelessly written of all great books. Cervantes, it is plain, did not look upon it in that light. He was very proud of its popularity; but all he ever claims for it is that it will amuse, and that it did the state some service in laughing chivalry romances out of fashion. He wrote it by fits and starts; he neglected it for his other works; he sent it to the printers without revision, and made merry over their blunders and his own oversights. But it may be that we owe more to this carelessness than we think. One of the marvels of this marvellous book is its perennial youth. After three centuries and more it is as fresh and full of life as when it came from La Cuesta's press. In his other works Cervantes studied recognised models and consulted the tastes of the day; in *Don Quixote* he followed the lead of his own genius alone, and wrote only as instinct prompted him. Written in a desultory fashion, it had time to grow and ripen under his hand; Don Quixote and Sancho, outlines at first, became by degrees flesh and blood realities to his mind, and beings that he loved; and the book—the second part especially—served him as a kind of commonplace-book to which he turned when he was in the mood, making it the depository of his thoughts and record of the experience and observation of a stirring life. We need not commit the disloyalty of doubting his word when he says that all he sought was to cure his countrymen of their passion for chivalry romances. He had motive enough in the magnitude of the evil, and his was only one of scores of voices lifted up against it; nor is there anything extraordinary in a champion of true chivalry, as he was, resenting a mockery that made it contemptible. But the genius of Cervantes was essentially discursive, and many other offenders and offences were comprehended in the indictment that he brought against the romances of chivalry and their readers.

The first complete edition of Cervantes's works was that of Rivadeneyra (12 vols. Madrid, 1863-64). The *Complete Works* (in English; 8 vols. Glasgow, 1901 *et seq.*) have been edited by J. Fitzmaurice-Kelly. Many editions of the selected works have been published. Of *Don Quixote* in the original or in translation hundreds of editions have appeared. The first worthy of the book was Tonson's (Lond. 1738, 4 vols.). There are translations in many languages. The oldest is the English by Shelton, made in 1608 and printed 1612 (second part, 1620), a vigorous but rude and inaccurate version (new ed. 1896). Other English translations are those of Phillips (1689), Motteux (1702), Jervas (commonly called Jarvis, 1742), Smollett (1755), A. J. Duffield (3 vols. 8vo, 1881), John Ormsby (4 vols. 8vo, 1885), and H. E. Watts (5 vols. 4to, 1888-89). The Life of Cervantes by Navarrete (1819) became the leading authority. Much supplementary information was brought to light by the researches of Pérez Pastor, who published in

two series (*Documentos Cervantinos*, 1897, 1902) 161 contemporary documents bearing on Cervantes's life. The Tercentenary Celebration (1905) was marked by considerable Cervantine study. L. Rius brought out a *Bibliografía Crítica* (3 vols. Madrid, 1895-1904). Cotarelo y Mori published *Efemerides Cervantinas* in 1905. A new edition of Avellaneda's second part of Don Quixote was prepared by Menéndez y Pelayo (1905). Professor Fitzmaurice-Kelly's *Cervantes in England* (1905) testified to British appreciation of Don Quixote and its author. The same writer's *Life* (1913), rejecting many legends and conjectures, adheres strictly to documentary evidence, including the most recent discoveries. Other English Lives are by Watts (1895) and A. F. Calvert (1905). See also *Spanish Language and Literature under SPAIN*.

**Cervetri**, a village 19 miles WNW. of Rome, on the site of the great Etrurian city, *Cære* (see ETRURIA). Conquered and degraded by the Romans in 353 B.C., it experienced but a brief renewal of prosperity under the empire as a watering-place (the warm *Bagni del Sasso*, still used), and finally fell into decay in the 13th century. Many Etruscan remains have been found near by.

**Cervidae** and **Cervus**. See DEER.

**Cervin**, MONT. See MATTERHORN.

**Cesalpino**. See CESALPINUS.

**Cesarewitch**. See CZAR.

**Cesari**, GIUSEPPE (sometimes called ARPINO), an Italian painter, born at Arpino about 1568, was greatly honoured by no less than five popes, and died at Rome, 3d July 1640. His works—in fresco and oil—display lively imagination, and great tact in execution.

**Cesarotti**, MELCHIORE, an excellent Italian poet, was born 15th May 1730 at Padua, where he filled the Greek and Hebrew chairs. He gained a reputation by his translation of Macpherson's *Ossian* (1763). The versification of this work, like that of his free translation of the *Iliad*, under the title of *La Morte di Ettore*, was admired by Alfieri, and Cesarotti unquestionably threw fresh life into Italian literature. His *Ragionamento sulla Filosofia delle Lingue* (8 vols. 1785) and *Ragionamento sulla Filosofia del Gusto* are his best works. He died 3d November 1808.

**Cesena**, a town of central Italy, 12 miles SE. of Forlì by rail, with a cathedral and a trade in silk, wine, hemp, and sulphur. Cesena gave birth to two popes—Pius VI. and VII. Pop. 5000. Here Murat defeated the Austrians, 30th March 1815.

**Ces'nola**, COUNT LUIGI PALMA DI, collector, was born near Turin, 29th June 1832. He served in the Austrian war (1848), with the Sardinian contingent in the Crimean war, went to New York in 1860, and served as a volunteer in the Civil War. Appointed American consul at Cyprus in 1865, he commenced a series of excavations which he continued for about ten years with the most remarkable success. His splendid collection of statues and figures, lamps, vases, inscriptions, and other antiquities, is in New York Metropolitan Museum of Art, of which he was director. Doubts expressed in 1879 as to the authenticity of part of the collection were proved to be groundless. He wrote *Cyprus, its Ancient Cities, Tombs, and Temples* (1877). He died 20th November 1904.

**Céspedes**, PABLO DE, Spanish painter, born at Córdoba in 1538, studied at Rome under Michelangelo and Raphael, and in 1577 became a prebendary at Córdoba, where he established a school of art, and was also active as an architect, painter, and writer. He died 26th July 1608.

**Cessio Bonorum** (Lat., 'cession or surrender

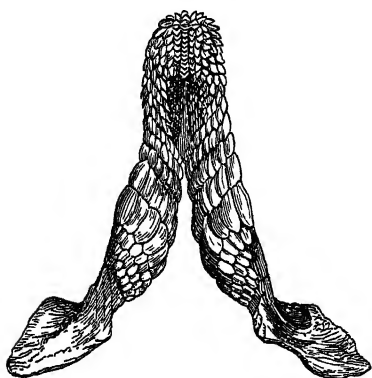
of goods'), a process which the law of Scotland borrowed from that of Rome, and which also appears in most of the Continental systems. On making a surrender of estate to his creditors, the debtor was granted a judicial protection from imprisonment in respect of all debts then due by him. As, however, imprisonment for debt was abolished by the Debtors Act, 1880, except in the case of rates and taxes due, cessio as a process for the protection or liberation from imprisonment of insolvent debtors became practically obsolete. The Act of 1880, however, reconstituted the process of cessio by converting it into a summary process for the administration and distribution of small estates in bankruptcy. This process proved defective in important respects; and by the Bankruptcy (Scotland) Act, 1913, the process of cessio was abolished and its place taken by a new process of 'summary sequestration,' competent in cases where the debtor's assets of every description do not in the aggregate exceed £300 in value. See BANKRUPTCY, SEQUESTRATION.

**Cesspool**. See SEWAGE.

**Cestoid Worms** (*Cestoda*), an order of flat worms (Plathelminthes), of internal parasitic habit, and generally known as Tapeworms (q.v.). The adult consists of an asexual 'head,' attached by hooks or suckers or both to the host, and budding off a long chain of flat sexual, hermaphrodite 'joints,' which become mature at a certain distance from the 'head,' have a measure of individuality and independence, and are eventually expelled. There is no alimentary canal nor vascular system; the nervous system is usually complex, but of a low order; there is a well-developed excretory system of branching tubes. The reproductive organs of the 'joints' are usually very complex. The liberated 'joints' or 'proglottides' break up, and set free embryos, which find their way into other hosts, and undergoing considerable change become bladder-worms, develop a head, or in some cases heads, and only become sexual when their host is in turn eaten by the original species in which the tapeworm flourished. There is thus an alternation of generations between the asexual bladder-worm and the sexual tapeworm. The order includes about 25 genera and 500 species, mostly parasitic in vertebrates. The genus *Tenia* (tapeworm) includes more than half the known species. The Cestodes are linked to the flukes or Trematodes by forms like *Amphilina*, *Caryophyllæus*, and *Archigetes*, which have no 'joints,' and a single reproductive system; and there is a well-marked series from these up to the most specialised *Tenia*. *Echinebothrium*, *Phyllobothrium*, *Anthobothrium*, *Acanthobothrium*, *Tetrarhynchus*, *Ligula* (q.v.), *Bothriocephalus* (q.v.), are the important genera besides *Tenia*. See TAPEWORMS; also BLADDER-WORM, PARASITIC ANIMALS, and Leuckart's *Parasites of Man*.

**Cestracion**, a genus of sharks, regarded as constituting a distinct family, Cestraciontidae, although not more than four species are known as now existing. It is characterised by having two dorsal fins and one anal, the first dorsal situated over the space between the pectorals and ventrals; a spine forming the front of each dorsal; a short wide tail, with its upper lobe strongly notched beneath; the mouth at the fore end of the snout; spiracles distinctly visible, rather behind the eyes; and small gill-openings. The front of the mouth is armed with obtuse angular teeth, whilst the margins and inner surface of the jaws are covered with pavement-like teeth, presenting a general continuity of surface, as in skates, and disposed in rounded oblique scrolls—the former evidently adapted to the seizing of food, the latter to the

crushing and bruising of it. They are of obvious use with a diet of hard-shelled crustaceans and



Upper Jaw of Port-Jackson Shark (*Cestracion philippi*).

molluscs. The front teeth are sharp in the young forms. The egg-case has two curious spiral ridges surrounding it. The Port-Jackson Shark, or 'Nurse' (*C. philippi*) of the Australian seas, and the Cat Shark of Japan and China (*C. zebra*), seem to differ chiefly in the patterns of colour. None exceed five feet in length. The Cestraciontidae are particularly interesting to geologists, for the oldest fossil sharks belong in great part to this family. 'The remains are found even in the Palaeozoic strata; they become more numerous in the Carboniferous series; they are very numerous in the Lias and Chalk formations; but there they cease almost entirely, the strata of the Tertiary series containing scarcely any of them.' In modern times the species are reduced, as we have



Outside view of Egg-case of *Cestracion philippi*.

seen, to four at most, and other types of shark have become more prevalent. The fossil forms were abundant, also much larger, and the cestracions thus furnish a particularly good illustration of a decadent family.

**Cestui que Trust**, a person for whom another is a trustee. The term is Norman-French, and means in English law, and also in the United States, exactly what Beneficiary (q.v.) means in Scots law. See TRUST.

**Cestus** (Gr. *kestos*, 'embroidered'), a girdle worn by Greek and Roman women, but at what part of the body is somewhat uncertain. It was worn apparently between the *cingulum*, which was a sash or girdle over the tunic just under the bosom, and the *zone*, worn mostly by young unmarried women lower down the body, just above the hips. According to Winckelmann, the cestus was itself worn round the loins; according to Heyne and Visconti, immediately under the bosom. The *cestus* of Aphrodite was covered with such alluring representations of the joys of love that she who wore it was irresistible. It was borrowed by Hera when she desired to win the love of Zeus. —CESTRUS, or more correctly, CÆSTUS, the boxing gauntlets worn by the ancient prize-fighters, which consisted of leather thongs bound round the hands and wrists. They sometimes reached as high up as the elbows, and were armed with lead or metal bosses to increase the force of the blow.

**Cetacea**, an order of mammals, of aquatic habit and fish-like form. The head is large, the

neck indistinct; there is generally a median dorsal fin, and the tail has lateral flukes; the fore-limbs are reduced to paddles, the hind-limbs are at most represented by slight internal traces; the skin is smooth, and, with the occasional exception of a few bristles near the mouth, hairless; there is a thick layer of fat or blubber under the skin which serves instead of hair as a heat-retainer. The eye is small, there is no external ear, the nostrils are situated vertically. The bones are spongy and oily, the neck vertebrae are compressed and often fused, there is no union to form a sacrum. The skull is peculiarly modified, the brain-case being high, and the front part prolonged into more or less of a snout. There are no collar-bones; the bones of the arm are flattened and stiff; the joints of the second and third fingers are always above the normal number; the whole arm forms a flipper; the hip-girdle and hind-leg are degenerate. In one group teeth are absent except in the foetus, and are replaced by 'whalebone' growths from the palate; in no case is there more than one set of teeth. The stomach has several chambers; the intestine is simple. The liver is less divided than usual, and there is no gall-bladder. The blood-vessels form wonderful networks (*retia mirabilia*). The top of the windpipe is prolonged forwards so as to form, when embraced by the soft palate, a continuous air-passage from nostrils to lungs. The brain is large. The placenta is 'non-deciduate and diffuse.' The tests are two in number, and lie beside the female genital aperture; the milk is squeezed into the mouth of the sucking young.

The Cetacea are widely distributed in all seas and in some large rivers. They swim powerfully, and the tail works up and down, not sideways. They rise to the surface to breathe, and do not spout sea-water from their blowholes. The expiration is periodic and violent, and the forcibly expelled air being laden with water, vapour may condense in a pillar of fine spray, or the ascending column may carry up some surface sea-water along with it, but it must be recognised that the process is simply that of ordinary expiration in peculiar conditions. They are mostly inoffensive, generally social in habit, vary from 4 to 60 feet in length, and feed on jelly-fish, crustaceans, pteropods, cuttlefish, fishes, and in one genus (*Orca*) on seals and on other whales.

Two very distinct series have to be distinguished —(a) the Toothed Whales or Odontoceti, and (b) the Baleen Whales or Mysticoceti. The former include Sperm Whales (*Physeter*), the Bottlenose (*Hyperoodon*), the genus *Platanista* and its allies, and the great family of Dolphins (q.v.). The latter sub-order includes the Right Whale (*Balaena*), the 'Humpbacks' (*Megaptera*), and the Rorquals (*Balaenoptera*).

In the Eocene, Cetacea are represented by primitive, less specialised forms, known as Zeuglodon, but the remains are, as one would expect, somewhat fragmentary, and the conclusions to be drawn from them very uncertain. In Miocene and Pliocene strata still more fragmentary cetacean remains have been found, and are grouped together in the genus *Squalodon*.

There is much doubt and dispute in regard to the origin and affinities of Cetacea. They are related by some to Carnivores, but the researches of Sir William Flower made it more probable that they have much closer affinities with Ungulates. He regarded it as not unlikely that the whole group had a fresh-water origin. Fuller details must be sought under the article WHALE. See Beddard's *Book of Whales* (1900).

**Ceteosaurus** (*kētos*, 'whale'; *sauros*, 'lizard'), a large dinosaurian reptile belonging to the Jurassic System (q.v.). According to Professor

Phillips, it may have reached a length of 50 feet, and when 'standing at ease' was probably not less than 10 feet in height and of a bulk in proportion. It appears to have frequented the marshes and river-sides of the period, and to have been a vegetable-feeder. The word is also spelt *Cetiosaurus*.

**Cetewayo.** See ZULUS.

**Cetinje** (*Tsetinje*, *Cettigné*), a town of Yugoslavia, capital of the kingdom of Montenegro till it was merged in that of the Serbs, Croats, and Slovenes, lies in a rocky valley 2093 feet above sea-level, and 17 miles E. of Cattaro, with which it is connected by a carriage road. It is the residence of an archimandrite, and consists of palaces, a few private houses, an abbey, jail, arsenal, theatre, library, museum, hospital, colleges, and a girls' high-school. Behind the old palace was a tree, under which the prince delivered judgments. It was in Austrian hands in 1916-18. Pop. 5300.

**Cetotolithes**, a name given by Owen to fossil cetacean ear-bones, which occur in great abundance in the Red Crag of Suffolk (see *PLIOCENE*). They are rubbed and water-worn, and have evidently been washed out of some earlier strata, which remain yet unrecognised. The extent of these earlier strata must have been very great, seeing that the crag beds now extend over a large district in Essex and Suffolk, and attain a thickness in some places of not less than 40 feet. Professor Henslow in 1843 drew the attention of agricultural chemists to this deposit as a source of materials for manure, and since then superphosphate manures have been manufactured from it to the value of many thousand pounds annually; a striking example of the valuable practical results which frequently flow from a purely scientific discovery.

**Cette**, an important seaport town of France, in the department of Hérault, is built on a neck of land between the lagoon of Thau and the Mediterranean, 23 miles SW. of Montpellier. The space inclosed by the piers and breakwater forming the harbour can accommodate about 400 vessels; and the harbour is defended by forts. A broad deep canal, lined with excellent quays, connects the port with the Lake of Thau, and so with the Canal du Midi and the Rhone, thus giving to Cette an extensive inland traffic; it has likewise an active foreign commerce. The principal trade is in wine, brandy, salt, dried fruits, fish, dyestuffs, perfumery, and verdigris. Cette has shipbuilding yards, salt-works, glass-works, factories for the manufacture of syrups and grape-sugar, &c. It is a resort for sea-bathing, and has extensive fisheries. Colbert founded it in 1666. Population, 36,500.

**Ceuta**, a fortified port belonging to Spain, on the coast of Morocco, opposite Gibraltar. The town occupies the site of the Roman colony of *Ad Septem Fratres*, so called from the seven hills rising here in a group, of which the most prominent are Montes Almina and Hacho; on the latter, the ancient *Abyla* (one of the Pillars of Hercules), is a strong fort, and on the former, among beautiful gardens, lies the New Town. Ceuta contains a cathedral, a hospital, and convents, but is chiefly of importance as a military station. The harbour is small, and exposed to the north, but has a lighthouse and some small trade. The mixed population numbers about 35,000. The place was a flourishing mart under the Arabs, who corrupted its Roman name to *Sebtah*; there the first paper manufactory in the Western world is said to have been established by an Arab who had brought the industry from China. In 1415 it was captured by the Portuguese, and annexed to Portugal; it fell to Spain in 1580. It has resisted

several sieges by the Moors (1694-1720 and 1732). It is reckoned part of Spain and of the province of Cadiz.

**Cevadilla.** See SABADILLA.

**Cévennes** (ancient *Cebenna*), the chief mountain-range in the south of France. With its continuations and offsets, it forms the watershed between the river-systems of the Rhone and the Loire and Garonne. Its general direction is from north-east to south-west, commencing at the southern extremity of the Lyonnais Mountains, and extending under different local names as far as the Canal du Midi, which divides it from the northern slopes of the Pyrenees. The Cévennes extend for over 150 miles, through or into nine departments, the central mass lying in Lozère and Ardèche, where Mont Lozère attains 5584 feet, and Mont Mézenc (the culminating point of the chain) 5754 feet. The average height is from 3000 to 4000 feet. The mountains consist chiefly of primary rocks, covered with tertiary formations, which in many places are interrupted by volcanic rocks. For the religious wars of which the Cévennes have been the arena, see ALBIGENSES, CAMISARDS, WALDENSES; also R. L. Stevenson's *Travels with a Donkey in the Cévennes* (1879), and Martel's *Les Cévennes* (1890), with 140 illustrations.

**Ceylanite.** See SPINEL.

**Ceylon** (the *Taprobane* of the Greeks and Romans, and the *Serendib* of the *Arabian Nights*), an island and British crown colony in the Indian Ocean, to the south-east of India, from which it is



separated by the Gulf of Manaar and Palk Strait, 32 to 120 miles broad. The name is derived from the Sanskrit *Sinhala*, 'the lion's den,' Pali *Sihalan*.

Length from Point Palmyra to Dondra Head, N. to S., 266 miles; width from Colombo to Sanganankande, 140 miles. Area, 25,481 sq. m., one-fourth of it cultivated. The chief river, the Mahavila-ganga, enters the sea near Trincomalee.

**Physical Features.**—In natural scenery Ceylon can vie with any part of the world; and as it rises from the ocean, clothed with the rich luxuriance of a tropical vegetation, it seems to the voyager like some enchanted island of Eastern story. Its hills, 'draped with forests of perennial green,' tower grandly from height to height, till they are lost in clouds and mist. Near at hand, a sea of sapphire blue dashes against the battlemented rocks that occur at isolated points, and the yellow strands are shaded by groves of noble palms. In shape Ceylon resembles a pear, but its inhabitants more poetically compare it to one of their elongated pearls. Undulating plains cover about four parts of the island, and the fifth is occupied by the mountain-zone of the central south, which has an elevation of from 6000 to 8000 feet above the sea-level. Pedrotallagalla, the highest mountain in the range, attains the height of 8292 feet; the celebrated mountain of Adam's Peak, 7360 feet; and the tableland of Nuwara-Eliya, 6189 feet.

**Geology.**—The mountain-system is mainly composed of metamorphic rocks, chiefly gneiss, frequently broken up by intrusive granite. With the exception of some local beds of dolomitic limestone, the gneiss is everywhere the surface rock, and the soil is composed of its disintegrated materials. The northern part of the island is rising; and the immense masses of corals continually increasing, retain the debris brought from the Indian continent by the currents of the sea, and thus form a flat, ever-increasing madrepora plain.

**Minerals.**—Plumbago, found on the southern range of hills, is by far the most important mineral; mica, thorian, and cerium (monazite) are also mined; gold, tin-stone, asbestos, apatite, and iron ore of excellent quality occur. The *gems* of Ceylon have been celebrated from time immemorial. Sapphire, ruby, oriental topaz, garnet, amethyst, cinnamon stone, and cat's-eye are the principal gems and precious stones of the island. Large numbers are purchased by passengers calling at Colombo and by native merchants for sale in southern India.

**Pearl-fisheries.**—The pearl-fisheries of Ceylon were known at a very remote date in the commercial history of the world. Under the Portuguese and Dutch governments, and now under the British government, the pearl-fisheries form a monopoly, and are under the inspection of an officer, who reports when a sufficient number of pearl-yielding oysters have reached maturity, and when the prospect of a successful fishing is thus probable. The fishings are uncertain, with intermittent periods of unproductiveness. Most noteworthy barren periods of the last hundred years have been 1815-27 (13 years), 1838-54 (17 years), 1864-73 (10 years), 1892-1902 (11 years), 1908 to 1923. The fluctuations are due to the monsoon storms, which wash away millions of growing spat into deep water, as reported in 1904-5 by the special commission which definitely proved that the formation of the pearl is usually due to the intrusion of a small worm—trematode, cestode, or nematode—which becomes a sac and is surrounded by the pearl substance (see PEARL). Methods for securing more regular harvests were suggested.

**Railways.**—There are over 800 miles of railways in Ceylon, owned and worked by the government. A line has been built along the reefs of Adam's Bridge, a ferry connecting the railways of Ceylon and India across a twenty-mile gap.

**Harbours.**—Point de Galle and Trincomalee are

good natural harbours. The breakwaters at Colombo, which provide safe anchorage for ships of any size in all weather, have concentrated the commerce of the island there, and have also attracted from Galle the mail and passenger steamers from Europe, India, Australia, and China, which used to coal and tranship at Galle. Trincomalee harbour is the finest in eastern waters.

In *climate*, Ceylon has a great advantage over the mainland of India, and as an island enjoys a more equable temperature. The average for the year in Colombo (q.v.) is 80° in ordinary seasons. April is the hottest month; and in May the south-west monsoon commences amid a deluge of rain, and continues the prevailing wind till October, when the north-east monsoon sets in: 80 inches is the average annual fall of rain, though in an exceptional year 120 inches have been registered. The beautiful tableland of Nuwara-Eliya was first visited by Europeans in 1826, and is now used as a sanatorium. Here the thermometer in the shade never rises above 70°, while the average is 62°; the nights are cool and refreshing. The north of the island, including the peninsula of Jaffna, the plains of Nuwara-Kalawa, and the Wanny, may be reckoned as a third climatic division. Here the annual fall of rain does not exceed 30 inches, and irrigation is largely employed in agriculture.

**Flora.**—The general botanical features of Ceylon are in many respects similar to those of Southern India. A very large number of the species of plants is, however, peculiar to the island. About 800 species (nearly 30 per cent. of the whole number found in Ceylon) are endemic—that is, found nowhere else in the world. The tree-vegetation of the forests is almost wholly composed of such endemic species, and not a few of endemic genera. The affinities and near alliances of these are with the plants of the Malay Islands and Peninsula. Hence, to speak more correctly, the flora of Ceylon partakes of an Indian as well as a Malayan character, but is identical with neither. As may be expected from the climatic peculiarities of the country the flora is greatly diversified. In the south-west mountainous parts of the island, with the exception of some grassy tracts called *patanas* and the plantations of tea, coffee, and cinchona, the slopes and summits are forest-clad. The trees are ever-green, with thick coriaceous leaves, growing closely together and forming dark jungles. The undergrowth is largely made up of gregarious plants known as *Nilus*, species of the genus *Strobilanthes*, which only flower at regular intervals of five, six, or seven years. Tree-ferns, often 25 feet in height, scarlet-flowering rhododendrons, numerous tufted bamboos, melastomads, and orchids are found in mountain forests. In the low country the vegetation is marked by the prevalence of palms, the coconut being pre-eminent. The beautiful areca-palm, the feathery jaggery or kitul, and the lordly talpat are the glories of Ceylon lowland vegetation. In the recesses of low-country forests the trees are high and closely packed. Amongst the timber-trees the most valuable are the calamander, satin-wood, and ebony. Two very interesting and peculiarly slender tree-ferns grow in the hot steamy forests of Ceylon, as also the most admired of Ceylon orchids, *Dendrobium Macartheae*. There has been extensive cutting down of forest in the mountains of Ceylon to establish plantations, and the lowlands have suffered no less severely by the indolent and improvident practice of native cultivation. As a consequence numerous foreign weeds, such as the lantana, white weed, and Spanish needle, have established themselves to the exclusion of native vegetation in the hills; while in the lowlands coarse grasses and worthless scrub have

covered the country. The orchids of Ceylon number about 150 species. With the exception of about a dozen *Dendrobiums*, *Erias*, and *Saccolabiums*, and the lovely *Wana-rajah*, there are few of a striking character. The ferns number about 270 species. Among the latter is an anomalous variety which bears spores on the upper instead of on the under side of the frond. One of the handsomest native trees of Ceylon is the Muruta (*Lagerstræmia Flos-reginæ*). To this might be added the *Saraca indica*, and the lovely Na (*Mesua ferrea*), or ironwood. In the forests climbing-plants and epiphytes of prodigious size and striking appearance cover the trees with a mass of parasitical foliage of extraordinary growth. In the north of Ceylon the dry forest-region is remarkable for its valuable timber-trees, such as the Palu, Halmilla or Trincomalee wood, and ebony. The characteristic palm of the north and of the peninsula of Jaffna is the Palmyra (*Borassus flabelliformis*).

**Fauna.**—In Ceylon, quadrumanous animals are represented by the *Loris gracilis* and five species of monkeys. Sixteen species of bats exist in Ceylon, including the flying-fox. Of the larger carnivora, the bear and leopard; and of the smaller, the palm-cat and the glossy genet (the civet of Europeans) may be mentioned. The tiger is not met with in Ceylon. Deer, buffaloes, and the humped ox of India are plentiful; the little musk-deer is less than 2 feet in length. The elephant, which is for the most part tuskless, is emphatically lord of the forests of Ceylon. The wild boar is also found. Whales are captured off the coast. Three hundred and twenty species of birds are found. The song of the robin and long-tailed thrush, and the flute-like voice of the oriole, are heard over the whole mountain-zone and far down into the neighbouring plains. Eagles, the beautiful peregrine falcon, owls, swallows, kingfishers, sun-birds, bulbuls, crows, paroquets, pigeons, pea-fowl, jungle-fowl, and many others of the feathered tribe, might be mentioned did space permit. Myriads of aquatic birds and waders, amongst which the flamingo is conspicuous, cover the lakes and lagoons. The crocodile is the largest reptile in the island; tortoises and lizards are also found. There are a few species of venomous snakes, and of these the ticpolonga and the cobra da capello are the most deadly.

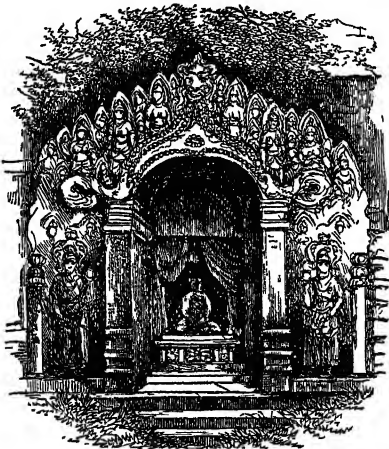
**Inhabitants.**—The Singhalese (*Sinhalese*, also spelt *Cingalese*), the most numerous of the natives of Ceylon, are supposed to be the descendants of those colonists from the valley of the Ganges who first settled in the island 543 B.C., and speak an Aryan language closely allied to the Pali (q.v.). The dress of the men, who have delicate features and slender limbs, looks singularly effeminate, and consists of a *comboy* or waist-cloth, very much resembling a petticoat; their long hair, turned back from the forehead, is confined with combs, and earrings are worn by way of ornament. Polyandry still lingers in the interior of Ceylon; but this and many other customs repugnant to Christianity are disappearing under the influence of education, of which the Singhalese readily avail themselves. The Kandyans, or Highlanders, are a more sturdy race, and maintained their independence for three centuries after the conquest of the low country by European settlers. The Malabars, or Tamils, have sprung from those early invaders of Ceylon who from time to time swept across from Southern Hindustan, and contended with the Singhalese kings for the sovereignty of the island. They have formed the chief population of Jaffna for full 2000 years, and constitutionally excel the Singhalese and Kandyans. The Moormen, who are the most energetic and intelligent

of the native communities, are met with in every province as enterprising traders, and are generally believed to be of Arab descent. The 'burghers' of Ceylon are people of European descent, who have become naturalised. Those of Portuguese extraction hold the lowest place, and are mostly tradesmen and artisans; but the Dutch burghers frequently fill responsible posts, and are employed in the government offices. There is besides a remarkable tribe of outcasts—the Veddas—hardly removed from the wild animals of the forest, and believed to be descended from the Yakkhos, the aboriginal inhabitants of the country. They occupy a district in the eastern part of the island, and have there preserved their ancient customs and manner of living unaltered for more than 2000 years.

**Religion.**—The Singhalese are devoted to Buddhism (q.v.), which is the prevailing religion of the island. Its sacred books are identical with those of Burma and Siam, and both record the doctrines of Gautama in the Pali language; the deviations are in matters of practice. The Malabar kings adulterated Buddhism to a considerable extent with Brahmanism, introducing the worship of Hindu deities into the Buddhist temples, and this continues more or less to be the case. More than once have the Buddhists of Ceylon sought to restore the purity of their faith—at one time sending deputies to Siam, at another to Burma, with this object in view. The Burman or Amarapura sect have long been the reformers of Singhalese Buddhism, and maintain no very friendly relations with the party who, supported by the priests of Siam, sanction the worship of Hindu deities and the employment of the priesthood in secular occupations, uphold caste, and restrict the sacred books. Caste was acknowledged by the Singhalese prior to the introduction of Buddhism, which in principle is opposed to it; but so firmly was it rooted that it still endures, though more as a social than a sacred institution. Gautama Buddha is said to have visited Ceylon three different times to preach his doctrine, and his *Sri-pada*, or sacred footstep, on the summit of Adam's Peak (q.v.), still commands the homage of the faithful. Buddhism was not, however, permanently introduced into Ceylon till 307 B.C. The influence of the priests gradually increased, and, by the piety of the Singhalese kings, monasteries were richly endowed, and at the present day no less than one-third of the cultivated land of the island is computed to belong to the priesthood, and is exempt from taxation. The priests of Ceylon are divided into two orders; any member is at liberty to lay aside his ascetic character, and return to a secular life. The most celebrated Buddhistic relic in Ceylon is the *Dalada*, or sacred tooth of Gautama, at Kandy, which is guarded with jealous care, and preserved in an elegant shrine; but it is well known that the original relic was destroyed by the Portuguese, and the present substitute is a piece of discoloured ivory, bearing no resemblance to a human tooth. Brahmanism or Hinduism (see INDIA) is the faith of the Tamils or Malabars, but the Moormen are Mohammedans. After the expulsion of the Dutch Christians, Protestant missions to the natives of Ceylon were commenced by the Baptists in 1813. The Wesleyan Methodists followed in 1814, the Americans in 1816, the Church of England in 1818, and Christian instruction has made some progress amongst the native populations. There is a government board of education. Colombo has a university college (1921), and a technical college (1893) known as the Government Technical Schools. There are both government and aided schools.

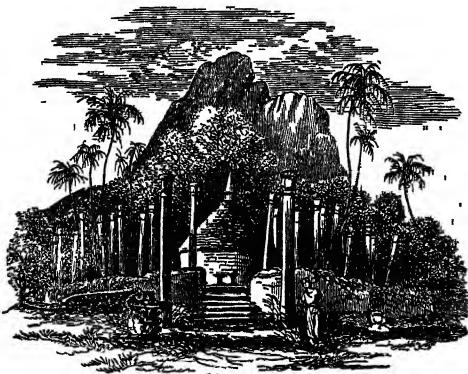
**Ancient Buildings.**—In all Buddhist countries

the sacred buildings present, with certain modifications, the same general character (see articles **BUDDHISM**, **BURMA**, &c.); and in Ceylon we find the three classes represented by the dagoba, or relic-shrine, the temple proper, and the vihara or monastery. The labour bestowed on these edifices in the early ages of the Singhalese monarchy is truly astonishing. In the north of the island, ruined cities buried for ages in the depths of the forest have been discovered, revealing monuments that in dimensions may almost compare with the pyramids of Egypt. The most remarkable of these vestiges of an early civilisation is Pollanarua, the ancient capital of Ceylon; and here is the celebrated *Gal-vihara*, a rock-hewn temple.



Entrance to the Temple of Danbula.

The cave-temple of Dambula was built 100 B.C., and is the most celebrated in the island. The bell-shaped tapering dagobas of Ceylon, as relic-shrines, answer to the pagodas of Burma—which they very much resemble—and the topes of Afghanistan. The ruins of the Jaytawanarama dagoba still reach the height of 249 feet; its diameter is 360 feet; and from base to pinnacle



The Ambustella Dagoba, Mihintala.

it is covered with trees of the largest size. The Ambustella of Mihintala is another remarkable dagoba. A very famous object in connection with Buddhism in Ceylon is the sacred Bo-tree (q.v.) of Anuradhapura. Amongst the antiquities of Ceylon must be mentioned those wonderful monuments of the former greatness of the Singhalese

people—the ruined tanks, with which scarcely anything of a similar kind, whether ancient or modern, can be compared. Thirty colossal reservoirs, and about 700 smaller tanks, still exist, though for the most part in ruins. The restoration of these magnificent works of irrigation has been for some time carried on by the government. In February 1888 the largest and most important tank in Ceylon, that of Kalawewa, was, after four years of labour, completely restored. It was built 460 A.D. to supply Anuradhapura with water, but had been ruinous for centuries. Now again it contains an area of seven square miles of water 20 feet deep, and supplies smaller tanks more than 50 miles distant.

The *history* of Ceylon may be conveniently divided into ancient and modern, and the latter into the Portuguese, Dutch, and British periods. The most famous of the Singhalese books is the *Mahāvamsa*, a metrical chronicle in the Pali language, extending from the earliest period to 432 A.D., and continued to 1756. The story begins with the invasion of Wijayo (543 B.C.), son of a petty Indian sovereign in the country watered by the Ganges. He subdued the Yakkhos, the aboriginal inhabitants; founded a dynasty that held undivided sovereignty in Ceylon for nearly eight centuries; and bestowed on his kingdom his patrimonial name of Sihala (whence Singhalese, Ceylon). In the reign of King Deveniapiatissa (307 B.C.), Buddhism was established as the national religion, and his reign was further remarkable by the planting of the sacred Bo-tree, 288 B.C.; and now commenced the erection of those stupendous buildings already noticed. The next important epoch in Singhalese history is the usurpation of the Malabars (237 B.C.), foreign mercenaries from the Coromandel coast, to whom the native sovereigns had intrusted the defence of the island. In 1071 A.D. a native dynasty was re-established in the person of Wijayo Bahu, which, for 100 years, delivered the country from the dominion of the Malabars. Prakrama Bahu commenced a reign in 1153, the most renowned in the records of Ceylon. He devoted himself to religion and agriculture, and besides many notable religious edifices, he caused no less than 1470 tanks to be constructed, subsequently known as the 'seas of Prakrama.' Thirty years after the death of this monarch, the Malabars landed with a large army, and speedily conquered the whole island. In 1235 a native dynasty recovered a part of the kingdom. During the reign of Dharma Prakrama IX. the Portuguese first visited Ceylon (1505); but it was in 1517 that they first formed a permanent settlement at Colombo for trading purposes. Their encroachments soon met with fierce resistance from the patriotic Kandians. 'Amity, commerce, and religion,' was the Portuguese motto; but their rule in Ceylon is a sad story of rapacity, bigotry, and cruelty. They were at last driven from the island by the Dutch in 1658, after a contest of twenty years, when the fanatical zeal of Roman Catholic sovereigns for the propagation of the faith was replaced by the earnest toil of the Dutch traders to intrench their trading monopolies. But the purely military tenure of the Dutch was destined to give place to the colonisation of the British. It was during the great European war succeeding the French Revolution that the English gained possession of the island. On the 1st August 1795 an expedition under Colonel James Stuart landed at Trincomalee, which was speedily captured, and finally the garrison of Colombo surrendered on the 16th February 1796. By this capitulation, all the Dutch settlements and strongholds in Ceylon were ceded to the English; though the island was not formally annexed to the British crown till the Peace of Amiens,

27th March 1802. The native sovereigns, however, continued in the possession of their mountain territory; but at length the Kandyan king, Wikrama Raja Singha, after perpetrating the most frightful atrocities on his own people, seized and murdered certain native merchants, British subjects, trading to Kandy. War followed, January 1815; Kandy was taken, and the tyrant sent a captive to the fortress of Vellore. On the 2d March 1815, a treaty was concluded with the native chiefs, by which the king was formally deposed, and his territories annexed to the British crown.

After the settlement of the Kandyan provinces, attention was drawn to the hill country of Ceylon as a probable field for the profitable investment of British capital and energy, and among other agricultural enterprises the cultivation of coffee was entered upon. The condition of soil and climate proved favourable, and the abolition of slavery in the West Indies, and the consequent labour difficulties, caused a rush towards Ceylon, and the area under coffee cultivation rapidly extended. The enterprise, though subject to all the vicissitudes incidental to tropical agriculture, steadily grew, and coffee soon became the staple export from the island; and the revenue directly and indirectly derived from it enabled successive governors to bridge rivers, to make roads and railways, and to restore many of the ancient irrigation works which, in the period antecedent to British rule, had fallen into disrepair. In 1869, however, a fungus (*Hemileia vastatrix*) attacked the leaves of the coffee-trees, and the energy of the tree which had hitherto produced fruit was now required for the constant reproduction of leaf. Planters were obliged to turn their attention to other pursuits. Cinchona, cacao, cardamoms, and many other products were introduced with varying success, but it soon became plain that Ceylon was capable of becoming a great tea-producing country, and tea has become the chief factor in restoring the financial equilibrium. Cinnamon and coconut cultivation are chiefly in the hands of natives; tea, cinchona, cacao, and cardamom cultivation in the hands of Europeans. The export of coffee has decreased to very small proportions, while that of tea has enormously increased. Rubber has rapidly assumed importance. Other exports are plumbago, cocoa, cinnamon, cinchona bark, copra, coconuts, coconut oil, citronella oil, poonac, arecanuts, cardamoms, coir, arrack, timber, tobacco, specie, skins, and vanilla. Among imports are cottons, salt fish, rice, coal and coke, wines.

A nationalist movement was accompanied in 1915 by religious riots on the one side and unconstitutional repression on the other. A small measure of reform conceded in 1920 was not acceptable to the National Congress.

A crown colony, Ceylon is administered by a governor aided by executive and legislative councils (the former consisting of seven members, the latter, since 1920, of thirty-seven, sixteen, ultimately twenty, being elected), and municipal councils. Local boards and village tribunals give a measure of self-government to the people. The population of Ceylon, 2,763,984 at the census of 1881, had risen in 1921 to 4,504,370, of whom 3,017,153 were Singhalese, 1,121,798 Tamil immigrants and settlers, 285,806 Moormen (Mohammedans of Arab descent), 9329 Europeans, 29,041 Eurasian descendants of Portuguese and Dutch, 13,813 Malays, 4402 Veddas.

See works on Ceylon by Sir James Emerson Tennent (1859), Baker (1855), Suckling (1876), Ferguson (1887, 1893, &c.), Miss Gordon Cumming (1891), Walters (1892), Cave (1894, 1908, &c.), Farrer (1908), and Willis (1908); Seligmann on the Veddas (1911); and Herdman's report on pearl-fisheries (1904-5).

**Cézanne, PAUL** (1839-1906), founder of post-impressionism, born at Aix-en-Provence, was a friend from school-days of Emile Zola, and in part the model for his Claude Lantier in *L'Œuvre*. He went to Paris, and took part in the Commune. He exhibited little, and withdrew from Paris to Aix, where he lived in seclusion. His pictures—still life, Provençal landscapes, figure studies—have been charged with incorrect drawing and weak colouring; but his sincerity and striving to express spiritual meaning are acknowledged. His influence on Gauguin and Van Gogh was powerful. See studies by Vollard (Paris, 1915; trans. 1924) and Tistrtram Klingsor (trans. 1925).

**Cezimbra**, a coast town of Portugal, about 18 miles S. of Lisbon; pop. 10,000.

**Chabas, FRANÇOIS**, born 2d January 1817, was a wine merchant at Chalon-sur-Saône, yet found time to become a learned linguist, though it was not till 1851 that he gave himself up to the study of hieroglyphics. The first results of his studies appeared in 1856, followed by a series of invaluable books and papers, elucidative chiefly of two important periods—the conquest of Egypt by the Hyksos, and the time of their expulsion. Among the more important of his many books are *Les Pasteurs en Égypte, Histoire de la XIX. Dynastie et spécialement des Temps de l'Exode*, and *Études d'après les Sources égyptiennes*. He died 17th May 1882.

**Chabazite**, a Zeolite (q.v.), a hydrated calcium aluminium silicate, with sodium and potassium, crystallises in glassy white or pink rhombohedra, commonly twinned.

**Chablis**, a town in the French department of Yonne, 12 miles E. of Auxerre, gives name to an esteemed white Burgundy (q.v.) wine.

**Chabrier, ALEXIS EMMANUEL** (1841-94), French composer, was born at Ambert, Puy-de-Dôme. His operas are *Gwendoline* (1886), *Le Roi Malgré lui* (1887), *Bruséis* (unfinished).

**Chachani**, a mountain (19,000 feet) 20 miles N. of Arequipa, in Peru, has (at 16,650 feet) a meteorological observatory established and worked by Harvard University.

**Chacma**. See BABOON.

**Chaco, EL GRAN**. See GRAN CHACO.

**Chaconne** (Fr.), an obsolete dance, probably Spanish (*chacona*, from Basque *chocoma*, 'pretty'). The movement is slow, and the music, a series of variations on a ground bass, mostly eight bars in length, appears in sonatas as well as in ballets. That in Bach's fourth violin sonata is well known.

**Chad**, or TSAD, LAKE, a lake of French Sudan and Nigeria, with an estimated area of 7000 sq. m., increased in the rainy season. It is very shallow, and is supposed to have lost about one-third of its area during fifty years of the 19th century. The western half contains the real lake; the eastern is generally a complex of low islands, separated by dried-up canals. The few streams that reach the lake are all small, except the Shari from the south-east; the lake, whose waters vary from fresh to brackish, occasionally discharges into the Benue. The first Europeans to see it were Denham and Clapperton.

See books by Alis (1892) and Burnache (1894); Boyd Alexander's *From Niger to Nile* (1907); and *Documents scientifiques de la Mission Tihou* (1910, et seq.).

**Chad, ST (Ceadda)**, was born in Northumbria, became a pupil of St Aidan, spent part of his youth in Ireland, and in 666 became Bishop of York. Doubt having been cast on the validity of his consecration, he withdrew in 669, but was immediately made Bishop of Mercia, fixing the see at Lichfield (q.v.). He died in 672, after a life eminent for humility and sanctity. See Life by Warner (1871).

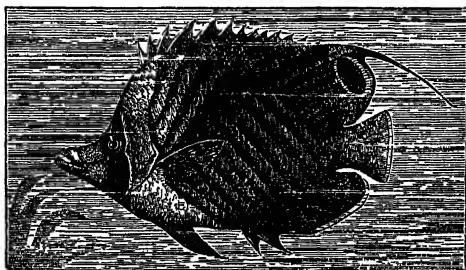
**Chadwick**, SIR EDWIN (1801-90), social reformer, born near Manchester, was called to the bar in 1830. His report (1833) as assistant poor-law commissioner laid the foundation of the later systems of government inspection. On the organisation of the new Poor-law Board, Chadwick was appointed secretary. See books by Richardson (1885) and Miss Hutchins (1909).

**Chadwick**, HECTOR MUNRO, studied at Wakefield Grammar School and Clare College, Cambridge; wrote *The Origin of the English Nation* (1907), *The Heroic Age* (1912), and other learned works on early Germanic languages and institutions; and became professor of Anglo-Saxon at Cambridge (1912).

**Chæronea**, a town in ancient Bœotia, near the river Cephissus, memorable for the disastrous defeat of the Athenians here by Philip of Macedon, 338 B.C. This defeat struck a death-blow to the liberties of Greece, and broke the heart of Isocrates; it was the 'dishonest victory' that 'killed with report that old man eloquent.' A colossal marble lion, together with the bones of 260 Greeks, was dug up here in 1880. Here also Sulla defeated the generals of Mithridates in 86 B.C. The famous Plutarch was a native of Chæronea.

**Chætoderma**, a remarkable primitive gasteropod, which in some respects serves as a connecting link between the worm and snail type. See CHITON.

**Chætodon**, a typical genus of a family of bony fishes, known as Squamipennes. The body is much compressed sideways, and consequently high; the scales are more or less smooth, and cover portions of the dorsal and anal fins in such a fashion that the boundary between fins and body is indistinct.



Chætodon setifer.

The mouth is generally small in front of the snout, and the slender teeth are arranged in bands. The lower rays of the pectoral fins are branched, and the hind fins are situated far forward on the thorax. The Squamipennes, or as some would call them, the Chætodontidæ, are tropical fishes, abounding near coral reefs, and well suited in the beauty of their colouring to such brilliant surroundings. They feed on small animals, are never very large, and but little used for food. Chætodon itself is a large genus, with some 70 beautiful species from the tropical Atlantic and Indo-Pacific. It has one dorsal fin, and a moderately long snout. In *Chelmo* the snout is longer, and is used to draw animals from their crevices. It often gets false credit for catching insects by spouting water. *Heniochus* is another pretty genus with horns on its head. *Holacanthus*, one species of which is called the 'Emperor of Japan' by the Dutch, is yet more brilliantly adorned, and *Pomacanthus* is peculiarly variable in its colouring. The Atlantic species of *Ephippus* (*E. faber*) is peculiar in the pathological-like enlargement of some of the bones at the back of the head. The Archer-fish (q.v.) is an allied genus. See Günther, *Study of Fishes* (1880).

**Chætopods** (Gr., 'bristle-footed'), a class of worms including familiar types like the Earthworm, the Fisherman's Lobworm, and the Sea-mouse. They are often included under the title of Annelids or ringed worms. The body consists of numerous more or less similar joints; and the locomotor organs are furnished with or represented by bristles. The class is split into two main orders of Oligochaeta and Polychæta, of which the latter is much the larger. The Oligochaeta have very rudimentary locomotor structures, which are in fact reduced to bristles; they are fresh-water or subterranean in habit; the familiar earthworm (*Lumbricus*) and certain river and pond worms (e.g. *Tubifex* and *Nais*) are common representatives. The Polychæta are, with three or four exceptions, marine; the bristles, which are numerous, are fixed in special locomotor outgrowths; and many other characters, such as the possession of antennæ, gills, &c., distinguish them from the earthworm order, and are in obvious association with their very different habits. Many of them, described as errant, lead a free life, and are carnivorous in their diet. The common Nereis, or Alitta, and the Sea-mouse (*Aphrodite*) are good examples. A large number, however, are sedentary in habit, vegetarian in diet, and often inhabit tubes. The lobworm (*Arenicola*), the common Serpula, and Terebella are characteristic types. To the two main orders of Chætopods above mentioned, the parasitic Myzostomata causing 'galls' on feather-stars (Crinoids), and the primitive aberrant Saccocirrus must be added. Polygordius is another common marine worm which, along with a few others, is usually regarded as a survival of the ancestral Chætopods or Annelids. See EARTH-WORM, LOBWORM, SEA-MOUSE, WORMS, &c.

**Chaffer**, a common name for beetles or coleopterous insects, especially for those which, either in the perfect or larval state, are destructive of plants, particularly of the wood, bark, or roots of trees. The word is seldom used alone, but generally as part of a name, with some prefix; thus, we have *Cock-chaffer*, *Rose-chaffer*, *Bark-chaffer*, &c. *Kafer* is the German word for 'beetle.'

**Chaffinch** (*Fringilla cœlebs*), one of the commonest British birds, a species of Finch (q.v.), and probably that to which the name Finch, now so extended in its signification, originally belonged. *Fink*, the German form of the name, and *pink* and *twink*, still used in England as popular names, have some resemblance in sound to the common call-note of the chaffinch. The whole length of the bird is about six inches. The tail is very slightly forked. The beak is almost equal in breadth and height. The male, in summer, has the top of the head and nape of the neck bluish-gray; the back, chestnut; the wings almost black, with two conspicuous white bars; the tail nearly black. The lower surface is reddish. The colours of the female are much duller than those of the male. The chaffinch is a very widely distributed species, being found in almost all parts of Europe, in some parts of Asia, in the north of Africa, and as far west as the Azores. In the colder northern countries it is migratory; in more southern regions it is stationary. Linnæus gave it the specific name *cœlebs*, from observing that the flocks seen during winter in Sweden consisted chiefly of males, the females having, as he supposed, sought a milder climate. A partial separation of the sexes is observed also in the great winter-flocks in Britain, but it is only partial; and Yarrell thinks that the young males of the previous season, which resemble the females in plumage, are associated with them, and have been mistaken for them. The flocks seen in Britain in

winter are believed to be augmented by migration from Scandinavia. The eggs are usually four or five in number, of pale purplish buff colour, sparingly streaked and spotted with reddish brown. The chaffinch feeds in great part on insects, and does much service in summer by destroying aphides and caterpillars; but eats also seeds, and is sometimes persecuted, because in spring it pulls up and eats young turnips and radishes when in the seed-leaf. It is particularly fond of the seeds of beeches and conifers. Great numbers of chaffinches are killed for the table in Italy. In Germany this bird was formerly in the highest esteem as a song-bird. Its notes are very clear and loud, but some individuals greatly excel the ordinary multitude of their species.—*Shalfu* or *shalfy* is the vernacular name in Northumberland and Scotland.

**Chagos Islands.** See DIEGO GARCIA.

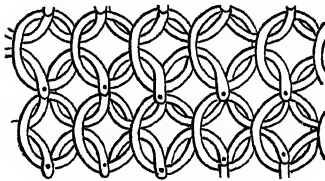
**Chagres**, a port of the republic of Panamá, on the N. coast of the Isthmus of Panamá, at the mouth of the Chagres River, superseded by Colón after the formation of the Panamá Railway. For the river, see CANAL (*Panamá Canal*).

**Chaillu**, PAUL DU. See DU CHAILLU.

**Chain**, in Surveying (called Gunter's Chain, from its inventor, Edmund Gunter, q.v.), is a measure of 22 yards long, composed of 100 iron links, each of which is thus 7·92 inches long. As an acre contains 4840 square yards, 10 square chains ( $22 \times 22 \times 10 = 4840$  square yards) or 100,000 square links make an acre.

**Chain Cable.** See CABLE.

**Chain-mail**, or CHAIN-ARMOUR, much used in Europe in the 12th and 13th centuries, and still



Piece of Chain-armour.

used in India and the interior of the Asiatic continent, consists of hammered iron links, connected together by riveted links so that each link embraces four others, and worked into the form of a garment. Such armour was much more flexible and convenient to the wearer than that which was formed of steel or brass plates, but was less fitted to bear the thrust of a lance. See ARMOUR.

**Chain-plates** are iron plates bolted on the sides of a wood ship below the channels. There is an eye on each plate, and these serve as attachments for the deadeyes or rigging-screws by which the shrouds and backstays are secured and set up. In modern steel vessels the chain-plates usually consist of flat iron or steel palms, with an eye on each, and these are riveted to the inside of the sheer or top strake of the shell-plating. The term 'chain' evidently arose because the lower deadeyes used to be attached by chain links.

**Chains.** Chain-making is a distinct trade by itself. Chains are of two distinct kinds—*short-link*, or close-link chain (fig. 1), and *stud-link*, or stayed-chain (fig. 2). The former usually consists of small sizes of chain, and the latter, which is a stronger form, comprises ships' cables and large chains. The size of a chain is measured by the diameter of the material forming the links.

The links are usually made of wrought iron, in two distinct ways—*side-welded* (fig. 3), and *end-welded* (fig. 4). The best chains have each link welded at one side; unimportant chains may have the weld at one end. End-welding is obviously the easier method, but it is not so reliable.

A side-welded chain is made in the following manner. Pieces of round rod, from which the links are to be formed, are cut off by gauge to the exact length required, the ends of each piece being cut at a suitable angle to form the joint, or, as it is termed, the scarph. Each piece of rod is then brought to a red heat, and bent into shape, by hand or machine (fig. 3). The first link is again heated, and the free ends closed. The scarphed ends are brought to a white heat and welded together by hammer. This link, while still



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

heated, is placed in a recess formed in an iron block for the purpose, and a hollow-faced tool and hammer, worked mechanically, finish the weld quite smooth like the other part of the link. The result is the completed link. Another link, cut and bent in the same way (fig. 3), is then heated, threaded through the first link, closed, welded, and finished in a similar manner. In this way each successive link is added, until the required length of chain is made. Stud-links are made in a similar way. The stud is put in while the link is still hot, the sides are closed on the stud, and the link is finally shaped by the hollow-faced tool as necessary. The next link is rove through the finished link, and is closed, welded, studded, and finished like the first one. The highest quality chains are made from special brands of wrought iron, selected not only for tensile strength and good welding properties, but for ductility; because high tensile strength is frequently possessed by a hard, brittle iron which is liable to snap when subjected to a sudden jerk, and therefore unsuited for cables.

Ships' cables are made in 15-fathom lengths, and, in all cases, require to be proved in accordance with the requirements of the Anchors and Chain Cables Act of Parliament. The system of testing, as carried out by Lloyd's Register of Shipping at their proving houses, complies with the act, and should be followed in the case of all important chains. Each length is proved for tensile strength to a 'statutory' test which is reckoned sufficient to detect bad workmanship and material, yet not so severe as to injure the nature of the material by overstraining it. But this 'statutory' test is not the extreme limit of strain which the chain ought to be able to bear in actual use. Therefore, before it is applied, a few links are selected and cut out from each 15-fathom length, and submitted to a so-called tensile 'breaking' test, which is 50 per cent. in excess of the statutory test. If these trial links withstand this extra strain satisfactorily, they are assumed to represent a fair average of the strength of that particular length to which they belong. Both these tests are gone through with each length of the cable, and, if proved satisfactory, the whole is then passed, certified, and stamped accordingly. Any unsatisfactory lengths are condemned, marked, and sent back to the manufacturer. Lloyd's rules provide for testing chain cables of sizes from  $\frac{1}{2}$  inch up to  $3\frac{1}{2}$  inches. The schedule in the act of parlia-

ment states the tests for sizes from  $\frac{1}{4}$  inch up to  $4\frac{1}{2}$  inches.

**Chaitanya**, founder of a Vaishnava sect with Vedānta elements; see SANSKRIT.

**Chaka**, or TSCHAKA, was chief of the Zulus (q.v.) in the first quarter of the 19th century.

**Chalaza**, the base of the Ovule (q.v.). Treub discovered in 1891 that the pollen-tube of *Casuarina* (q.v.), instead of entering through the micropyle, bores through the stalk of the ovule and enters by the chalazal end. Other peculiarities are plurality of embryo-sacs, absence of antipodal cells, presence of a cell-wall about the ovum, elongation of the embryo-sac into the chalaza, and the formation of endosperm before fertilisation. Treub proposed to divide the Angiosperms in Chalazogamæ and Porogamæ, as the former seemed allied to Gymnosperms. Several of the Amentaceæ are more or less chalazogamic, as well as Ulmaceæ, Urticaceæ, Euphorbiaceæ, and others. See also Eggs in article BIRD.

**Chalcedon**, a city of ancient Bithynia, at the entrance of the Euxine, opposite to Byzantium. It was founded 684 B.C. by a colony from Megara, and soon became a place of considerable trade and importance. Taken by the Persians, it finally merged into the Roman empire, under which it was made a free city. Chosroes, the Persian, captured it in 616 A.D., after which it declined, until it was finally demolished by the Turks, who used its ruins to build mosques and other edifices at Constantinople. Chalcedon was the birthplace of the philosopher Xenocrates.

The council of Chalcedon was the fourth œcumenical council, and was assembled (451 A.D.) by the emperor Marcian for the purpose of drawing up a form of doctrine in regard to the nature of Christ which should equally avoid the errors of the Nestorians (see NESTORIUS) and Monophysites (q.v.). Six hundred bishops, almost all of the Eastern Church, were present. The doctrine declared to be orthodox was, that in Christ there were two natures, which could not be intermixed (this clause was directed against the Monophysites), and which also were not in entire separation (this was directed against the Nestorians), but which were so conjoined, that their union destroyed neither the peculiarity of each nature, nor the oneness of Christ's person.

**Chalcedony** (often misspelled *Calcedony*), a beautiful mineral of the quartz family, consisting of quartz with some admixture of opal. It derives its name from Chalcedon in Bithynia, near which it is found in considerable abundance, and has been known by the same name from ancient times. It never occurs in crystals, but usually in mammillary, botryoidal, or stalactitic forms, lining or entirely filling the cavities of rocks, and more particularly old igneous rocks, such as the basalt-rocks of Scotland, the Faroe Isles, Iceland, &c. It constitutes the whole or the principal part of many agates. It is generally translucent, sometimes semi-transparent, has a somewhat waxy lustre, and is in colour generally white or bluish white, sometimes reddish white, sometimes milk white, less frequently gray, blue, green, yellow, brown, or even black. Its fracture is even, or very slightly conchoidal. Chalcedony is much used in jewelry, for brooches, necklaces, and ornaments of all sorts, the largest pieces being sometimes made into little boxes, cups, &c. It was much used by the ancients, and many beautiful engraved specimens appear in antiquarian collections. Chalcedonies with disseminated spots of brown and red were once very highly prized, and were called *Stigmities* or *St Stephen's stones*. Petrified plants are sometimes found in chalcedony, in which they appear to have been incased whilst it was in course of formation. Specimens of chal-

cedony are sometimes found inclosing a little water in the interior, which gives them a very beautiful appearance; but the water easily escapes, and to prevent this, rings or other ornaments made of such stones are kept in distilled water when not worn. The ancients set a very high value on these *enhydrites* (Gr. *en*, 'in,' and *hydōr*, 'water'). See JASPER.

**Chalcedonyx** (or, erroneously, *Calcedonyx*), a name given to agates formed of cacholong, or a white opaque chalcedony, alternating with a grayish translucent chalcedony.

**Chalchihuitl**, the Indian name of a green-coloured stone, taken from a quarry near Santa Fé, and by some regarded as a species of turquoise, by others identified with Jade (q.v.). It was valued above gold by the ancient Mexicans, who fashioned it into beads and ornaments.

**Chalcididæ**, a small family of short-tongued lizards, restricted to America. *Chalcides* (*C. flavescens*) occurs in tropical America. *Heterodactylus* is an allied Brazilian genus. The same title is applied to a family of insects. See CHALCIS.

**Chalcis**, the capital of the Greek island of Eubœa, on the Euripus, a strait separating the island from Eceotia, and here only 120 feet wide. Chalcis is a place of very great antiquity, and it soon became a great trade centre, sending out colonies to Macedonia, where the peninsula of Chalcidice commemorated its name, as well as to Campania (*Cuma*), South Italy, and Sicily. Successively Athenian, Macedonian, and Roman, it was a place of great military importance, nearly nine miles in circumference, and had many fine temples, theatres, and other public buildings. Aristotle died here. In the middle ages it was prosperous under the Venetians, who held it for nearly three centuries, until its conquest by the Turks in 1470. Pop. 13,000.

**Chalcis**, a typical genus of a large family of Hymenopterous insects, not unlike small wasps. The family (Chalcididæ or Pteromalini) has this great importance that the larvæ of its members are parasitic in the eggs, larvæ, or pupæ of other insects, and as some of the latter are very destructive to plants, their parasites are animals to be thankful for. Thus forms so different as the cabbage butterfly and the destructive Hessian fly have their attendant Pteromalini. Many of the so-called gall-wasps (Cynipidæ) which cause many of the commonest galls—for instance on the oak, or the curious bunches on rose and briar bushes—are preyed upon by Chalcididæ. Some of the hosts of these Chalcidæ are themselves parasitic, and thus we have parasites within parasites, or double parasitism, there being in this case no honour among thieves.

**Chalcondylas**. See CHALKONDYLAS.

**Chaldaea**. See BABYLONIA; for Chaldee, see ARAMÆA; for the Chaldeans, GREEK CHURCH.

**Chalder**, an old Scottish dry measure, containing 16 bolls. See BOLL and FIARS.

**Chaldron** (Lat. *caldarium*, 'a vessel for warm water'), an old dry measure used in selling coal, and containing 36 heaped bushels (=  $25\frac{1}{2}$  cwt.). Coal is now sold by weight.

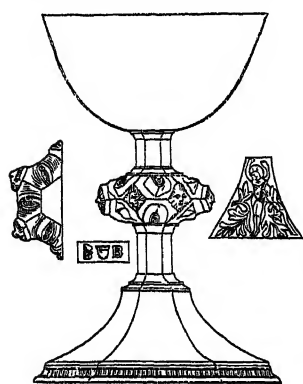
**Chalet** is the French-Swiss name for the wooden hut of the Swiss herdsmen on the mountains; but is also extended to Swiss dwelling-houses generally, and to picturesque and ornate villas built in imitation of them.

**Chaleurs**, BAY OF, an inlet of the Gulf of St Lawrence, between Gaspé, a district of Quebec, and New Brunswick, having a depth of 90 miles from east to west, and a width varying from 12 to 20. It is deep and well sheltered, and much frequented for its mackerel fisheries.

**Chalfont St Giles**, a village of Buckinghamshire, 16 miles SE. of Aylesbury. Milton's cottage (1665) was purchased by the nation in 1887.

**Chalgrove**, a village 13 miles SE. of Oxford, the scene of a skirmish in the Civil War between Prince Rupert's cavalry and a parliamentary force under Hampden, in which that patriot received his death-wound, June 18, 1643.

**Chalice** (Lat. *calix*, 'a cup'). The name has long been applied only to the cups used for the administration of the wine in the holy communion. Anciently made of glass, precious stone, horn, and other substances, chalices have for many centuries been formed of silver, or sometimes gold, occasionally enriched with jewels. Their fashion has followed the art of the times, the hemispherical bowl and plain circular foot of Romanesque or Norman days giving way to a conical bowl and hexagonal foot in the Perpendicular period, and these in turn to more modern shapes, seldom of



Chalice (1459) at Nettlecombe, County Somerset.

(From Cripps's *Old English Plate*.)

such beauty and excellence as those of Gothic design. Before the Reformation a crucifix or other sacred device always occupied one side of the foot. The chalice was usually accompanied by a paten, which might serve as a cover to the bowl, as well as for carrying the wafer or bread. In medieval times a chalice of tin or pewter, if not of silver, was placed in the coffin of ecclesiastics at burial. The chalice is the emblem of St John the Evangelist. Old chalices are much sought after by collectors. The glass 'Luck of Edenhall,' preserved in the family of Musgrave, near Penrith, is apparently an old chalice. The use of the *mixed* chalice, the mingling of water with the wine used in the Lord's Supper, and in the Roman rite, has been matter of controversy in the Church of England. The chalice veil is a covering for the chalice, of the same colour as the priest's vestments.

**Chalk**, a soft earthy variety of limestone or carbonate of lime, forming great strata, and claiming the attention of the geologist even more than of the mineralogist (see CRETACEOUS SYSTEM). It is generally of a yellowish-white colour, but sometimes snow-white. It is easily broken, and has an earthy fracture, is rough and very meagre to the touch, and adheres slightly to the tongue. It generally contains a little silica, alumina, or magnesia, sometimes all of these. Although often very soft and earthy, it is sometimes so compact that it can be used as a building-stone; and it is used for this purpose either in a rough state, or sawn into blocks of proper shape and size. The siliceous particles being separated by pounding and diffusing in water, it becomes whiting, of which the domestic uses are familiar to every one. Carpenters and others use it for making marks, which are easily effaced: the *blackboard* and piece of chalk are now common equally in the lecture-rooms of universities and in the humblest village-schools. Chalk, perfectly purified, is mixed with vegetable colouring matters, such as turmeric, litmus, saffron, and sap-

green, to form pastel colours or coloured chalks; but vegetable colours which contain an acid are changed by it (see CRAYON). The *Vienna white* of artists is simply purified chalk. In a perfectly purified state it is administered as a medicine to correct acidity in the stomach. Chalk is also extensively used as a manure. See LIME, MANURE.

**BLACK CHALK** is a mineral quite different from common chalk, and apparently receives its name from resembling it in meagreness to the touch, in soiling the fingers, and in being used for drawing, writing, &c. It is also called Drawing-slate. It is of a slaty structure, of a bluish or grayish-black colour, easily cut and broken, and makes a perfectly black mark on paper. It is used for drawing and as a black colour in painting. It becomes red by exposure to heat. It is essentially a kind of Clay (q.v.), and derives its colour from carbon, which it contains. It is found associated with schists, &c. in Spain, France, Italy, &c., also in the coal formation in Scotland.—**BRIANÇON CHALK** and **FRENCH CHALK** are popular names for Soapstone (q.v.).—**RED CHALK** is *ochry red clay-iron ore*, consisting of clay and much peroxide of iron. It is of a brownish-red colour, and a somewhat slaty structure, the cross fracture earthy. The coarser varieties are used chiefly by carpenters, the finer by painters. It occurs in thin beds in clay-slate and graywacke-slate in some parts of Germany.—'Chalking the door' is a time-honoured mode of warning tenants to remove from burghal tenements of the humbler kind, still in use in Scotland.

**Chalkondylas**, or **CHALKONDYLES**, **DEMETRIOS** (1424–1511), Greek scholar, was born in Athens. As one of the earlier fugitives to Italy (1447), he taught Greek at Perugia, Padua (1463–71), Florence (1471–91), and Milan (1491–1511). His *editio princeps* of Homer (Florence, 1488, printed by Bernardo and Neri Nerli) was the first great work ever printed in Greek. He was also editor of the first editions of Isocrates (Milan, 1493) and Suidas (Venice, 1499). About 1493 he published, under the title *Erotemata*, a catechism of Greek grammar, aiming at greater simplicity than that of Theodoros Gaza. The teaching of Chalkondylas was a great influence in the Renaissance. His pupils included Grocyn, Linacre, Latimer, Leonico Tomeo, and Leo X.

**Challenger Expedition**, a circumnavigating scientific exploration of the open sea sent out by the British government in 1872–76—earlier expeditions being those of the *Lightning* (1868) and *Porcupine* (1870). In 1872 the *Challenger*, a corvette of 2306 tons, was completely fitted out and furnished with every scientific appliance for examining the sea from surface to bottom—natural history work-room, chemical laboratory, aquarium, &c. The ship was given in charge to a naval surveying staff under Captain Nares; and to a scientific staff, with Professor (afterwards Sir) Wyville Thomson at their head, for the purpose of sounding the depths, mapping the basins, and determining the physical and biological conditions of the Atlantic, the Southern and the Pacific Oceans. With this new commission, the *Challenger* weighed anchor at Sheerness on the 7th December 1872, and on the evening of the 24th May 1876 she dropped anchor at Spithead, having in these three and a half years cruised over 68,900 nautical miles, and made investigations at 362 stations, at each of which were determined the depth of channel; the bottom, surface, and intermediate temperatures, currents, and fauna; and the atmospheric and meteorological conditions. The route was by Madeira, the Canaries, the West Indies, Nova Scotia, Bermudas, Azores, Cape Verde, Fernando Noronha, Bahia, Tristan da Cunha, Cape of

Good Hope, Kerguelen, Melbourne, the Chinese Sea, Hong Kong, Japan, Valparaiso, Magellan's Strait, Monte Video, Vigo, and Portsmouth. Between the Admiralty Isles and Japan the *Challenger* made her deepest sounding, on the 23d March 1875, 4575 fathoms. See the copious *Reports on the Scientific Results of the Voyage of H.M.S. Challenger*, edited by Sir Wyville Thomson and Sir John Murray, which mark an era in deep-sea exploration. They extend in all to fifty volumes (1880-95), the bulk of the large quartos devoted to *Zoology*, the others representing *Botany* (3 vols.), *Deep-sea Deposits* (1 vol.), *Physics and Chemistry* (3 vols.), and a *Narrative* (2 vols.) To these invaluable reports many articles in the present work are indebted for materials and illustrations. See also the works of Sir C. Wyville Thomson, H. M. Moseley, Spry, Lord George Campbell, Wild; and the articles in this work on ATLANTIC OCEAN, PACIFIC OCEAN, SOUNDING, and especially SEA.

**Challis, JAMES**, astronomer, born at Braintree in Essex, 12th December 1803, graduated senior wrangler and first Smith's prizeman at Cambridge in 1825, was ordained in 1830, and in 1836 became professor of Astronomy at Cambridge, where he died 3d December 1882. He was also till 1861 director of the Cambridge Observatory, and published a number of works, including 12 vols. of astronomical observations (1832-64). In August 1846, whilst carefully preparing to test Adams' results, he twice unconsciously noted the position of the planet Neptune before its discovery at Berlin on 23d September. See ADAMS (J. C.).

**Challoner, RICHARD**, a learned Roman Catholic prelate, born at Lewes in Sussex, September 29, 1691. Becoming a Roman Catholic, he was sent in 1704 to the English College at Douay, where he became a professor, and remained until 1730. In that year he was sent to labour in London, and here he served as a missionary priest until 1741, when he was raised to the episcopal dignity as Bishop of Debra and coadjutor of Bishop Petre, whom he succeeded as Vicar Apostolic of the London district in 1758. During the 'No Popery' riots of 1780 he was sequestered near Highgate, and he died in London, January 12, 1781. Of Challoner's numerous controversial treatises, the best known is his *Catholic Christian Instructed*, an answer to Conyers Middleton's *Letters from Rome*. His *Garden of the Soul* is still the most popular prayer-book with English Catholics, and his revision of the Douay version of the Bible (5 vols. 1750) is substantially the Bible used by them. Of his historical works the most valuable are his memoirs of missionary priests and other Catholics who suffered death or imprisonment in England for their religion, from 1577 till the end of the reign of Charles II. (2 vols. 1741), and his *Britannia Sancta* (2 vols. 1745), a collection of the lives of British and Irish saints. See Life by E. H. Burton (1909).

**Chalmers, ALEXANDER**, an industrious biographer and miscellaneous writer, was born at Aberdeen in 1759. After a course of study at his native university, he abandoned a projected medical career, and repaired to London, where he soon became an active writer for the press and the busiest of booksellers' hacks. He died in London, 10th December 1834. His editions of Burns, Beattie, Fielding, Gibbon, Bolingbroke, Shakespeare, Johnson, and Boswell's Johnson are now of no importance; but that of *The British Essayists*, in 45 vols., is still esteemed as accurate and handy. His prefaces to 'Walker's' Classics (45 vols.), and his enlarged edition of Johnson's *Collection of the Poets* (21 vols.), contain much honest work. But his reputation depends mainly on the *General Biographical Dictionary* (32 vols. 1812-14).

**Chalmers, GEORGE**, Scottish antiquary, was born in 1742 at Fochabers in Elginshire, and was educated there and at King's College, Aberdeen. Having afterwards studied law at Edinburgh, in 1763 he went to North America, where he practised as a lawyer at Baltimore till the breaking out of the war of independence. Then returning to Britain, he settled in London (1775), and was appointed clerk to the Board of Trade in 1786. The duties of this office he continued to discharge with diligence and ability till his death on 31st May 1825. Of his thirty-three works the chief is *Caledonia; an Account, Historical and Topographical, of North Britain* (vols. i-iii. 1807-24). In 1888-93 it was reprinted at Paisley in 7 vols., comprising the matter prepared for the unpublished 4th vol., and furnished with a much-needed index. Among his other publications are *A Collection of Treaties between Great Britain and other Powers* (2 vols. 1790); *Lives of Defoe, Paine, Ruddiman, and Mary, Queen of Scots*; and editions of Allan Ramsay and Lyndsay.

**Chalmers, GEORGE PAUL, R.S.A.**, was born at Montrose in 1833 (not 1836). He served as errand-boy to a surgeon, and apprentice to a ship-chandler; but he was resolved to become an artist, and in 1853 he came to Edinburgh, and studied under Scott Lauder. His 'Favourite Air,' attracted attention in 1854, and in 1867 he was elected an A.R.S.A., in 1871 an R.S.A. His untimely death at Edinburgh (28th February 1878) was due to injuries received some days before either from violence or by misadventure. His works are distinguished by admirable breadth, effective concentration of lighting, freedom of handling, and rich and powerful colouring. He executed some important portraits. His landscapes, mainly of his later years, include 'End of the Harvest' (1873) and 'Running Water' (1875). 'The Legend,' a large unfinished subject-picture, and 'Prayer' (1871), were etched by Rajon. See a monograph on him by J. M. Gray (1879), and works on Scottish Painting by W. D. McKay (1906) and J. L. Caw (1908).

**Chalmers, THOMAS**, born at Anstruther, 17th March 1780, was educated at the university of St Andrews, and at nineteen licensed to preach. In 1803 he was ordained minister of the parish of Kilmany, in Fifehire, about 9 miles from St Andrews. At this period his attention was almost entirely absorbed by mathematics and natural philosophy. He carried on mathematical and chemistry classes in St Andrews during the winter of 1803-1804, and by his enthusiasm and lucidity of exposition obtained for himself a high reputation as a teacher. In 1808 he published an *Inquiry into the Extent and Stability of National Resources*. Shortly after this, domestic calamities and severe illness rendered him keenly susceptible of religious impressions. Having to prepare an article on Christianity for Brewster's *Edinburgh Encyclopedia*, he commenced a thorough study of the evidences, and rose from his investigations convinced that Christianity was the truth, and the Bible the veritable 'word of God.' Then the great genius of the man broke forth like sunshine. He grew earnest, devout, and faithful to his pastoral duties. In July 1815 he was translated to the Tron Church and parish, Glasgow, where his magnificent oratory took the city by storm. His *Astronomical Discourses* (1817) and *Commercial Discourses* (1820) had a widely extended popularity. In 1817 he visited London, where his preaching excited as great a sensation as at home. But Chalmers' energies could not be exhausted by mere oratory. Discovering that his parish was in a state of great ignorance and immorality, he began to devise a scheme for overtaking and checking

the alarming evil. It seemed to him that the only means by which this could be accomplished was by 'revivifying, remodelling, and extending the old parochial economy of Scotland,' which had proved so fruitful of good in the rural parishes. In order to wrestle more closely with the ignorance and vice of Glasgow, Chalmers in 1819 became minister of St John's parish, of whose 2000 families, mostly workpeople, more than 800 had no connection with any Christian church. Chalmers broke up his parish into 25 districts, each of which he placed under separate management, and established two day schools, and between 40 and 50 local Sabbath schools, for the instruction of the children of the 'poorer and neglected classes,' more than 1000 of whom attended. In many other ways he sought to elevate and purify the lives of his parishioners. While in Glasgow, Chalmers had matured his opinions relative to the best method of providing for the poor. He disliked the English system of a 'compulsory assessment,' and preferred the old Scotch method of voluntary contributions at the church-door, administered by elders. The management of the poor in the parish of St John's was intrusted to his care by the authorities as an experiment, and in four years he reduced the pauper expenditure from £1400 to £280 per annum. Edward Irving was for two years his assistant. But such herculean toils began to undermine his constitution, and in 1823 he accepted the offer of the Moral Philosophy chair in St Andrews, where he wrote his treatise on the *Use and Abuse of Literary and Ecclesiastical Endowments* (1827). In the following year he was transferred to the chair of Theology in Edinburgh, and in 1832 he published a work on political economy. In 1833 appeared his Bridge-water treatise, *On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man*. It was received with great favour, and obtained for the author many literary honours; in 1834 he was elected by the Royal Society of Edinburgh first a fellow and then a vice-president, and by the French Institute a corresponding member, while in 1835 the university of Oxford conferred on him the degree of D.C.L. In 1834 he was appointed convener of the Church-extension Committee; and after seven years of enthusiastic labour, he announced that upwards of £300,000 had been collected from the nation, and 220 new churches built. Meanwhile, however, troubles were springing up in the bosom of the church itself. The Evangelical party had become predominant in the General Assembly; the struggles in regard to patronage between them and the 'Moderate' or 'Erastian' party became keener and more frequent, until the decision of the civil courts in the famous Auchterarder and Strathbogie cases brought matters to a crisis; and on the 18th of May 1843 Chalmers, followed by 470 clergymen, left the church of his fathers, rather than sacrifice those principles which he believed essential to the purity, honour, and independence of the church (see FREE CHURCH). The rapid formation and organisation of the Free Church were greatly owing to his indefatigable exertions. Chalmers was elected principal of the Free Church College, and spent the close of his life in the zealous performance of his duties there, and in completing his *Institutes of Theology*. He died suddenly at Morningside, Edinburgh, May 30, 1847.

The works of Chalmers extend to 34 vols. (9 of which include his posthumous works). They contain valuable and, in some cases, original contributions to the sciences of natural theology, Christian apologetics, and social economy; while on minor topics, such as the church-establishment question, they exhibit both novelty and ingenuity

of argument. As a religious orator Chalmers was unique and unrivalled. There have been few men in whom such gifts of intellect, feeling, and imagination were so harmoniously combined with the shrewdest common-sense and the highest administrative ability. Never did Scotland produce a greater or more lovable soul, one more gentle, guileless, and genial-hearted, or yet more fervid from the strength of a resolute will, before whose impetus difficulties were dashed aside as by a torrent. There have been loftier and more purely original minds in Scotland than his, but there has never been a truer one, nor a heart whose Christian faith and piety were more intense and sincere.

See his *Memoirs*, by his son-in-law, Dr W. Hanna (4 vols. 1849-52), and his *Correspondence* (1853); also *A Biographical Notice* by Dean Ransay (1850), an Essay by Dr John Brown in his *Horæ Subsecivæ*, and small books on him by D. Fraser (1881) and Mrs Oliphant (1893).

**Châlons-sur-Marne**, the capital of the French department of Marne, on the right bank of the river Marne, 107 miles E. of Paris by rail. An old place, with timber houses and many spired churches, it has an interesting cathedral, dating chiefly from the 13th century, a handsome hôtel-de-ville (1772), and a fine public park, though the Germans cut down its immemorial elms for fuel. It still does a considerable trade in Champagne wine; but its manufacture of the worsted cloth known as 'shalloon' (Chaucer's *chalons*) is a thing of the past, and the population has dwindled from 60,000 in the 13th century to 31,000 in the 20th. Near Châlons, which takes its name from the *Catalauni* of Latin writers, the Romans and Goths in 451 A.D. defeated Attila (q.v.) and his host of Huns. In 1856 Napoleon III. formed the celebrated camp of Châlons, 16½ miles to the north-east of the town. Hence, during the Franco-Prussian war, on the night of 21st August 1870, MacMahon withdrew his troops, and next day the town was occupied by the Germans, as it was again in September 1914.

**Chalon-sur-Saône** (ancient *Cabillonum*), a town in the French department of Saône-et-Loire, 84½ miles by rail N. of Lyons. Lying on the right bank of the Saône, at the point where that river is joined by the Canal du Centre, uniting it with the Loire, Chalon has an extensive traffic with the central districts of France, as well as with the Mediterranean and Atlantic. Fine quays and houses line the river; and the chief building is the church of St Vincent, 14th to 15th century. The industries are copper and iron founding, machinery, shipbuilding, manufactures of glass, paper, beet-sugar, and chemicals. Pop. 31,600.

**Chalybæus**, HEINRICH MORITZ, philosopher, born at Pfaffroda in Saxony, 3d July 1796, spent some years in teaching, and was appointed in 1839 professor of Philosophy in the university of Kiel. Dismissed, however, in 1852, owing to his Germanic sympathies, he died at Dresden, 22d September 1862. His chief work is his *System der speculativen Ethik* (1850); his review of the historical development of speculative philosophy has been translated into English by Tulk (1854) and Edersheim (1860).

**Chalybeate Waters** are those which contain a considerable portion of iron in solution. See MINERAL WATERS.

**Chalybite**, an iron ore (ferrous carbonate  $\text{FeCO}_3$ ), crystallising in the hexagonal system, is brown with a white streak. Mixed with clay it forms clay-ironstone. See IRON AND STEEL.

**Cham**, the pseudonym assumed by the caricaturist, Amédée de Noé (*Cham* being the French for *Ham*, the son of Noah), son of the Comte de Noé by an English mother, and born at Paris in 1819. He studied art under Delaroche,

and soon acquired a great reputation as a skilful and witty delineator of the humorous side of Parisian life. In 1843 began his famous connection with the *Charivari*, in which paper and in the *Journal des Pêlerinages* he continued to delight his fellow-citizens until close upon his death on 6th September 1879. He was profoundly sceptical, but not unkindly, and obtained, as Edmond About pointed out, the success of an *homme d'esprit*. His masterpieces were chiefly social rather than political, and among his skits may be mentioned *Proudhomana*, *Baigneurs et Buveurs d'Eau*, *Souvenirs de Garrison*, and *L'Exposition de Londres*. Several good collections of his comic illustrations have been made—for instance, *Douze Années Comiques* (1880), with an introduction by L. Halévy, and *Les Folies Parisiennes* (1883), with an introduction by Gérôme. See *Life* by Rabeyre (1885); and for specimens of Cham's art, Sala's *Paris herself again* (1882).

**Chama**, a genus of bivalve molluscs, the only surviving type of a family which was once extremely numerous and abundant, especially in the Jurassic and Chalk times. The genus is represented by about half a hundred living forms, restricted to warmer waters, and especially common about coral reefs. The general appearance is somewhat clam-like, the valves are unequal, of considerable thickness, and covered with leaf or scale-like outgrowths. They are very passive animals, usually fixed, with the mantle margins fused together, with very small foot and respiratory apertures, with well-developed hinge and an external ligament, and often of a bright colour. Some forty fossil species are known from Cretaceous and Tertiary strata, and the genus is of interest as the sole survivor of a once much larger family. The common English name for shells of the genus is Clam (q.v.).

**Chamæleon** (Gr. *chamailéon*, 'ground lion'), a large genus of lizards, forming a very distinct family. Among the most distinctive features may be noted the soft tuberculated skin, with its power of changing colour; the coiled tail, adapted for curling round the branches of trees; the division of the toes of fore and hind feet into two bundles; the absence of an external ear-drum or tympanic membrane; the long worm-like insect-catching tongue, capable of extremely rapid protrusion. Even more remarkably distinctive, however, are certain peculiarities in the skeleton, and especially in the skull, which separate the chamæleons from all other lizards.

*Description*.—The body is flattened, and bears a toothed crest of skin along the back. The head is



Chamæleon.

triangular, surmounted by a ridge. The animal stands unusually high upon its legs. The fore-feet are divided into three united internal digits and two external; the reverse (and the digits, corresponding to our great and second toes, form one bundle, and the other three—external—another

united group) occurs in the hind-feet. The digits are tipped by long sharp claws. The long compressed tail is curled ventralwards. The mouth-aperture is small, but the tongue extremely long. It is the most active part of the animal, is cup-shaped at the end, covered with a viscid secretion, and very efficient in insect-catching. The large lateral eyes, with circular lids leaving only a small aperture, are very active, and can be rapidly turned in all directions, a possibility which to some extent compensates for the stiffness of the head. The skin is soft, loose, and shagreen-like, the scales being very small. The glandular pores common on the thighs and near the anus of lizards are absent.

Among the internal peculiarities may be noted the largeness of the lungs, which admit of being greatly distended, so as to puff out the body into marked plumpness. They appear to be connected with surrounding air-spaces. The habit the chamæleon has of thus blowing itself out, taken along with its power of fasting, gave origin to the ancient supposition that it fed on air. The skeletal peculiarities are numerous. The chamæleons differ from all lizards except the *Amphisbænas* (q.v.), in having no 'columella' or epipterygoid skull-bone, and no interorbital septum, and from all other forms in the fact that the pterygoid and quadrate bones are not united. The latter is firmly fused to the skull, and the parietals are also peculiar in their firm attachments. The teeth are confined to a ridge along the summit of the jaws. The vertebrae are hollow in front; the breastbone is small, and only a few anterior ribs reach it; as in the geckos, many of the posterior ribs are united ventrally by hoops across the abdomen; there are no clavicles; the scapula and coracoid of the shoulder-girdle and the ilia of the hip-girdle are peculiarly long and narrow.

*Life and Habit*.—Except as regards tongue and eyes, the chamæleons are very sluggish. They are strictly arboreal lizards, moving very slowly, in perfect silence, and waiting rather than hunting for their insect prey. At a distance of several inches, about half as long as the body in some cases, they can most unerringly catch the unconscious insect. Probably the most familiar fact about chamæleons is their power of changing colour. Under the thin outer skin there are two layers of pigment-containing cells, the outer bright yellow, the inner brown to black. Under nerve control the disposition and expansion of the pigment-containing cells vary, and this produces change of colour. The change depends much more on internal emotions, expressing themselves in nervous stimulus and inhibition, than on external physical influences. The change appears to be rather emotional than protective. Most chamæleons are oviparous, and lay 30 to 40 thin-shelled eggs, which are deposited in an excavated hollow and covered over with earth and leaves. Moseley has described a South African species which brings forth its young alive.

*Species and Distribution*.—The genus *Chamæleo* is a large one, and some naturalists split it up. Chamæleons are especially at home in the Ethiopian region, but may occur beyond its limits. The commonest of the numerous species is *C. vulgaris*, which is abundant in Africa, and is also found in South Europe (Andalusia). The predominant colour varies in different species. Many males are adorned with horns on the head. One form, distinguished as a distinct genus (*Rhampholeon*), has a tail too short for clasping purposes, but this loss is made up for by accessory structures on the feet. The chamæleon was well described by Aristotle, but in later days became the subject of numerous ridiculous fables. It was also in repute

for supposed medicinal virtues. See LIZARD; Huxley's *Anatomy of the Vertebrates*; St George Mivart in *Nature*, vol. xxiv.; the *Cambridge Natural History*, vol. viii. (1904); and Sir E. Ray Lankester's *Treatise on Zoology* (1900-10).

**Chamærops**, a genus of palms, remarkable for its wide range into northern climates throughout the world, and of which one species, *C. humilis*, is the only palm truly indigenous to Europe. This species, the common Fan-palm, is widely distributed through Southern Europe, but has been extirpated in Southern France. This palm is very tolerant of a cold climate. It forms dense furze-like thickets from the suckers which arise from its creeping roots, but when these are not allowed to grow, its stem may reach a height of 20 feet or more. In Algeria it is troublesome to agriculturists, but its growth is increasingly becoming of profit on account of the excellent fibre yielded by its stem. This the Arabs mix with camel's hair and make into hut-covers, &c.; cordage and sailcloth, paper and pasteboard, are also prepared from it, and it finds many uses under the title of vegetable or African horse-hair. The leaves are used in paper-making, and furnish a convenient thatching material. This species is sometimes called *palmetto* in Europe. The true *Palmetto* is *Sabal Palmetto* of Florida and Carolina (see also BRAZILIAN GRASS). In China and Japan *Trachycarpus excelsa* (see HEMP PALM) and *T. Fortunei* are specially prominent; both can be grown in the open air in the south of England. Disseminated by blackbirds in Italian Switzerland, they would soon establish themselves were not the young plants dug out for sale.

**Chamalari**, a peak (23,944 feet) of the Himalayas, between Tibet and Bhutan, 140 miles E. of Mount Everest.

**Chaman**, New, in British Báluchistán, on the borders of Afghánistán, is the terminus of the North-western Railway, by which the trade routes from Kábul and Herát by Kandahár are connected with the railways of British India. Old Chaman, on the same railway, lies to the SE., on the Kojak Range.

**Chamba**, one of the Punjab Hill States, immediately SE. of Kashmir, with an estimated area of 3200 sq. m. Population, 136,000, nearly all Hindus. It is shut in on nearly all sides by lofty hills, and traversed by two ranges of snowy peaks and glaciers, with fertile valleys to the south and west. Agriculture and grazing are the leading industries; iron, copper, and slate are plentiful; and the mountains teem with game. The principality came into the hands of the British in 1846, who in 1847 assigned it to the present line of rajas.

**Chambal**, a principal tributary of the Jumna River, rises in the Vindhya Range, 2019 feet above sea-level, flows in a north-easterly direction, and after a course of 650 miles falls into the Jumna 40 miles below the town of Etawah. In heavy rains its volume is greater than that of the Jumna.

**Chamber**, of a firearm, is the name given to that part of the bore which contains the powder, when its diameter is not the same as the Calibre (q.v.) of the gun. Formerly, chambers were always smaller in diameter than the bore, to prevent any air-space behind the projectile, but now that much heavier charges are fired, they are made larger. They tend to weaken the gun, but enable a shorter cartridge to be used, and so prevent the dangerous wave action which would be set up in a long one. See CANNON, RIFLES.

**Chamberlain**, an officer appointed by a king or nobleman, or by a corporation, to perform domestic and ceremonial duties. The LORD CHAMBERLAIN has been one of the principal officers

of state from at least the 13th century, and in 1406 parliament declared that he should always be a member of the council *ex officio*. Though he has long ceased to have any share in the responsibilities of government, the Chamberlain is still an officer of very high standing in the royal household. He has control over all the officers and servants 'above stairs,' except those of the bedchamber, over the establishment attached to the Chapel Royal, the physicians, surgeons, and apothecaries of the household. The chamberlain has further the oversight of the royal musicians, comedians, trumpeters, messengers, &c. When the office of Keeper of the Great Wardrobe was abolished in 1782, the duties of providing the state robes of the royal family, the household, and officers of state, devolved on the Lord Chamberlain. All theatres in towns in which a royal palace is situated require to be licensed by the Lord Chamberlain, and no new play can be performed anywhere without his license. His duties as licenser of theatres and plays are defined by acts consolidated in 1843 (see the article PLAY). All persons desiring to be presented at levees or drawing-rooms require to send their cards to the Lord Chamberlain, and it is his duty to see that the persons thus applying are entitled by station and character to be presented to the sovereign. The Chamberlain also issues invitations to royal balls, parties, and receptions. In accordance with ancient custom the Lord Chamberlain is still a member of the Privy-council. His salary is £2000 a year. Since 1924 his office has been regarded as non-political.

*The Vice-chamberlain* is the deputy and assistant of the Lord Chamberlain, and in his absence exercises the full authority which belongs to his principal. His office existed in the time of Richard II. He is also dependent on the administration, and is usually a member of the Privy-council. His salary is £924 per annum.

**Chamberlain**, THE LORD GREAT, is a hereditary officer of great antiquity, and formerly of great importance. He has the government of the palace at Westminster, and upon solemn occasions the keys of Westminster Hall and of the Court of Requests are delivered to him. At these times the Gentleman Usher of the Black Rod, the Yeoman Usher, and the door-keepers are under his orders. At coronations, state trials, banquets, and the like, the fitting-up of the Hall devolves on him. When the King goes to parliament, the Lord Great Chamberlain delivers the sword of state to any member of the administration whom he chooses, to be borne before His Majesty, he himself walking on his right hand. During the sitting of parliament he has charge of the House of Lords, and issues tickets of admission on the opening or prorogation of parliament. Some fees and perquisites belong to him. This office was conferred by Henry I. in 1101 on Alberic de Vere. Mary, daughter of John de Vere, sixteenth Earl of Oxford, married Peregrine Bertie, the 'brave Lord Willoughby' (1555-1601); and on the death of their last male descendant in 1779, the honour, after much litigation, was adjudged to belong conjointly to his sisters and co-heiresses—viz. the Lady Willoughby de Eresby and the Marchioness of Cholmondeley, by whose descendants or their deputies its duties have since been discharged alternately.

**Chamberlain**, THE RIGHT HON. JOSEPH, M.P., the eldest son of Joseph Chamberlain, was born in London on the 8th July 1836. He was educated at University College School, and entered his father's screw factory at Birmingham (the name of the firm being Nettlefold), from which,

however, he retired in 1874. Mr Chamberlain had by this time acquired considerable celebrity as a Radical politician. In 1868 he was appointed a member of the Birmingham Town-council; was Mayor of Birmingham from 1873 to 1876, and chairman of the Birmingham School-board from 1874 to 1876. Defeated at Sheffield in 1874, he was returned for Birmingham without opposition in June 1876. He soon made his mark in parliament, and on the return of the Liberals to power in 1880 he was appointed President of the Board of Trade, with a seat in the cabinet. To Mr Chamberlain's exertions was due the passing of the Bankruptcy Bill, but his efforts to amend the Merchant Shipping Acts were unsuccessful. Meanwhile his influence was increasing rapidly outside the House; he came to be regarded as the leader of the extreme Radical party, and enunciated schemes for the regeneration of the masses which were based on the doctrines of the 'restitution' of land and the 'ransom' of property. During the last hours of Mr Gladstone's government he was understood to be opposed to the renewal of the Irish Crimes Act; and during the general election of 1885 he was most severe in his strictures on the moderate Liberals, and produced an 'unauthorised' programme (in opposition to that of Mr Gladstone), which included the readjustment of taxation, free schools, and the creation of allotments by compulsory purchase. He was returned free of expense by the western division of Birmingham. On February 1, 1886, he became President of the Local Government Board, but resigned on March 26 because of his strong objections to Mr Gladstone's Home Rule measures for Ireland; and after the 'Round Table' conference had failed to reunite the Liberal party he assumed an attitude of uncompromising hostility to his old leader's new policy, and was bitterly assailed by Home Rulers as a renegade. He became leader of the Liberal-Unionists when the Duke of Devonshire went to the Upper House. He was commissioner on the Canadian fishery dispute; and in 1895 he was made Colonial minister in the Unionist cabinet (see SALISBURY). As such he had to deal with the troubles in South Africa, and to conduct the negotiations which issued in the war of 1899-1902, and was re-elected to parliament in 1900 to defend his and the government's policy against keen opposition. To aid in the reconstruction he made a personal tour of South Africa after the war. His promotion of the constitution of the Australian Commonwealth was a feature of his energetic colonial policy. In 1903 he startled friends and foes alike by his scheme for preferential treatment of colonial imports and protection for native manufactures. To secure greater freedom for action he withdrew from the cabinet in 1903, and began a vigorous campaign. From 1906 practically withdrawn by ill-health from public life, he died 2d July 1914.—Imperial preference was given effect to (1919) by his son, J. AUSTEN CHAMBERLAIN, born in 1863, educated at Rugby and Trinity College, Cambridge. Elected in 1893 Unionist M.P. for East Worcestershire, in 1914 for West Birmingham, he was Civil Lord of the Admiralty, Secretary to the Treasury, Postmaster-general, Chancellor of the Exchequer, Indian Secretary, a member of the War Cabinet (1918), Chancellor of the Exchequer (1919), Lord Privy Seal and Unionist Leader from 1921 till the Unionists, against his wish, withdrew from the Coalition in 1922. He became Foreign Secretary and leader of the House of Commons in the Baldwin administration, 1924. He negotiated the Locarno (q.v.) Treaty and was created K.G.

**Chamber of Commerce**, a body of merchants, traders, bankers, and others, associated to promote the local and general interests of trade and commerce. The oldest chamber is that of

Marseilles, which dates from the end of the 14th or commencement of the 15th century. It shared in the municipal jurisdiction and in the administration of justice in mercantile questions. It was several times suppressed and re-established, and it was not till 1650 that it received its ultimate organisation. The chamber of Dunkirk was established in 1700. The same year a council-general of commerce was instituted at Paris, which, in addition to six councillors of state, consisted of twelve merchants or traders, delegated by the principal commercial towns of the country, an arrangement which led within the next few years to the formation of chambers of commerce everywhere in France. We thus find that the chamber at Lyons was instituted in 1702, those of Rouen and Toulouse in 1703, of Montpellier in 1704, of Bordeaux in 1705, &c. These chambers were all suppressed by a decree of the National Assembly in 1791, but they were re-established by a consular edict in 1802. Their organisation was modified in 1832, in 1851, and in 1852. The members of these bodies are now elected by the chief merchants of each town chosen for that purpose by the prefect. The number of this elective body cannot be less than 9 nor more than 21. They hold office for six years, one-third of their number being renewed every two years. The functions now assigned to these chambers in France are—to give to the government advice and information on industrial and commercial subjects; to suggest the means of increasing the industry and commerce of their respective districts, or of improving commercial legislation and taxation; to suggest the execution of works requisite for the public service, or which may tend to the increase of trade or commerce, such as the construction of harbours, the deepening of rivers, the formation of railways, and the like. On these and similar subjects the advice of the chambers, when not volunteered, is demanded by the government. In most of the other countries of continental Europe there are similar institutions.

The oldest chamber of commerce in Great Britain is believed to be that of Glasgow, which was instituted 1st January 1783, and obtained a royal charter, registered at Edinburgh on the 31st of the same month. That of Edinburgh was instituted in 1785, and incorporated by royal charter in 1786. The Edinburgh Chamber of Commerce was the first public body which petitioned for the abolition of the Corn Laws, and the adoption of free-trade principles; and it stood almost alone in the United Kingdom in advocating the Suez Canal project. It also originated the movement which resulted in placing the telegraph service in connection with the Post-office. Between six and seven hundred of the bankers, merchants, and ship-owners of Edinburgh and Leith constitute the chamber. The London Chamber of Commerce (1882) may now be regarded as the most important in the United Kingdom. Its membership is over 8000. The main branches of commercial enterprise are dealt with by separate departments of the chamber, while by public lectures and the frequent publication of detailed reports it maintains communication with chambers of commerce throughout the country, and serves when necessary to unite and concentrate their action in the promotion of reforms in our mercantile system and in the development of the commercial resources of the empire. The Manchester chamber, so famous for its exertions in the cause of free trade, was established in 1794. Its members number over 3000. The Leeds chamber was established in 1785. In Hull there has been a chamber of commerce since 1837; but those of Liverpool, Birmingham, and Bradford, notwithstanding the great trading and manufacturing interests of these towns, were not

established till 1850; in which year also a similar institution was established in South Australia. The Liverpool Chamber of Commerce numbers some 1500. The Manchester chamber has an income of over £8000 a year from subscriptions, ranging from £1, 1s. for individual members, to £10, 10s. for large firms. There are now similar chambers in all the great mercantile towns of Great Britain and Ireland, and in 1860 there was established the Association of British Chambers of Commerce, which meets in annual and quarterly conference for the promotion of commerce. The association, with affiliated chambers at home and abroad, represents a membership of about 45,000. The Chamber of Commerce of New York, organised in 1768, was incorporated by a royal charter in 1770, afterwards superseded by charter granted by the state government. Its aims are similar to those in Britain, and it comprises some 1200 members, who have established a court of arbitration for differences amongst members. Like bodies have been formed in other large American cities. In Canada the Dominion Board of Trade consists of the Chambers of Commerce, or Boards of Trade, as they are indifferently called, of the most important cities.

**Chambers** are private rooms attached to most of the English courts, in which the judges, or more frequently the masters and chief clerks, transact a large amount of judicial business. In fact nearly all business which is begun by what is technically called a *Summons* in England goes to chambers—e.g. all such incidental matters as the recovery of documents, examination of witnesses about to go abroad, investigation of accounts, settling of deeds between parties. A decree of the court which directs further procedure is carried out by a summons to proceed in chambers. Counsel attend in chambers only in important matters. In Scotland a good deal of this business takes the form of a remit to an accountant or other man of business, a judicial reference, a commission to examine witnesses, but all initiated by a motion in court.

*Chamber-counsel*, a barrister or advocate who gives opinions in his own chambers, but does not, or rarely does, plead in court.

**Chambers, EPHRAIM**, an amiable but frugal free-thinking encyclopædist, was born about 1680 at Kendal, and began life as an apprentice to a globe-maker in London, where he conceived the idea of a cyclopædia that should surpass Harris's *Lexicon Technicum* (1704). It appeared in 2 folio vols. in 1728, and reached a 6th edition in 1750, Chambers having died meanwhile on 15th May 1740. A French translation gave rise to the more famous *Encyclopédie* of Diderot and D'Alembert; itself expanded into Rees's *Encyclopædia*. Dr Johnson told Boswell that he had partly formed his style upon Chambers's Proposal for his Dictionary. See *ENCYCLOPÆDIA*.

**Chambers, SIR WILLIAM**, architect, was born of a Scots family at Stockholm in 1726, but was brought up in England. At first a sailor, he soon turned to the study of architecture in Italy and at Paris. He rose rapidly, and as early as 1757 was employed by Augusta, Princess-dowager of Wales, to construct the well-known semi-Roman and oriental buildings in Kew Gardens. The king of Sweden made him a knight of the Polar Star. Somerset House (1776) was his design, which Fergusson pronounces 'the greatest architectural work of the reign of George III.' His *Treatise of Civil Architecture* (1759) was successful, but his absurdly pretentious and ignorant *Dissertation on Oriental Gardening* (1772) justly covered him with ridicule. Chambers enjoyed the friendship of Johnson, Reynolds, and Garrick, and died in London, March 8, 1796.

**Chambers, WILLIAM**, publisher, was born 16th April 1800 at Peebles, his father being a cotton manufacturer there. The boy got a fair elementary education; but owing to the father's misfortunes, his schooling terminated with his thirteenth year. Hence his education for life-work was mainly due to the habit, very early acquired and long maintained, of miscellaneous and extensive reading. The household migrated to Edinburgh in 1813, and next year William was apprenticed to a bookseller. His five years up, he started business in a humble way for himself (May 1819), to bookselling afterwards adding printing. Between 1825 and 1830 he wrote the *Book of Scotland*, and in conjunction with his brother Robert, a *Gazetteer of Scotland*. His experience gained as a bookseller and printer was next utilised in his attempt 'to take advantage of the universal appetite for instruction which at present exists,' and to 'supply that appetite with food of the best kind,' which resulted in the founding of *Chambers's Edinburgh Journal* on 4th February 1832. This was about six weeks in advance of the *Penny Magazine*, and it may be considered the pioneer of that class of cheap and popular periodicals of a wholesome kind now so generally diffused. At the end of the fourteenth number he united with his brother Robert in founding the business of William & Robert Chambers, in which they were associated in writing, editing, printing, and publishing. W. & R. Chambers issued a series of works designed for popular instruction, including besides the *Journal*, *Information for the People*, 2 vols.; the 'Educational Course' series; *Cyclopædia of English Literature*, 2 vols. (new ed. 1903, 3 vols.); *Chambers's Miscellany*, 20 vols.; *Papers for the People*, 12 vols.; and the present *Encyclopædia*, 10 vols. (1859–1868; new ed. 1922 *et seq.*). In 1849 William acquired the estate of Glenormiston, Peeblesshire, and in 1859 founded and endowed an institution in his native town for purposes of social improvement. Twice elected Lord Provost of Edinburgh, William occupied that office for four years (1865–69), during which he promoted several important public acts, including one for the improvement of the older part of the city, which soon resulted in a great diminution of the death-rate. (The death-rate of the city in 1865–75 was 26.26 per 1000; in 1875–85, only 19.94.) He also carried out at his own cost a thorough restoration of St Giles' Cathedral. He died 20th May 1883, having shortly before received the offer of a baronetcy. He was made LL.D. of Edinburgh in 1872. A statue has been erected to his memory in Edinburgh. Besides many contributions to the *Journal*, he was author and editor of various volumes, and wrote *The Youths' Companion and Counsellor*, *History of Peeblesshire* (1864), *Ailie Gilroy*, *Stories of Remarkable Persons*, *Stories of Old Families*, and *Historical Sketch of St Giles' Cathedral* (1879).

ROBERT CHAMBERS, born in Peebles, 10th July 1802, took to Latin and books at an early age, and began business as a bookseller in Edinburgh in 1818. His leisure hours were devoted to literary composition, the impulse to which, his brother says, came upon him like an inspiration at nineteen years of age. In 1824 he published the *Traditions of Edinburgh*, the writing of which procured him the friendship of Sir Walter Scott, who furnished some memoranda for the work. Between 1822 and 1834 he wrote in all twenty-five volumes, many of them of great literary interest and permanent historical value. He had already won reputation as an author when he joined his brother after the success of the *Journal* in 1832; and this success was materially promoted by his essays, and by his versatility and elegance as a writer, his diligence in collecting and working up stray

material, and his perception of what was suited to the popular taste in history, poetry, science and arts. In 1844 he published anonymously the remarkable work, *Vestiges of Creation*, which prepared the way for Darwin's great work, *The Origin of Species*. The authorship, positively ascribed to him in the *Athenæum* of 2d December 1854, was first acknowledged in Mr Ireland's introduction to the 12th ed. (1884). He received the degree of LL.D. from St Andrews in 1863. The labour in preparing the *Book of Days* (2 vols. 1863) broke his health, and he died at St Andrews, 17th March 1871. Other works by Robert are *Popular Rhymes of Scotland*, a valuable contribution to folklore (1847), *History of the Rebellions in Scotland, Life of James I., Scottish Ballads and Songs* (3 vols. 1829), *Dictionary of Eminent Scotsmen, Ancient Sea Margins* (1838), *The Life and Works of Robert Burns* (1851; new ed. 1896), *Domestic Annals of Scotland* (3 vols. 1859-61), and *Songs of Scotland prior to Burns* (1862). His *Select Writings* (7 vols.) were published in 1847.—His son ROBERT CHAMBERS, born in 1832, became head of the firm in 1853, and conducted the *Journal* till his death, March 23, 1888.—See W. Chambers's *Memoir of William and Robert Chambers* (1872; 13th ed., with supplementary chapter, 1884).

**Chambersburg**, capital of Franklin county, Pennsylvania, in a pleasant valley 52 miles WSW. of Harrisburg by rail, has several manufactories, breweries, foundries, and machine-shops. A large part of the borough was burned by the Confederates in 1864. Pop. 13,000.

**Chambertin**, a famous red Burgundy, obtained from a vineyard (62 acres) of that name in the French department of Côte-d'Or, 7 miles S. of Dijon by rail.

**Chambéry**, capital of the former duchy and present French department of Savoy, beautifully situated between two ridges of hills, amid gardens and country seats, 370 miles SE. of Paris by rail. The scenery around, with the river Laisse flowing through the valley, is exceedingly fine. The town itself, however, is dull and uninteresting, with narrow and gloomy streets winding between high well-built houses. Notable edifices are the small cathedral, the palace of justice, and the old castle of the Dukes of Savoy, restored early in the 19th century. Chambéry has manufactures of clocks, silk-gauze soap, hats, paper, gloves, and a trade in silk, wine, coal, &c. Pop. 20,000. From 1525 to 1713 Chambéry was under the dominion of France, and again from the Revolution to 1815, when it was restored to the House of Savoy; but in 1860, by the cession of Savoy, it came again under the rule of France.

**Chambezi**, the farthest head-stream of the Congo, flows south-west to Lake Bangweolo (q.v.).

**Chambon, LE, or LE CHAMON-FEUGEROLLES**, a town in the French department of Loire, 5½ miles SW. of St Étienne, has coal-mines, and manufactures steel, ironmongery, silk, &c.; pop. 12,000.

**Chambord**, a celebrated château in the French department of Loir-et-Cher, stands 12 miles E. of Blois, in the midst of a walled, sandy park of 13,000 acres. Commenced by Francis I. in 1526, it is a huge Renaissance pile, with numberless turrets, chimneys, gables, and cupolas, and with four round towers, each 63 feet in diameter. There are no fewer than 440 rooms. Chambord, the 'Versailles of Touraine,' was a residence of the French kings down to Louis XV., who conferred it on Marshal Saxe; and here in 1670 Molière gave the first representation of his *Bourgeois Gentilhomme*. Among its various occupants were Diane de Poitiers, Stanislaus of Poland, and Marshal Berthier, upon whom it was bestowed by Napoleon in 1809. It was

bought from his widow in 1821 for 1,542,000 francs, and presented to the future Comte de Chambord, who spent large sums on its restoration. He left it to his wife, and, after her, to her nephews, by a will which was more than once disputed, but recognised by the state as valid. See *La Question de Chambord*, by J. B. C. Arnauld (1887).

**Chambord, HENRI CHARLES DIEUDONNÉ, COMTE DE**, was born in Paris, 29th September 1820, seven months after the assassination of his father, the Duc de Berri (q.v.). On the day of his baptism with water brought by Châteaubriand from the Jordan, the 'Child of Miracle' was presented by the Legitimists with the château of Chambord; hence in 1844 he dropped the title of Duc de Bordeaux for that by which he was most usually known. When Charles X. abdicated at the July revolution of 1830, he did so in favour of his little grandson; but the people insisted on the 'citizen king,' and the elder Bourbons were driven into exile. They fixed their court successively at Holyrood, Prague, and Görz, where the old king died in 1836, and the young count was trained in clerical and absolutist ideas by his aunt, the Duchesse d'Angoulême, and his tutor, the Duc de Damas. A good, dull, timid soul, whom D'Orsay likened to 'a palace with no room furnished but the chapel,' 'Henry V.' had three times a chance of regaining the crown of his ancestors—in 1848, 1870, and 1873, on which last occasion, three months after Thiers's overthrow, he paid an incognito visit to Versailles. Each time he fooled away his opportunities, always vanishing just when his presence was indispensable, and ever protesting that he would 'never abandon the white flag of Joan of Arc.' A fall from his horse (1841) had lamed him for life; his marriage (1846) with the Princess of Modena (1817-86) brought him no successor; and in keeping up a stately mimic court, in stag-hunting from a phaeton, in issuing manifestoes, in visiting innumerable churches, and in much travelling, he passed forty years of blameless inertia. His death, after long suffering, at his castle of Frohsdorf, in Lower Austria, 24th August 1883, was a relief at once to himself and to his adherents. The Comte de Paris inherited his claims. See BOURBON; and the Comte de Falloux' *Mémoires d'un Royaliste* (2 vols. Paris, 1888).

**Chambre Ardente** ('the fiery chamber'), a name given at different times in France to an extraordinary court of justice, probably on account of the severity of the punishments which it awarded, the most common being that of death by fire. In the year 1535, Francis I. established an Inquisitorial Tribunal and a Chambre Ardente. Both were intended for the extirpation of heresy. The former searched out cases of heresy, and instructed the processes; while the latter both pronounced and executed the final judgment. Under Henri II., the activity of the Chambre Ardente received a new impulse. In 1679 Louis XIV. employed a Chambre Ardente to investigate the numerous reports of poisoning cases which the trial of the Marchioness Brinvilliers (q.v.) caused to be circulated. Many persons of the first rank were examined on suspicion, but no one was executed except the pretended sorcerer, Voisin (1680).

**Chambre Introuvable** (Fr., 'the chamber the like of which is not to be found again') was the name given to that Chamber of Deputies in France which met after the second return of Louis XVIII. (July 1815), and which, by its fanatical royalty, began to throw the country and society anew into commotion. The name was given to it by the king in his gratitude (though some think even he spoke ironically); but it soon came to be used sarcastically for any ultra-royalist assembly.

**Chameleon.** See CHAMÆLEON.

**Chamfer.** In Architecture, an angle which is slightly pared off is said to be chamfered; a large chamfer, as in a wall at the window opening, is called a *splay*. The chamfer is sometimes made slightly concave, in which case it is called a *hollow* chamfer. Chamfers, in Gothic architecture, have frequently ornamental terminations of various kinds. The term chamfer is applied to wood-work as well as stone.

**Chamfort**, NICOLAS, a famous writer of maxims and anecdotes, was born in Auvergne in 1741. He was of illegitimate birth, and was educated at one of the Paris colleges, where he obtained a scholarship. Having distinguished himself in the prize competitions of the Academy, he gained an entrance into the highest literary circles in Paris, and for some years lived literally 'by his wit, if not by his wits.' At one time Madame Helvétius gave him free lodgings at Sevres, and he was afterwards made independent by a pension bestowed on him by a now forgotten man of letters named Chabanon. At the Revolution he espoused the popular side, and was hailed in the clubs as 'La Rochefoucauld-Chamfort.' After a time, however, certain incisive witticisms—such as, 'Be my brother or I will kill you,'—drew down on him the anger of the Jacobin leaders. Threatened with arrest, he tried to commit suicide, wounded himself horribly, and died after several days' suffering, 13th April 1794. His writings include tales, dramas, and *éloges* on Molière and La Fontaine—all of little or no worth—a brilliant collection of maxims, and an even more admirable collection of anecdotes. Many of his sayings are among the sharpest and bitterest ever penned—the utterances of a reluctant but sincere cynic. Unexcelled in anecdote, he offers a series of masterly portraits in miniature of Parisian society. See a selection, *The Cynic's Breviary* (trans. Hutchison, 1902), and *Maxims and Considerations* (trans. E. P. Mathers, 1926).

**Chamier**, FREDERICK (1796–1870), an English novelist, entered the navy in 1809, and retiring in 1833, was promoted to be captain in 1856. He imitated Marryat with some success, though he fell short in invention and humour. His best romances, now almost forgotten, are *Life of a Sailor* (1832), *Ben Brace* (1836), *The Arethusa* (1837), *Jack Adams* (1838), and *Tom Boulvine* (1841). He also wrote a continuation of James's *Naval History* (1837), and a somewhat prejudiced *Review of the French Revolution of 1848* (1849).

**Chaminade**, CÉCILE LOUISE STÉPHANIE (born 1861), composer, pianist, and conductor, was born in Paris. Her compositions include a *Symphonie lyrique* for chorus and orchestra: a ballet, *Callirhoe*, songs; and piano-pieces.

**Chamisso**, ADELBERT VON, one of the most celebrated of German lyric poets, was born in 1781, at the château of Boncourt, in Champagne. The French Revolution driving his parents to settle in Prussia in 1790, he became in 1796 a page of the queen, and two years later entered the Prussian service. But when the campaign of 1806 broke out he returned to France, for though no admirer of Napoleon, he would not fight against his native land. At this time he was thrown into the circle of Madame de Staël at Coppet, and there began that study of natural science which he afterwards pursued at Berlin. In 1815–18 he accompanied a Russian exploring expedition round the world as naturalist (see CORAL); and on his return was appointed custodian of the Botanical Garden of Berlin. In 1835 he was elected to the Academy of Science; and, after a happy domestic life, he died at Berlin, 21st August 1838, universally loved and honoured. He wrote several works on natural

history, but his fame rests partly on his poetical productions, still more on his quaint and humorous fiction called *Peter Schlemmahl* (1813), the story of the man who lost his shadow, which has been translated into almost all the languages of Europe. The character of his poetry is wild and gloomy, and he is fond of rugged and horrible subjects. In his political songs he succeeds well in humour and irony; nor is he deficient in deep and genuine feeling. Indeed, several of his ballads and romances are masterpieces in their way. His collected works have been edited by Hitzig (6th ed. 1874). See lives by Fulda (1881) and Lentzner (Lond. 1893).

**Chamois** (*Antilope* or *Rupicapra*, Ger. *Gemse*), a goat-like species or genus of Antelope (q.v.). It inhabits the Alps and other high mountains of Central and Southern Europe, such as the Pyrenees,



Chamois.

the Carpathians, and the mountains of Greece; it is also found on some of the Mediterranean islands, and on the Caucasus, Taurus, and other mountains of the west of Asia. In Europe it is now most numerous on the Bavarian and Styrian Alps. The chamois is about the size of a large goat, but the neck is longer in proportion, and the body shorter; the horns on both sexes are seldom more than six or seven inches long, black, rising nearly straight up from the forehead, and so bent back at the tip as to form a hook. A peculiar gland opens at the base of each horn. The summer colour is reddish brown, with a darker dorsal band, and a yellowish ventral surface; the winter colour is a darker brown, but white below. A dark brown band runs from the eye along each cheek. The rest of the head is pale yellow. The short tail is black.

The usual summer-resort of the chamois is in the higher regions of the mountains, not far from the snow-line, and it is often to be seen lying on the snow. In winter it descends to the higher forests. The aromatic and bitter plants of the mountain-pastures are its favourite food. Young twigs of rhododendron, willow, juniper, &c. are greedily devoured. It is—like the ruminants generally—very fond of salt, and often licks stones for the saltpetre which forms on them. The chamois is gregarious: flocks of one hundred used sometimes to be seen; but in the Swiss Alps, where the numbers have been much reduced by hunting, the flocks generally consist only of a few (4 to 20) individuals. Old males often live solitarily. The female bears one or rarely two young at a birth, in the month of March or April. The general cry of the chamois is a goat-like bleat.

It is an animal of extraordinary agility, and flocks may often be observed sporting in a remarkable manner among the rocky heights. It can leap over ravines 16 to 18 feet broad; a wall 14 feet high presents no hindrance to it; and it passes readily

up or down precipices which almost no other quadruped could attempt. The hunting of the chamois is attended with great hardship and much danger. The hunter sometimes goes out on the adventurous chase alone; but more frequently several go out together, dividing into parties, of which one drives and the other shoots. The scent, sight, and hearing of the chamois are extremely keen. When a flock is feeding, one is always on the watch, and by a sort of whistle, announces apprehended danger. The flesh is highly esteemed. The skin is made into leather, and from it the original *shammoy* or *shammy* leather (wash-leather), so much prized for softness and warmth, was obtained, although the name has now become common also to leather prepared from the skins of other animals (see LEATHER). The horns are often used to adorn alpenstocks. Hairy balls or Concretions (q.v.) found in the stomach used to have a medicinal reputation. When taken young the chamois is easily tamed, and its general disposition is gentle and peaceable. In the 20th century it has been introduced from Austria into New Zealand.

**Chamomile.** See CAMOMILE.

**Chamouni**, or CHAMONIX (Lat. *Campus munitus*, from the shelter of the mountains), a celebrated valley and village among the French Alps, in the department of Upper Savoy, lying 53 miles ESE. of Geneva, at an elevation of about 3400 feet above the level of the sea. The valley, bounded on the E. by the Col de Balme, is about 13 miles long and 2 broad, and is traversed by the Arve. On the north side lies Mont Brévent and the chain of the Aiguilles Rouges, and on the south, the giant group of Mont Blanc, from which enormous glaciers glide down, even in summer, almost to the bottom of the valley. The chief of these are the Glacier des Bossons, des Bois, de l'Argentière, and du Tour; the Glacier des Bois expands in its upper course into a great mountain-lake of ice called the Mer de Glace. The village of Chamouni owes its origin and its alternative name, Le Prieuré, to the Benedictine convent founded here before 1099. Until 1741, however, the valley was little sought; the region was known, from the savageness of its inhabitants, by the name of Les Montagnes Maudites, or 'accursed mountains.' In that year it was visited by two Englishmen, Pococke and Wyndham, who described it in the Transactions of the Royal Society, but it was only in 1787 that the attention of travellers was effectually called to it by the Genevese naturalist, De Saussure, and others. Since then the number of visitors has gradually increased; now over 15,000 tourists are accommodated annually in the large hotels that have sprung up in the village, where an English chapel was opened in 1860. Grazing and such farming as the elevation allows are carried on, but most of the people are in some fashion dependent on the strangers for their income. Here the best guides are to be found for the neighbouring Alps, and from this point Mont Blanc is usually ascended. At the article ALPS there is a view of Chamouni, whose beauties have been celebrated by Byron, Coleridge (who was never there), Shelley, Wordsworth, Lamartine, and Ruskin. See E. Whymper's admirable *Guide* (1896; many new editions).

**Champac**, or CHUMPAKA (*Michelia Champaca*), an Indian tree (order Magnoliaceæ) possessing great beauty both of foliage and flowers, and venerated both by Brahmanists and Buddhists. Images of Buddha are made of its wood. Its yellow flowers and their sweet oppressive perfume are much celebrated in the poetry of the Hindus. The timber of this and other species is useful and fragrant, and the bark and root are employed in native medicine.

**Champagne**, a district and ancient province of France, surrounded by Luxemburg, Lorraine, Burgundy, Île de France, and Orléanais; now forming the departments of Marne, Haute-Marne, Aube, and Ardennes, and parts of Yonne, Aisne, Seine-et-Marne, and Meuse. It was popularly divided into Upper and Lower Champagne and Brie Champenoise, and was fertile in its western, barren in its eastern part. Its chief towns were Troyes, Bar-sur-Aube, Laon, and Rheims. The province was about 180 miles long by 150 broad, its surface presenting extensive plains with ranges of hills, especially in the north and east.

In ancient times Champagne was known as a part of *Gallia Lugdunensis*, was subjugated by Cæsar, and afterwards was annexed to the kingdom established by the Franks. From the 11th century it had its own counts and dukes, who were vassals of the French kings. By the marriage of Philip IV. with Joanna, heiress to Navarre, Champagne, and Brie, Champagne in 1284 came to the French crown, and was incorporated in 1328.

**Champagne Wine** is the produce of vineyards in the above-mentioned province of Champagne. There are white and red champagnes; the white is either sparkling or still. Sparkling or effervescent (*mousseux*) champagne is the result of a peculiar treatment during fermentation. In December the wine is racked off, and fined with isinglass, and in March it is bottled and tightly corked. To clear the wine of sediment, the bottles are placed in a sloping position with the necks downward, so that the sediment may be deposited in the necks of the bottles. When this sediment has been poured off, some portion of a *liqueur* (a solution of sugar-candy in cognac with flavouring essences) is added to the wine, and every bottle is filled up with bright clarified wine, and securely re-corked. The fermentation being incomplete when the wine is bottled, the carbonic acid gas generated in a confined space exerts pressure on itself, and it thus remains as a liquid in the wine. When this pressure is removed it expands into gas, and thus communicates the sparkling property to champagne. The effervescence of the wine thus prepared bursts many bottles, in some cases 10 per cent.; and in seasons of early and sudden heat, as many as 20 and 25 per cent. have been burst. Still or non-effervescent champagne is first racked off in the March after the vintage. Creaming or slightly effervescent champagne (*demi-mousseux*) has more alcohol, but less carbonic acid gas than sparkling champagne.

The best varieties of this wine are produced at Reims and Epernay, and generally on a chalky soil. Among white champagnes of the first class, the best are those of Sillery, which are of a fine amber hue, dry, spirituous, and possessing a superior bouquet; those of Ay and Mareuil are less spirituous, but are sparkling, with a pleasant bouquet. Other white wines of first class are those of Hautvilliers, Dizy, and Pierry.

The cellars in which the vintages are stored are cut out of the calcareous rock. The fact that the sale of champagne is very extensive and lucrative, has naturally given rise to adulterations. Spurious champagne is readily manufactured by simply charging other light wines with carbonic acid gas. The popular notions about gooseberry champagne have but small foundation, if any. Gooseberry-juice is far more costly than grape-juice, wherever the grape flourishes, and in this country there are no such great gooseberry plantations as would be required for a flourishing champagne industry, which would demand a few hundred tons of fruit per annum. German purveyors have succeeded in preparing light wine—such as Rhenish—very like genuine champagne. And much champagne

was made on French methods in California before the days of prohibition.

**Champaign**, a city of Illinois, 128 miles SSW. of Chicago by rail. It has furniture and wagon factories, and the Illinois Industrial University (1868). Pop. 16,000.

**Champaigne**, PHILIPPE DE, portrait and religious painter, born in Brussels in 1602, was painter of the queen of France, rector of the Academy of Paris. He retired to Port Royal, and died in 1674.

**Champaran**, a British Indian district in the NW. corner of Bihar and Orissa, with an area of 3531 sq. m.

**Champarty**, or CHAMPERTY (a Norman-French word derived from *campi pars* = the right of the feudal lord to take part of the produce of land cultivated by his tenants), means in English law a bargain whereby the one party is to assist the other in recovering property, and is to share in the proceeds. All such bargains are illegal, and therefore null and void. More particularly an agreement to advance funds, or supply evidence, or professional assistance, for remuneration contingent on success, and proportional to, or to be paid out of property recovered, is illegal; so is a purchase by a solicitor from his client of the subject matter of a pending suit; so is every such purchase, if the real object is only to enable the purchaser to maintain the suit. A man may, however, lawfully sell evidence, and may lawfully purchase an interest in property, though adverse claims exist which make litigation necessary for realising that interest. 'The sale of a mere right to sue is bad, the right to complain of a fraud is not a marketable commodity.' Champarty, as one form of Maintenance (q.v.), was made criminal by various old English statutes, but these are never enforced, and the Criminal Law Commission recommended their repeal. In Scotland there is no law against maintenance and champarty. There is a common-law doctrine against what were in the Roman law called *pacta de quotâ litis*—i.e. purchases of litigations by professional men connected with the suit, who thus had exceptional advantages in making such a contract. But this would not probably be held to strike against an agreement by a non-professional person to advance funds for litigation on terms depending on the result, provided the terms were not extortionate or unconscionable. A Scottish act of 1594 prohibits the purchases of pleas by advocates or agents. In both countries a solicitor can lawfully agree to charge nothing except in event of success; and by recent statute, agreements for the division of profits between town and country agents are made legal. Although there are traces of the law of champarty in the United States, the American law resembles that of Scotland more than that of England. Contracts by solicitors for contingent fees, to the extent even of one-half the property in dispute, have been sustained. In general, however, the American law construes professional contracts as merely giving security for the true worth of the services rendered.

**Champfleury**, the assumed name of JULES FLEURY-HUSSON, French author, born at Laon 10th September 1821, achieved some distinction as a realistic writer of plays and romances. Works of greater value, however, are those on the history of caricature, of literature, and of art from 1825 to 1840, and his *Bibliographie Céramique* (1882). He died director of the potteries at Sevres, 7th December 1889. See works by Troubat (1900-8).

**Champion** (Low Lat. *campio*, from Low Lat. *campus*, 'a combat,' whence also A.S. *camp*, 'a fight'), in the judicial combats of the middle ages, it was allowed to women, children, and

aged persons, except in cases of high treason or of parricide, to appear in the lists by a representative. Such a hired combatant was called a champion. Those who followed this profession were generally of the lowest class, and were held disreputable (see BATTLE, WAGER OF). At a later period, in the age of chivalry, the word champion came to have a more dignified acceptance, and signified a knight who entered the lists on behalf of an injured lady, of a child, or of any one incapable of self-defence (see CHIVALRY). In England, the crown had its champion, the Champion of England, who, mounted on horseback and armed to the teeth, challenged, at every coronation at Westminster, all who should deny the king to be the lawful sovereign. This office is said by Dugdale to have been conferred by William the Conqueror on Robert de Marmion, with the Lincolnshire manor of Scrivelsby; and by reason of his tenure of that manor, the championship was claimed under Henry IV. by Thomas Dymoke. The ceremonies of the championship were last exercised at the coronation of George IV. See DYMOKE; *Notes and Queries* (1887) and Lodge's *Scrivelsby* (1893).

**Champlain**, a beautiful lake separating the states of New York and Vermont, and penetrating, at its north end, about 6 miles into the Dominion of Canada. Lying 91 feet above sea-level, it is 110 miles long, by from 1 to 15 broad, empties itself into the St. Lawrence by the Richelieu River, and has communication by canal with the Hudson. The lake, now an important trade channel, was the scene of several incidents of the French and Indian revolutionary wars; and here a British flotilla was defeated by the Americans, 11th September 1814. It was discovered by Champlain in 1609. See W. Max Reid, *Lake George and Lake Champlain* (1910).

**Champlain**, SAMUEL DE, French governor of Canada, and founder of Quebec, was born at Brouage in Saintonge in 1567, and in 1603 made his first voyage to Canada. In 1604-7 he was engaged in exploring the coasts, and on his third voyage in 1608 he founded Quebec. In 1612 he was appointed lieutenant of Canada (under an honorary governor); and the following years were occupied with attacks on the Iroquois, explorations of the interior, and journeys to France, until 1629, when he had to surrender to an English fleet, and was carried captive to England. He returned to Canada in 1633, and died there in 1635. His works were reprinted at Quebec, in 4 vols., 1870. See Parkman, *Pioneers of France in the New World* (1865); and Lives by Dionne (in French, 1891; trans. 1905), Gravier (1900), and Sedgwick (1902).

**Champlain Period**, the name given by Dana to the period succeeding the glacial—nearly the post-glacial period; see PLEISTOCENE.

**Champollion**, JEAN FRANÇOIS, the founder of modern Egyptology, distinguished from his brother (see below) as 'Champollion le jeune,' was born 23d December 1791 at Figeac, in the French department of Lot. He was educated at Grenoble, and devoted himself from his boyhood to the study of oriental languages, especially Coptic. In 1807 he went to Paris to pursue these studies, and in 1816 he became professor of History at the Lyceum of Grenoble. He had already published (1811-14) the first two volumes of a large work entitled *L'Égypte sous les Pharaons* (3 vols.), in which he reproduced, by means of Coptic documents, the national geography of Egypt, when he was expelled from his chair for his Bonapartist sympathies. Comparison of the monuments with the MSS. led him to the conviction that the three systems of Egyptian writing, the hieratic, demotic,

and hieroglyphic, were essentially one; and that the hieroglyphs were not signs for *ideas*, but for *sounds*. The first results of his labours were published in *De l'Écriture hiéroglyphique des anciens Égyptiens* (1821) and his famous *Lettre à M. Dacier* (1822); and in his *Précis du Système hiéroglyphique* (1824; 2d ed. 1828) he established the conclusion that the hieroglyphs were partly phonetic or alphabetic characters. The final solution by which he arrived at the whole alphabet of twenty-five letters (see **HIEROGLYPHICS**) was pronounced by Niebuhr to be the greatest discovery of the century. Champollion was sent by the king on a scientific mission to Italy in 1824-26, and in 1826 was appointed conservator of the Egyptian collections; and about the same time he published his *Panthéon Égyptien* (1823), with drawings of Egyptian deities from the papyrus-rolls and notes regarding their Egyptian designations, and his *Lettres relatives au Musée royal Égyptien de Turin* (2 vols. 1824-26). In 1828-30 he accompanied a scientific expedition sent to Egypt by the king of France. On his return to Paris he was made a member of the *Académie des Inscriptions* (1830), and a new chair of Egyptology was founded for him in the Collège de France. He died March 4, 1832. The MSS. which he left unpublished, extending to more than 2000 pages, were bought by the Royal Library at Paris for 50,000 francs. His posthumous works are *Lettres écrites d'Égypte et de Nubie* (1833; new ed. 1867); *Grammaire Égyptienne*, his principal work (3 vols. 1836-41); *Monuments de l'Égypte et de la Nubie* (5 vols. 1835-45); *Dictionnaire Égyptien en écriture hiéroglyphique* (1842-44); and *Monuments de l'Égypte et de la Nubie* (1844), the last work being afterwards continued and completed under the superintendence of Rougé.

**Champollion-Figeac**, JEAN JACQUES, an archaeologist, brother of J. F. Champollion (q.v.), was born 6th October 1778 at Figeac. After holding at Grenoble the offices of librarian and professor of Greek, he was appointed in 1828 conservator of MSS. in the Royal Library in Paris; but after the February revolution was deposed from office by Carnot. In 1848 he was appointed librarian of the palace of Fontainebleau. Besides the *Antiquités de Grenoble* (1807) and *Recherches sur les patois de France* (1809), his chief works include the *Annales des Lagides* (2 vols. 1819; supplement, 1821), *Les Tournois du Roi René* (1827-28), and numerous publications of French historical documents. After the death of his younger and more celebrated brother, Champollion-Figeac prepared, with the help of his MSS., *L'Égypte ancienne et moderne* (1840) and *L'écriture démotique égyptienne* (1843). Along with his son Aimé he wrote the text to Silvestre's *Paléographie universelle* (4 vols. 1839-41). He died 9th May 1867.—**AIMÉ** (1812-94) wrote on the Dukes of Orleans, Francis I., and *Les Deux Champollion* (1888).

**Chance** (through the French from Low Lat. *cadentia*), in its original and strict meaning, may be defined as that which determines the course of events, in the absence of law, ordinary causation, or providence. Strictly speaking, it is an idea which few would now be disposed to admit as corresponding to anything which really exists; the religious mind excluding it as inconsistent with the belief in the divine government, and the philosophical mind rejecting it as inconsistent with a recognition of universal laws of causation. As a word, however, it has always been, and always will be popularly accepted; and its use is correct so far as we overlook, or choose for the moment to throw out of view, the more universal connection of events, and regard them as their emergence, on

a superficial view, appears to be determined. It is clear that chance, being only legitimate as an expression in popular parlance, is a term which is much too indefinite to admit of any kind of measurement. What is sometimes called the *Doctrine of Chances* is more properly the *Theory of Probabilities*, and will be dealt with under the head of **PROBABILITY**. For games of chance, see **GAMING**.

**Chancel** (Lat. *cancellus*, 'a screen'). The chancel, choir, or eastern part of a church was often separated from the nave by a screen of lattice-work, so as to prevent general access thereto, though not to interrupt either sight or sound. As it was in this part of the church that the service was always performed previous to the Reformation, the clergy were held to have a special right to it, in return for which its repairs in general still fall on the impropriator, rector, or vicar, and not on the parish. The chief pew in the chancel belongs to the rector or impropriator, but the disposal of the seats in the church, with this exception, belongs to the ordinary, or, practically, to the churchwardens, to whom the authority of the ordinary is delegated. No monument, moreover, can be set up without the ordinary's consent. And where the freehold of the chancel vests in a lay impropriator, nevertheless the right of possession in it for public worship vests in the minister or churchwardens, so that they cannot be excluded from it, nor be charged with trespass for making a door into it from the churchyard. The term chancel is usually confined to parish churches which have no aisles around the choir, or chapels behind it or around it; and in this case the chancel and the choir have the same signification. In small churches which have no constructional chancel, the space within the altar rails is sometimes called by this name, but is more strictly styled the 'sanctuary.' But in larger churches there are sometimes chancels at the ends of the side aisles, and this whether the choir has the character of a choir in the larger sense, or of a chancel. See **CHURCH**.

**Chancellor** (Lat. *cancellarius*). It is said that the chief notary or scribe of the Roman emperor was called chancellor, either because he was intrusted with the power of obliterating, *cancellare*, or crossing out (*cancellare*, 'to make lattice-work') such expressions in the edicts of the prince as seemed to him to be at variance with the laws, or otherwise erroneous; or (more probably) because he sat *intra cancellos*, within the lattice-work or railings (*cancelli*) which were erected to protect the emperor from the crowding of the people when he sat in judgment. Neither the title nor the office of chancellor is at all peculiar to England. The chancellor of France (Chancelier de France) from a very early time was an officer of state of great power and dignity, under whom several other officers, bearing also the title of chancellor, were employed in the administration of justice and in the defence of the public order. The office was abolished at the Revolution; and though it was restored by the Bourbons, many of the functions of the old chancellor were transferred to the minister of justice, and have ever since been held by him.

In most of the other countries of Europe there are officers of state who bear this or analogous titles, though their powers and duties are very various. In mediæval Germany the archbishop and elector of Mainz was Arch-chancellor of the Holy Roman empire, and appointed a Vice-chancellor. The chief functionary in the Austrian empire had often been termed chancellor; and on the reconstitution of the German empire, Prince Bismarck was made 'Chancellor of the Empire' (*Reichskanzler*).

The Russian minister of Foreign Affairs was sometimes called Vice-chancellor. In the United States Chancellor is the title of the chief judge of the Court of Chancery (q.v.), in a few states where such a court still exists. Besides these state-chancellors, there were officers in many other capacities to whom the title was given. Every bishop has his chancellor in the Church of Rome, and there are still chancellors of cathedrals, dioceses, universities, orders of knighthood, &c. It is usually said that the existence of the office in modern states is due to the influence exercised by the Roman imperial constitution, through the church, the profession of the law being generally exercised by ecclesiastics; and it is for this reason, probably, that the bishop and the king are furnished with officers bearing the same title, and exercising analogous functions.

**LORD CHANCELLOR.**—Soon after the Norman Conquest the English chancellor became a judicial officer of high rank (see CHANCERY), and a confidential adviser of the sovereign in state affairs. Being charged with the supervision of charters and other instruments, he obtained the custody of the Great Seal. The office of chancellor or Keeper (q.v.), which in 1576 was declared to be exactly the same, is created without writ or patent, by the mere delivery of the Great Seal. The chancellor, if a baron, takes precedence of every temporal lord not a member of the royal family, and of all bishops except the Archbishop of Canterbury. To slay the chancellor is treason. The chancellor is a privy-councillor by his office, and prolocutor, or speaker of the House of Lords, by prescription; in the latter capacity he occupies the Woolsack (q.v.). Though the form in which his tenure of office is terminated is by the resumption of the Great Seal by the sovereign, the chancellor is now always a cabinet minister, and resigns office with the party to which he is attached. He has the appointment of all justices of the peace throughout the kingdom, but this privilege he exercises generally on the recommendation of the lord-lieutenants and local authorities. But the most important, and, as it now seems, somewhat anomalous branch of his patronage, arises out of his having been originally an ecclesiastic. Though the last bishop who held the office was John Williams, Archbishop of York, who was Lord Keeper from 1621 to 1625, the chancellor still continues to be patron of a large number of crown livings (though in 1863 about 300 were sold to augment the incomes of those sold and those retained), and visitor of all hospitals and colleges of the king's foundation. As representing the paternal character of the sovereign, again, the chancellor is the general protector of all infants, idiots, and lunatics, and has the supervision of all charitable uses in the kingdom. His jurisdiction 'in lunacy' is committed to him by special delegation from the sovereign. As regards his judicial patronage, the arrangement is, that the chancellor appoints in general all the judges of the superior courts, except the chief-justice, who is nominated by the prime-minister of the day. He also appoints the judges of the county courts, and various subordinate officers. All these functions the chancellor performs in addition to his extensive duties as a judge in the House of Lords, the Privy-council, the Court of Appeal, and the Chancery Division of the High Court of Justice. Objection has often been taken to the combination of judicial and political offices in the same person, but the proposal to appoint a minister of justice has not yet found favour. The salary of the chancellor is £10,000 a year, and he has an annuity of £5000 on retiring from office.

Among the notable Lord Chancellors of England have been Cardinal Wolsey (1515), Sir Thomas

More (1529), Bishop Gardiner (1553), Sir Francis Bacon (1617), Hyde, Earl of Clarendon (1660), Ashley, Earl of Shaftesbury (1672), Lords Jeffreys (1685), Hardwicke (1737), Thurlow (1778), Eldon (1801, 1807), Erskine (1806), Lyndhurst (1827, 1834, 1841), Brougham (1830), Cranworth (1852, 1865), Chelmsford (1858, 1866), Campbell (1859), Westbury (1861), Cairns (1868, 1874), Hatherley (1868), Selborne (1872, 1880), Halsbury (1885, 1886, 1895-1905), Herschell (1886, 1892), Loreburn (1905), Haldane (1912, 1924), Birkenhead (1919). See Campbell's *Lives of the Chancellors* (1845-47), corrected and continued by Atlay (2 vols. 1907-8).

The office of Chancellor of Scotland was abolished at the Union, a keeper of the Great Seal (q.v.) being appointed. The English chancellor is described as Lord High Chancellor of Great Britain and Ireland, but in Scotland has scarcely any jurisdiction, and in Ireland there was a separate chancellor.

**CHANCELLOR OF A CATHEDRAL** is an officer who formerly had charge of the chapter library, custody of the common seal, superintendence of the choir practices, and headship of the cathedral schools; sometimes being also visitor of all church schools in the diocese. Hence he was often styled *Scholasticus* or *Capischolius* (= *Caput Scholæ*). These functions are now generally in abeyance.

**CHANCELLOR OF A DIOCESE** is, as legal adviser to the bishop, an ecclesiastical judge, uniting the functions of vicar-general and official principal, appointed to assist the bishop in questions of ecclesiastical law, and hold his courts for him. By an act of Henry VIII. it is provided that he may be a layman, whether married or single, provided he be doctor of the civil law, lawfully create and made in some university. By the canons of 1603 he must be a bachelor of law, at the least, or a master of arts. There are certain cases, however, in which the bishop must sit in person.

For other Chancellors, see UNIVERSITY, EX-CHEQUER, LANCASTER (DUCHY OF).

**Chancellor, RICHARD**, a daring English seaman, who seems to have been brought up in the household of the father of Sir Philip Sidney, and was chosen in 1553 as captain of the *Bonaventure* and 'pilot-general' of Sir Hugh Willoughby's expedition in search of a North-east Passage to India. The ships were parted in a storm off the Lofoden Islands, and Chancellor, after waiting seven days at Vardöhus, the rendezvous that had been agreed upon, proceeded alone into the White Sea, and travelled thence overland to the court at Moscow, where he was very hospitably treated, and was able to conclude a treaty giving freedom of trade to English ships. His interesting account of Russia was published in Hakluyt's *Navigations*. Next spring Chancellor rejoined his ship and returned to England, where his hopeful reports led to the establishment soon after of the Muscovy Company. In the summer of 1555 he made a second voyage in the *Bonaventure* to the White Sea, and was at Moscow once more in the succeeding winter. In July 1556 he set sail on his voyage homewards, but on 10th November was lost in the wreck of his ship in Aberdour Bay off the Aberdeenshire coast.

**Chancellorsville**, a post-station of Spottsylvania county, Virginia, near the south bank of the Rappahannock, 11 miles W. of Fredericksburg. In a desperate battle here, May 2 and 3, 1863, General Lee defeated the Federal forces under Hooker. The Confederates, however, suffered a severe loss in Stonewall Jackson (q.v.), who was accidentally wounded by his own men.

**Chance-medley** and **Chaud-medley** are law expressions, which practically both mean the

same thing, that a particular homicide was justifiable because it was done in the hot blood caused by an unprovoked assault. The phrase has no reference to homicide by accident. See MAN-SLAUGHTER, SANCTUARY.

**Chancery**, the office of a chancellor or ambassador; a place in which writs, &c. are prepared and formally recorded. In England the Chancery was in early times the office in which writs and forms of process were prepared; some of these forms being kept in the Hanaper or hamper, and some in the Petty Bag. When the chancellor became a judicial officer of the first rank, the COURT OF CHANCERY exercised a very wide jurisdiction. The court could not maintain its hold on criminal cases, or on civil cases in which the common-law courts could do adequate justice; but the equitable jurisdiction of the court was established, after a keen struggle with the common lawyers. The assistance of the chancellor, as 'keeper of the king's conscience,' was invoked in cases where the common law might work injustice. A trustee, for example, was in law the owner of the trust property, but the Court of Chancery, which acted *in personam*, would compel him to render an account of his trust to the beneficial owner. This power to enforce equitable claims gave the court an administrative jurisdiction which was used for the protection of infants, married women, mortgagors, &c. The prejudice of the common lawyers against the court was due to the fact that its extensive powers were exercised at the discretion of the chancellor, and not according to settled rules. So late as the time of Charles II., Shaftesbury was thought to be a good chancellor, though he was not a lawyer. A succession of eminent chancellors, from Lord Nottingham to Lord Eldon, developed the rules of equity into a logical system. They did so, it must be admitted, at the expense of unfortunate suitors; and the Court of Chancery became a byword for delay and expense. Some of the evils satirised, and somewhat exaggerated, by Dickens in *Bleak House* (1853) have been removed by modern legislation.

The judges of the Court of Chancery were the Lord Chancellor, the Master of the Rolls (originally a subordinate officer, but afterwards an independent judge), a Vice-chancellor added in 1813, and two more Vice-chancellors added in 1841, when the equity business of the Court of Exchequer was transferred. Two Lords Justices of Appeal were added in 1851. On the passing of the Judicature Acts the inconvenient and indefensible distinction between courts of equity and law was abolished, and the judges of the Court of Chancery became members of the Court of Appeal, or of the Chancery Division of the High Court of Justice.

Among the officers of the Court of Chancery were the MASTERS IN CHANCERY, whose office is now abolished, their duties being for the most part assigned to the chief-clerks in the Chancery Division. The office of Accountant-general is also abolished, and His Majesty's Paymaster-general is charged with the duty of accounting for funds 'in Chancery'—i.e. for cash and stocks standing in the account of any cause or matter before the court; the total funds are now very much smaller than formerly. The falling-off indicates that matters in Chancery are now more or less expeditiously disposed of. The dormant and unclaimed Chancery funds are mostly in very small sums. Under an Act of 1872, unclaimed balances are transferred to the National Debt Commissioners, but the Consolidated Fund is liable in respect of any claim on these balances.

In various British colonies Courts of Chancery have been established, and the distinction between courts of law and equity has been preserved. But

in the colonies and the United States, as in England, the 'fusion of law and equity' has been effected by legislation. The anomalies of the old system have been removed; but many of the distinctive doctrines and rules of the Court of Chancery remain. In several of the original thirteen states there are distinct Courts of Chancery, but in most of the United States equity powers have been conferred on the higher law-courts, and the principles of equity are administered therein. By the United States constitution and several Acts of Congress, equity powers commensurate with those of the Court of Chancery in England were conferred on the Federal Courts.

The CHANCERY OFFICE, in Scotland, is an office in the General Register House at Edinburgh, managed by a director, in which all royal charters of novodamus, patents of dignities, gifts of offices, remissions, legitimations, presentations, commissions, and other writs appointed to pass the Great and Quarter Seals, are recorded. Prior to 1874 a great number of royal charters by progress passed through this office; and this is still done with regard to precepts from Chancery in favour of heirs in crown holdings. It is the duty of the director to keep a record of the decrees of service pronounced in favour of heirs by the Sheriff of Chancery, who holds a special court in Edinburgh for considering such petitions, and to send printed indexes of his record to the sheriff-clerks in the various counties. The record kept by the director also includes the decrees of service pronounced in the different sheriff-courts, and of these the director is bound to furnish extracts. See SEAL.

**Chancre.** See SYPHILIS.

**Chanda**, chief town of a district of India, on the south-west frontier of the Central Provinces, 90 miles S. of Nagpur. Its stone battlemented walls are 5½ miles round, and 20 feet high. It produces silk, cotton, and brass ware. Pop. 20,000.

**Chandausi**, a town of the United Provinces of India, 27 miles S. of Moradabad, exporting cotton, sugar, and hemp; pop. 22,000.

**Chanderi**, a town of Central India, 105 miles S. of Gwalior. It is now an insignificant place, but its fort and many ruined buildings attest its strength and splendour in former times, when it is said to have contained 14,000 stone houses (not to speak of mosques), and 360 caravanserais.

**Chandernagore** (properly *Chandan-nagar*, 'city of sandalwood'), a French city, with a scanty territory of about 3½ sq. m., on the right bank of the Hugli, 22 miles above Calcutta by rail. Established in 1673, the place for a while rivalled Calcutta; now, through the gradual silting up of the river, it has lost most of its commercial advantages, and has little external trade. It is the seat of a French sub-governor, with a few soldiers, and has in all a population of 25,000, including some 10,000 British. The town was bombarded and captured by the English in 1757, restored in 1763, twice retaken, and finally restored to the French in 1816.

**Chandler, RICHARD**, a learned classical archaeologist, was born at Elson, Hants, in 1738, and educated at Winchester and at Queen's and Magdalen colleges, Oxford. His first important work was *Marmora Oxoniensia* (1763), an elaborate description of the Oxford marbles. He afterwards travelled through Greece and Asia Minor, with Revett, architect, and Paus, a painter, at the expense of the Dilettanti Society, to examine and describe the antiquities. The materials collected were given to the world in the following publications: *Ionian Antiquities* (1769), *Inscriptiones Antiquae* (1774), *Travels in Asia Minor* (1775), and *Travels in Greece*

(1776). Chandler was made D.D. in 1773, and afterwards held preferments in Hants and at Tilehurst, near Reading, in Berks, where he died 9th February 1810.

**Chandler, SAMUEL**, an English Nonconformist divine, born at Hungerford in 1693, became minister of a Presbyterian church at Peckham, and preached at the Old Jewry from 1726 until his death in 1766. He was an industrious writer, and published especially a large number of works relating to the deist controversy and to catholicism.

**Chandor**, a small town with a famous fort, in Bombay province, 40 miles NE. of Nasik.

**Chandos**, a great English family, descended from a follower of William the Conqueror. Sir John, who fought at Crécy, saved the Black Prince's life at Poitiers, and was Edward III.'s lieutenant in France and Constable of Guienne, died of wounds received in battle in 1370. See Life by Fillon (1856). The last representative in the direct male line was Sir John Chandos (died 1428), whose sister married one Giles Brydges. Their descendant, Sir John Brydges, was lieutenant of the Tower under Queen Mary, and was created Baron Chandos in 1554. James Brydges (1673-1744), eighth Lord Chandos, sat in parliament for Hereford from 1698 to 1714, and was created Duke of Chandos in 1719. The lucrative post of paymaster of the forces abroad (1707-12) supplied means for building a palace at Canons, near Edgware, which cost £200,000, but was torn down at the duke's death. Here Handel lived two years, and produced 'Esther.' In 1796 the title passed by marriage to the Grenvilles, till 1889 the Dukes of Buckingham and Chandos. See Memoir of first Duke by J. R. Robinson (1893).

**Chandpur**, a town of British India, in the United Provinces, 19 miles S. of Bijnaur; pop. 12,000.

**Chandragupta**. See SANDROCOTTUS.

**Changarnier, NICOLAS ANNE THÉODULÉ** (1793-1877), French general, born at Autun, was educated at Saint-Cyr, and went in 1830 to Algeria, where for eighteen years he saw all the active service there was to be seen. On the proclamation of the Republic in 1848 he acted as provisional governor-general of Algeria, but returned to Paris to take command of the garrisons of Paris and of the National Guard. He did much to check the outbreaks of the anarchist party during 1849. In the Legislative Assembly he held a sort of neutral position between the Orléanists and the Legitimists, whilst opposing the Bonapartist party. At the *coup d'état* in December 1851, after being imprisoned in Ham, he went into exile till the Franco-Prussian war, when he offered his services to Napoleon III. He was in Metz with Bazaine, and, on its capitulation, retired to Brussels. He returned to France in 1871, entered the Assembly, and assisted M. Thiers in reorganising the army. See Life by Comte d'Antioche (1891).

**Chang-Chow**, a city of China, in Fo-kien, 28 miles W. by S. of Amoy, its port. It is a centre of the silk trade, and has iron-works, brick-works, and sugar factories. Pop. estimated at 1,000,000.

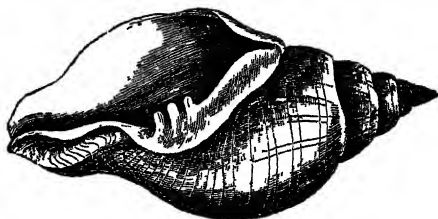
**Chang-Chow**, a city of China, in Kiang-su, about 50 miles E. by S. of Nanking; pop. 360,000.

**Changeling**. It was at one time a common belief that infants were sometimes taken from their cradles by fairies, who left instead their own weakly and starveling elves. The children so left were called *changelings*, and were marked by their peevishness, and their backwardness in learning to walk and speak. As it was supposed that the fairies had no power to change children who had been christened, infants were carefully watched until that ceremony had been performed. This superstition

is alluded to by Shakespeare, Spenser, and other poets, and Luther's *Table-talk* proves him a very firm believer. See Sikes's *British Goblins* (1880).

**Chang-Sha**, a city of China, capital of the province of Hu-nan, on the Siang-kiang, 50 miles S. of its mouth in Lake Tong-ting-hu. It is a seat of the silk industry. Pop. 535,800.

**Chank-shell** (*Tsjanka*), the popular name of the shell of several species of Turbinella, a genus of (Prosobranchiate) Gasteropod molluscs, natives



Chank-shell.

of the East Indian seas. These shells (especially *T. rapa* and *T. pyrum*) are obtained chiefly on the coasts of the south of India and Ceylon, and form a considerable article of trade to Calcutta. They are sliced to make bangles and anklets for Hindu women. The shell is a sacred symbol, and the god Vishnu is represented with one in his hand. A specimen opening to the right is especially venerated.

**Channel, THE ENGLISH** (*La Manche*, 'Sleeve,' of the French, and the *Mare Britannicum* of the Romans), is the narrow sea which, since the glacial period, separates England and France. On the east, it joins the North Sea at the Strait of Dover, where it is narrowest, being only 21 miles wide from Dover to Cape Gris-Nez. From this strait it runs west-south-west for 280 miles, and joins the Atlantic Ocean at the Chops, with a breadth of 100 miles between the Scilly Isles and Ushant Isle. With an average breadth of 70 miles, it is 90 miles wide from Brighton to Havre; 60 miles from Portland Bill to Cape La Hague; 140 miles—its greatest breadth—from Sidmouth to St Malo; and 100 to 110 miles west of the latter line. It occupies 23,900 square geographical miles, and contains the Channel Isles, Ushant Isle, Isle of Wight, and many islets and rocks, especially off the coast of Brittany. It is shallowest at the Strait of Dover, where a chalk ridge at the depth of twelve to thirty fathoms joins England and France. West of this, the average depth of the central portion is thirty fathoms, with hollows from forty to sixty-two fathoms deep. The English coast-line of the Channel is 390 miles long, and the French coast-line is 570 miles long. Westerly winds prevail, and the current, though imperceptible, is always from west to east. The English Channel abounds in fish, of which the chief are pilchard, mackerel, and oysters. See CHANNEL TUNNEL.

**Channel Islands** (*Îles Normandes* or *Îles de la Manche*), a group of small islands in the English Channel, off the west coast of the Cotentin peninsula in NW. France. They formed part of the old duchy of Normandy, and all, save the Îles Chausey (French), near St Malo, have, since 1066, adhered to the British crown. Their combined area is over 75 sq. m.; total population (1861) 91,000, (1921) 89,600. The chief islands, which lie between 49° 10' and 49° 45' N., 2° 2' and 2° 41' W., are Jersey to the south (45 sq. m.; pop. 49,500), Guernsey to the west (24½ sq. m.; pop. 42,000), Alderney to the north (3 sq. m.; pop. 3100), Sark towards the middle (2 sq. m.; pop. 600). Alderney is 8½ miles from France, Jersey 14, Guernsey 28. Alderney is

55 miles S. of England (Portland Bill), Guernsey 74, Jersey 80. Guernsey lies some 16 miles SW. of Alderney, and the same distance NW. of Jersey, which is 31 miles S. of Alderney. Lesser islands and groups of rocks include Herm (320 acres), Jethou (44 acres), and Brecqhou (74 acres), between Guernsey and Sark; Lihou (38 acres), W. of Guernsey; Burhou and the Casquets, W. of Alderney; the Dirouilles, Ecréhous, and Minquiers, between Jersey and France. Jersey with its outlying rocks forms one *bailiwick*; Guernsey with all the remaining islands and islets forms another. The inhabitants are industrious and thrifty. While jealously guarding home rule, they are very loyal British citizens. Military service within the islands is compulsory, Jersey, Guernsey, and Alderney each having a royal militia. Owing to their exposed position and strategic importance—Alderney is 'the key of the Channel'—the islands have been fortified from early times. Martello towers were erected round the coasts to ward off invasion in the 17th or 18th century. Reefs, currents, and fogs often make navigation difficult or dangerous, but Guernsey and Jersey are in regular communication with Southampton and Weymouth. The spring tides rise nearly 40 feet in Guernsey, 40 feet in Jersey. The scenery is beautiful—charming lanes and picturesque coasts with cliffs, caves, and fantastic rocks. Although so near France, England, and one another, the Channel Islands have one and all preserved and developed marked peculiarities of their own in government, customs, language, fauna, flora, &c. To their climate, scenery, freedom, quaint institutions, and cheapness of living the Channel Islands owe their high reputation as a holiday resort and place of retirement or exile. The islands have produced many noted seamen, soldiers, marksmen, and golfers.

*History.*—The islands originally formed part of the Continent, from which, apparently, Guernsey (then embracing Sark, Herm, and Jethou) and Alderney were separated long before Jersey. There are many prehistoric stone monuments, locally called *pouquelayes*, and recent excavations have revealed valuable paleolithic remains. The Romans called Jersey *Cæsarea*, Guernsey *Sarnia*, and Alderney *Riduna*. The Christian religion was established in the islands in the 6th century by British and Breton missionaries—Saints Marcouf, Sampson, Helier, and Magloire in particular; and the Gallo-Roman hierarchy was centred at Dol. There is some evidence of a partial occupation of the islands by Saxon and Danish sea-rovers. Guernsey is named in the Edda, and arms of Viking character have been dug up there. The islands were probably used as depots in the conquest of Neustria by the Northmen. They continued subject to Brittany until 933, when with the Cotentin they were added to the duchy of Normandy. The institutions then introduced were those already established on the mainland of Normandy (q.v.). The feudal system, however, was only partially introduced. The parishes did not become manors—as happened in England after the Conquest—nor did the Norman seigneurs make a general practice of residing in the islands. They drew rents as absentee landlords from the allodial proprietors who, willingly or otherwise, accepted their protection. But these did not yield military service; and the island militia, when formed, adopted and preserved, till comparatively recent times, a parochial organisation. The 12th century is the beginning of the authentic history of these singular little communities, and of the ecclesiastic organisation already transferred from the see of Dol to that of Coutances. When Philip Augustus declared the duchy of Normandy forfeit (1204), the Channel Islands adhered to King John of England. Some of the seigneurs whose fiefs in

Normandy were confiscated then settled in Jersey, where they formed the chief notables and members of the local government. From the time of John to that of Henry VI., many attempts were made by France to conquer the islands. Guernsey was held by the French for some years during the 14th century, though finally reconquered by the English with help from Jersey. In 1461 Jersey itself was conquered, and was held by a French governor for about six years, being finally liberated early in the reign of Edward IV. by Sir R. Harliston. Henry VII. carried his repression of the aristocracy into the islands, where he curtailed the feudal jurisdictions. The Reformation took early and deep root in the Channel Islands, aided by a considerable immigration of exiled Huguenots from the mainland; but the Anglican ritual was not introduced without difficulty. In 1568 Elizabeth attached the islands to the diocese of Winchester. Other effects of Elizabeth's reign are the foundation of the college (grammar-school) of St Peter Port, in Guernsey, the grant of Sark to the Carterets of Jersey, and the improvement of the Castle of St Helier, in Jersey, which, like the Guernsey 'College,' still bears the name of the virgin queen.

During the reign of Charles I. Guernsey sided for the most part with the English parliament, Jersey with the crown. In the former island, however, Castle Cornet, which commands the harbour, held out for Charles until Jersey was conquered in 1651. Under the Commonwealth the Channel Islands continued to enjoy their old privileges, being specially excluded from the 'Instrument of Government,' and from the operation of the excise.

In the reign of Charles II. the Channel Islands were once more threatened by France, and the militia was improved and formed into regiments. The total population of the Channel Islands was then about 25,000. The reign of William III. witnessed the famous British naval victory of La Hogue, near Alderney, largely due to information conveyed to the admiral by a gentleman of Guernsey. The privilege of neutrality (granted 1482) was rescinded (1689), and the inhabitants entered upon a course of privateering, which made them, in the words of Burke, 'one of the naval powers of the world.'

In 1781 a semi-official landing—the last invasion by the French—took place in Jersey, headed by an adventurer named Macquart, styling himself Baron de Rullecourt. His defeat by Major Peirson, who fell in the engagement, has been rendered famous by Copley's picture in the National Gallery. Victor Hugo lived in exile in the Channel Islands from 1852 to 1870. At the beginning of the 20th century many French orders took refuge there.

*Administration.*—The bailiwicks of Jersey and Guernsey date from about 1290. Each has a lieutenant-governor—who represents the king, can veto legislation, and generally commands the forces—a crown-appointed bailiff, as chief civil and judicial officer, a royal court or *cour royale* (with judicial functions) including 12 jurats or judges, elected for life, and a legislative assembly called the States (*États*). The Channel Islands are not bound by acts of the imperial parliament unless specially named therein. Organic statutes of the states require ratification by the Privy-council. Alderney has its own states and court subordinate to Guernsey. Sark also has a subordinate court and local peculiarities of law and constitution; its seigneur retains certain old feudal rights. Jersey's constitution is more democratic than that of Guernsey, where the royal court exercises greater administrative powers. Jersey jurats are directly elected by the whole body of voters; Guernsey jurats by the États d'Élection, consisting of bailiff, jurats, people's deputies, constables, and

douzeniers Parochial affairs in the islands are managed by constables, assisted by centeniers, vingteniers, douzeniers, and other officers. Most offices are unsalaried.

*Language.*—The people, especially in Sark, Guernsey, and Jersey, adhere to their old Norman-French speech, a dialect of the *Langue d'Oïl*, once a literary language. Its best-known monument is the *Roman de Rou* of Wace, a native of Jersey, who wrote in the 12th century. In the 19th century it was revived by Georges Métivier, called the 'Guernsey Burns,' the compiler of a *Dictionnaire Franco-Normand* (1870), and Sir Robert Marett (1820–84), the author of many poems written in the Jersey form of the language. The French language, in its modern shape, is the official language of the states and of the law-courts, and only recently has the use of English been made optional. French services are held in many parish churches. English is gaining ground through the schools.

The basis of the local law is the *Grand Coutumier de Normandie* (see NORMANDY). There are many interesting survivals of feudal times, including the Clameur de Haro (q.v.), the system of land tenure and succession, manorial courts and the *Cour d'Héritage* (Jersey) or *Court of Chefs-plaids* (Guernsey and Sark), where homage is still done.

The cost of living in the Channel Islands is low; there is little poverty, and also little display of wealth. The inhabitants are free from English taxes, and the local taxation is light. Duties on wines, spirits, and tobacco are small in comparison with the corresponding English duties. Each bailiwick has its own budget and public debt, and its own methods of raising revenue—import duties, harbour dues, and the like. Nearly half the entire population is congregated in the Jersey and Guernsey capitals, St Helier (28,900) and St Peter Port (18,000), which are also the chief ports.

The climate is mild and sunny. The mean annual rainfall is 34 inches in Jersey, 36·5 in Guernsey; but the climate is not over moist, the soil being porous and evaporation rapid. The mean annual temperature of Jersey is 52° F.; of Guernsey, 50°. The range of temperature is very moderate; but the climate of Guernsey is rather more equable than that of Jersey. Frost and snow are rare. The autumns are very beautiful; and a second summer, called the *Petit Été de Saint Martin*, generally lasts from mid-October till mid-December. Flowering plants and shrubs are about a fortnight earlier in the spring than in England. The sunshine averages over five hours a day throughout the year.

In *Fauna* and *Flora* the islands differ strangely among themselves and from the adjacent coasts of France and England. Jersey and Alderney have moles and toads, Guernsey none. The black rat holds its own in Sark and survives in the other islands. Both Jersey and Guernsey have a vole peculiar to the island. Each of the larger islands has its own breed of cattle. The insect fauna and marine fauna (sponges, sea anemones, &c.) are rich, and, like the flora, suggestive rather of the Mediterranean than of the Channel. Plants indigenous and exotic, useful and ornamental, grow luxuriantly, the Guernsey lily being typical in splendour, the Jersey cabbage in size. Jethou boasts a yellow forget-me-not of its own.

*Geology.*—Most of the islands are composed of granitic rocks. Alderney is a mass of syenite, with hornblende, porphyry, and occasional sandstone. The structure of Guernsey is hard syenite to the north, and gneiss to the south. The geology of Jersey is more varied, presenting a mixture of metamorphic rocks, conglomerates, and sandstones, with syenites and quartzites. Shale and blown sand are also prevalent. Sark is composed of very hard syenite, with veins of greenstone

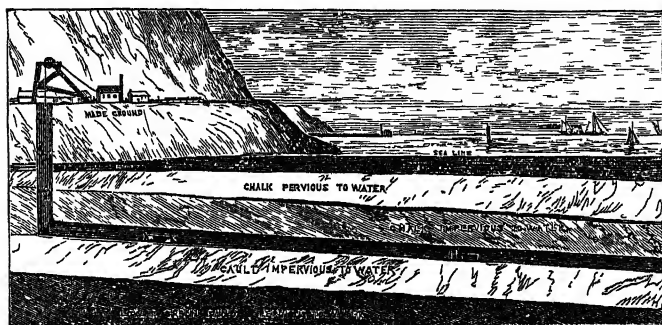
and felspar. Granite is quarried from all the islands, especially from Guernsey, Herm, and Mont Mado in Jersey, both for home use and for exportation.

*Industries and Production.*—The chief industry was fishing before the Newfoundland fisheries were opened up; then knitting of woollen garments such as *jerseys* and *guernseys*. After 1689 privateering, shipbuilding, and later smuggling and cooping, developed to a great extent. The leading industries are now agriculture, horticulture, and cattle-rearing. About half the total area is arable land. The soil is generally light, deep, and fertile. The holdings are nearly all small—farms of five to twenty acres. Seaweed (*vraic*) is gathered in vast quantities from the shores at certain seasons under strict regulations and is used as a fertiliser; it is also burned for its chemical products. In Jersey the principal crop is potatoes, an early harvest ensuring good prices, and enabling the same fields to be used for a second or even a third crop, such as barley, tomatoes, or turnips. Guernsey, with a less sunny exposure, specialises in tomato culture under glass, and also in floriculture, viticulture, and market-gardening. The chief cereals are oats and wheat. Much hay is grown, and there are relatively extensive areas of permanent grass. Jersey, Guernsey, and Alderney are all famous for breeds of horned cattle for dairy purposes (see CATTLE). Many are exported. The islands contain some 19,000 head of cattle. Other industries include granite-quarrying (especially in Guernsey and Alderney), fishing (cod, lobsters, conger eels, &c.), and catering for visitors. The chief exports are potatoes, tomatoes, stone, and flowers; principal imports are flour and corn, coal, and manure. The unit of land measurement is the *vergée*; 1 acre = 2½ Jersey vergées = 2½ Guernsey vergées. The Jersey lb. is somewhat greater than the English lb., but less than the Guernsey lb. Jersey uses English money, French silver and copper and bronze coins of its own; in Guernsey English money, French silver and local bronze coins are current, 8 Guernsey doubles almost equalling a penny.

See Ansted and Latham's *Channel Islands*, Bicknell's (1910), Le Quesne's *Constitutional History of Jersey* (1856), Tupper's *History of Guernsey* (1876), *Black's Guide*, Sine's *Prehistoric Times and Men of the Channel Islands* (1914), MacCulloch's *Guernsey Folk-lore* (1903), and Wimbush and Carey, *The Channel Islands* (1904). And see also the separate articles on Alderney, Jersey, Guernsey, and Sark.

**Channel Tunnel**, a projected tunnel under the English Channel, designed to provide continuous communication by rail between England and France. Historically, Channel tunnel schemes have taken two main forms: (1) tunnels consisting of built-up structures resting on the sea-bed; (2) tunnels bored through the ground under the sea. (1) Proposals of this nature were made by Tessier de Mottray in 1803, by Thomé de Gamond in 1833, and after 1850 by many others. The latest project of the kind was one of 1905. At no time, however, has any attempt been made to give actual effect to these plans. (2) Tunnels of the second kind are alone of practical importance. At the beginning of the 19th century a French engineer, Mathien, suggested the digging of a tunnel under the Straits of Dover to be used by stage-coaches and diligences, but the scheme, though favourably regarded for a time by Napoleon, never materialised. It fell to the railway era, and the great engineering feats which accompanied it, to lend practicality to the project. Thus, in 1856, and again in 1867, Thomé de Gamond in France submitted plans for a railway tunnel, while about the same time in England William Lowe was also engaged on the idea. The

joint plans of these engineers were subsequently adopted by an international committee and approved by the French Ministry of Public Works, but in 1870 the Franco-German war came to interrupt the scheme. In 1875, however, following



Section of the Bed of the English Channel, showing the proposed tunnel.

successful negotiations between the governments of France and Britain, experimental and working concessions were made to the Channel Tunnel Company in England, and to the French Submarine Railway Company in France. But in England rival companies also arose, and much discussion in parliamentary committees followed, with the result that in 1882 boring operations then in progress were suspended by government order, mainly on military grounds. On the French side the work of tunnelling also necessarily ceased. At this time a distance of something over a mile had been pierced on either side, from Sangatte near Calais, and from Shakespeare's Cliff near Dover. Since 1882 the project for a tunnel has from time to time been revived, but always without success. The circumstances of the Great War caused a renewal of interest in the scheme. Plans were then brought forward, and for these parliamentary sanction continues to be sought.

The tunnel it is now proposed to construct would be about 30 miles long, including 7 or 8 miles of land approaches. It would consist of two parallel tubes, 18 feet in diameter, lying at not less than 100 feet below the Channel bed. These tubes would be excavated by electric power, and cut entirely within the strata of the 'old gray chalk' (*crasse de Rouen*), which extends from shore to shore, and which, being impervious to water, is peculiarly favourable to the engineer. The tunnel, it is suggested, should be maintained under the authority of the British War Office, and so constructed as to allow of flooding in the case of military emergency. When completed it would be worked, pumped, and ventilated by electricity supplied from a station in Kent, 10 or more miles inland. The work, it is computed, would be finished in about five years' time, at a cost of some £32,000,000.

Advocates of a Channel tunnel point to the great economic advantages which would result from the linking up of Britain with the railway net of Europe. They stress, too, benefits to international goodwill and understanding. In Britain military inexperience has always been the capital argument against the scheme. Dangers to British morals, politics, commerce, and life generally have also been advanced. The strength of an insular tradition is the greatest barrier of all; for that reason Channel tunnel schemes have always been much less favourably regarded in Britain than in France.

**Channing**, WILLIAM ELLERY, a great American preacher and writer, was born 7th April 1780, at Newport, Rhode Island. He graduated at

Harvard in 1798, and in 1803 was ordained minister of a Congregational church in Boston, where his sermons soon became famous for their 'fervour, solemnity, and beauty.' Though never a Trinitarian, at first he had Calvinistic leanings, but

gradually drifted towards what is now known as Unitarianism, although the name itself was repugnant to him, and he would gladly have seen liberal theology growing naturally outwards from within the church herself. His famous sermon, preached at the ordination of the Rev. Jared Sparks in 1819, was a fearless and plain definition of the Unitarian position. It involved him in controversy, a thing which he naturally loathed. To the end of his life he preserved a devoutly Christian heart, shrinking with the delicate instinct of a pious nature from everything cold, one-sided, and dogmatic, whether Unitarian or Trinitarian. As late as 1841

he wrote, 'I am little of a Unitarian, have little sympathy with the system of Priestley and Belsham, and stand aloof from all but those who strive and pray for clearer light.' He had sympathy for social and political as well as purely religious progress, advocated temperance and education, and denounced war and slavery with more than his accustomed eloquence. In 1821 he received the title of D.D. from Harvard University, and next year he visited Europe, and made the acquaintance of several great English authors, such as Wordsworth and Coleridge, both of whom were strongly impressed in his favour. Coleridge said of him, 'He has the love of wisdom and the wisdom of love.' Among his most popular works were his *Essay on National Literature*, *Remarks on the Character and Writings of John Milton*, the *Character and Writings of Fénelon*, his essay on *Negro Slavery*, and that on *Self-culture*. Besides these, he wrote a variety of other essays and treatises, all characterised by vigour, eloquence, pure taste, and a lofty tone of moral earnestness. He died October 2, 1842, at Bennington, Vermont. His works were collected before his death in 5 vols. (Boston, 1841), to which a sixth volume was afterwards added. The American Unitarian Association (Boston) has reprinted the whole in a single cheap volume. See the memoir by his nephew, William Henry Channing (1848; new ed. 1880), and the more recent *Lives by Frothingham* (1887) and *Chadwick* (1903).

**Chansons de Geste**, long narrative poems, dealing with warfare and adventure, which were popular in France during the middle ages. *Gestes*, from the Latin *gesta*, signified, first, the deeds of a hero, and secondly, the account of these deeds; the family to which the hero belonged being spoken of as *gens de geste*. One of these poems, and that the greatest of all, was composed in the 11th century—namely, the *Chanson de Roland*, which is treated of in the article *ROLAND*. Most of the others were produced in the 12th and 13th centuries, only a few poems to which the name is strictly applicable having been written after the year 1300 A.D. They were mainly the work of *trouvères*, and were carried by wandering minstrels, *jongleurs* and *jongleresses*, from castle to castle, and from town to town. They are distinguished from the later Arthurian romances and from the Romans d'Adventures both by their matter and their form. Their subjects are invariably taken from French history, or from what passed as such, and they are written in verses of ten or

twelve syllables, arranged in *laissez*, or stanzas of irregular length, throughout each of which the same rhyme or assonance is repeated. In his introduction to the *Song of Roland*, M. Génin points out that it is the decasyllabic verse of the *Chansons* and not the Alexandrine (a form introduced in the 13th century) which is the true epic verse in French literature. A large number of these poems celebrate the exploits of the peers of Charlemagne, and form what is termed the Carolingian cycle, which includes the *Song of Roland*. But while the author of that poem depicts Charlemagne as on the whole a worthy and venerated sovereign, the aim of the later writers is to exalt the vassal nobles at the expense of the emperor, who is invariably presented in an odious or ridiculous light. 'The great emperor,' says M. Gêruez, 'pays for the misdeeds of his feeble successors; the monarchy of which he remains the representative has been degraded; consequently he is degraded along with it, to the profit of the feudal hero who is opposed to him.' The principal poems of the Carolingian cycle (setting aside the *Song of Roland*) are *Ogier le Danois*, *Renaut de Montauban*, *Raoul de Cambrai*, *Huon de Bordeaux*, *Les Saisnes*, *Doon de Mayence*, *Gérard de Viane*, and *Hugues Capet*. *Ogier* is a typical chanson containing more than 13,000 lines, written by Raimbert of Paris in the first half of the 12th century. It tells how the vassal noble Ogier, after vainly seeking reparation for the death of his son, who has been slain by a son of Charlemagne, is pursued by the emperor into Italy and captured after a heroic resistance; how, saved from death by the intervention of Archbishop Turpin, he lives in concealment until the Saracens invade France, and the emperor is forced to implore his aid; how he yields at last to repeated entreaties, frees the land from the heathen, marries a princess, and lives happily to the end of his days. The style of the poem is clear and vigorous, the characters stand out vividly, the narrative interest is considerable, and the hero rivets the sympathy of the reader. The *Voyage de Charlemagne à Constantinople*, which belongs to the same cycle, offers a strong contrast to *Ogier*. It is a mock-heroic piece, full of broad and extravagant pleasantries, and is rather a long fabliau than a true Chanson de Geste. Among the other chansons which have come to light, the most remarkable are *Garin le Loherain* (ascribed to Jean de Flay), which takes us back to the times of Charles Martel and Pepin, and describes the feud between the Counts of Metz and the Counts of Boulogne; *Amis et Amiles*, and its sequel *Jourdains de Blavnes*; *Berte aus grans Piés*, one of the most graceful of all; *Gérard de Roussillon*; *Fierabras*; *Aliscans*, which relates the wars of William of Orange with the Saracens; and *Antioche*, which gives a singularly animated account of the siege of Antioch by the crusaders, one of whom is supposed to have written the original version of the poem. The last forms one of the series known as *Le Chevalier au Cygne*, which is concluded with *Baudouin de Sebourg*.

The *Chansons de Geste* are not, strictly speaking, epics, though they are frequently described as such. They are rather the material out of which a genuine epic, such as the *Iliad* or the *Nibelungenlied*, might have been wrought had a great poet appeared to extract the gold from the dross, and mould a work of art out of this rich mass of national legend. There has been a natural tendency to overestimate their worth on the part of those by whom they have been exhumed and edited. Their literary merit, however, is incontestable, and their historical interest is very great. They faithfully reflect the beliefs and customs of the ages in which they were written; they abound in

spirited battle-pieces, and contain not a few passages marked by deep and simple pathos. Their plots are somewhat monotonously alike. The strength of their writers does not lie in invention, but in fresh and vivid and sometimes (as in the picture of the sack of the abbey in *Kuoul de Cambrai*) terribly realistic descriptions. Their verse is by no means unmelodious, and their style is rich in picturesque and poetical epithets.

See Joseph Bédier, *Les Légendes épiques recueillies sur la formation des Chansons de Geste* (4 vols. 1913); Léon Gautier, *Les Épopées Françaises* (2d ed. 1878-94), and in Petit de Julleville's *Littérature Française*; *Histoire Poétique de Charlemagne* and other works, by G. Paris (1866); C. d'Héricault, *Essai sur l'Origine de l'Épopée Française* (Frankfort, 1860); Génin's introduction to the *Chanson de Roland* (1850); the series, *Les Anciens Poètes de la France*, which MM. Guesnard and Michelant began to issue in 1858; Fauriel, *Épopée Chevaleresque au Moyen Âge*; P. Rajna, *Le Origini dell' Epopea Francese* (1884); C. Nyrop, *Storia dell' Epopea Francese* (1888); G. Kurth, *Histoire Poétique des Mérovingiens* (1893); works by Paulin Paris; Petit de Julleville; papers in *Romania*, and the publications of the Société des Anciens Textes Français.

**Chant**, in Music, is the name applied to the short tunes used in the English Church since the Reformation for the psalms and, less properly, the canticles. The adaptation of the form to the structure of the psalms is obvious. Its distinguishing point is that each section is composed of a reciting note of indefinite length, according to the number of words sung to it, followed by a few notes in regular time, called the Mediation or Termination. The tunes were originally derived, as the name indicates, from the Canto Fermo, or Plain Song of the Roman Church, also called Gregorian Tones. These Gregorian tones were preceded by a still earlier form, the Ambrosian Chant, which was the first attempt to systematise the traditional music of the Christian church, carried out by Ambrose, Bishop of Milan, in the 4th century. Of this, next to nothing is now known, the statements of musical historians being founded on slender authority, and curiously at variance. If any fragments still remain in the services of the Roman Church, they cannot be distinguished from the later Gregorian music (see PLAIN SONG, INTONING). There has been a revival in the present day of the old Gregorian chants, which are all 'single,' that is, composed of only two sections, and adapted to a single verse, and have the additional feature of an introductory 'intonation' of two notes before the first reciting note; but many consider these of mainly antiquarian interest. The double chant, adapted to a couple of verses, and hence more suitable for antiphonal singing, dates from the time of the Restoration; and in later days there have been added quadruple chants. The repertory has been enriched by almost every English composer of the last three centuries, famous or obscure. The objectionable 'florid' style has now happily gone out. On the subject of 'pointing' the psalms—i.e. indicating the division of the verses to accord with the chant, there is great diversity of usage, and no authoritative system. Chanting is gaining ground in the Presbyterian and other churches.

See Helmore's *Psalter Noted and Plain Song*, the *Cathedral Psalter*, and Ouseley and Monk's and Oakeley's *Psalters*.

**Chantal**, MME. DE, founder of the order of the Visitation. See FRANCIS OF SALES, SÉVIGNÉ, and the Life by H. Brémond (1912).

**Chantibun**, or CHANTABON, a port of Siam, near the mouth of the Chantibun River, has valuable ruby mines, and exports sapphires and white pepper; pop. 7000.

**Chantilly**, a town in the French department of Oise, 26 miles NNE. of Paris. One of the most beautiful places in the vicinity of the capital, and the headquarters of French horse-racing, it attracts immense numbers of visitors. Apart from its natural beauty, it is interesting as the place where the Great Condé spent the last twenty years of his life in the society of Molière, Boileau, Racine, La Fontaine, and Bossuet, and where his cook killed himself, on the occasion of a royal visit, because the fish failed to arrive. His magnificent chateau was pulled down at the Revolution of 1793, but was rebuilt by the Duc d'Aumale, who bought back the estate in 1872, and who in 1886 presented it to the French Institute, with its priceless art collections, its celebrated stables for 250 horses, and its 16th-century 'Petit Chateau', one of the finest specimens of Renaissance architecture in France. The grounds, park, and forest, 6050 acres in area, are of great beauty—truly a princely gift, its value nearly £2,000,000. The manufacture of silk pillow-lace, or *blonde*, so famous in the 18th century, is all but extinct. Pop 5000.

**Chantrey**, SIR FRANCIS LEGATT, an eminent English sculptor, was born at Jordanthorpe, in Derbyshire, on 7th April 1781 (not 1782, as has been generally said). His father, who was a carpenter, and rented a small farm, died when Chantrey was only twelve years of age, leaving the mother in narrow circumstances. The boy was in 1797 apprenticed for seven years to a carver and gilder in Sheffield called Ramsay. It was in these humble circumstances that Chantrey acquired the rudiments of art. He began to model in clay and to draw portraits and landscapes in pencil. His efforts were encouraged by J. R. Smith, the mezzotint engraver: he acquired some local celebrity as a portrait painter, and in 1802 was enabled to cancel his indentures with Ramsay. Soon afterwards he came to London, and studied for a short time in the schools of the Royal Academy, employing himself also in wood-carving. In 1805 he received his first commission for a marble bust, that of the Rev. J. Wilkinson, for the parish church, Sheffield. This was followed by commissions for colossal busts of admirals for Greenwich Hospital; and having in 1807 married a cousin with some property, his early struggles were over. In 1808 he was successful in the competition for the statue of George III. for Guildhall, and during the rest of his life he was largely employed on works of portraiture. The features of the most celebrated men of his time were transcribed by his chisel, and it was in this class of severely realistic work that he most uniformly excelled; though probably his most widely known statue-group is that of the 'Sleeping Children' in Lichfield Cathedral, a subject—its design has been attributed, in error, to Flaxman—in which the real and the ideal seem to meet and blend. His busts include those of James Watt, Wordsworth, and the two very celebrated heads of Sir W. Scott, which he executed in 1820 and 1828. Among his statues are Sir Joseph Banks (1827), Sir John Malcolm (1837), Francis Horner, William Pitt, George IV., and the Duke of Wellington; while his head of Satan and his 'Plenty' designs for Sheaf House, Sheffield, and his 'Penelope' at Woburn, are examples of his rare treatment of ideal and imaginative subjects. In 1816 Chantrey was elected an Associate, in 1818 a Member of the Royal Academy; and in 1835 he was knighted by William IV. Allan Cunningham, the poet, was his secretary and superintendent of works from 1814 till the date of Chantrey's death, 25th November 1841. The sculptor acquired by the practice of his art a fortune of about £150,000; and bequeathed to the Royal Academy, with liferent to his widow, who died in 1875, a sum in Consols yielding £2000

to £3000 annually, of which the president was to receive £300 and the secretary £50, and the rest was to be devoted to the purchase of works of art executed in Great Britain. The collection is now in the Tate Gallery.

See G. Jones, *Sir Francis Chantrey* (1849); J. Holland, *Memorials of Chantrey* (1851); Fish, *Chantrey and his Bequest* (1904).

**Chantry**, a term applied alike to endowments to provide for the chanting of masses, and to the chapels in which such masses are celebrated. These endowments were commonly made in the form of testamentary bequests, the object being to insure the erection of a chapel near or over the spot where the testator was buried, and to remunerate the priests for saying masses in it for the repose of his soul, or of the souls of others named in his will. Many such chantry chapels are still to be seen in English parish churches; but they were more common in abbeys and monastic establishments, in which it was deemed a privilege to be buried, and where some such offering to the brotherhood was in a measure the price of sepulture. These chapels, which have generally the tomb of the founder in the middle of them, are separated from the aisles or nave of the church by open screen-work. Sometimes, again, they are separate erections, projecting from the church externally; but in cathedrals and the larger churches they are generally constructed within the church, often between the piers. Many chantries are lavishly enriched with sculpture and tracery of all descriptions, and some are adorned with gilding and painting. Chantry priests seem often to have been bound to instruct the poor in grammar and to teach song-schools.

**Chanty**, or SHANTY, is a rude song sung by sailors to keep time as they haul lines. Usually one man, the chanty-man, sings a line, and the others follow with a refrain. The chanty-man will supplement the traditional words by improvising as many additional lines as are required. Since the middle of the 19th century, as sailing-ships have been superseded by steamers, chanties have tended to disappear.

**Chanute**, a city of Kansas, 110 miles SSW. of Kansas City, has oil and gas wells, with refining and other industries; pop. 10,000.

**Chanzy**, ANTOINE EUGÈNE ALFRED (1823-83), born at Nouart (Ardennes), served mainly in Africa till 1870, when at the head of the second Army of the Loire he resisted the invaders inch by inch with stubborn valour till the great six days' conflict about Le Mans. He sat in the National Assembly, was governor-general of Algeria (1873-79), a life senator, and ambassador to Russia (1879-81).

**Chaos** signified, in the ancient cosmogonies, that vacant infinite space out of which sprang all things that exist. Some poets make it the single original source of all; others mention along with it Gaia, Tartaros, and Eros. By some also only the rough outlines of heaven and earth were supposed to have proceeded from Chaos, while the organisation and perfecting of all things was the work of Eros. Still later cosmogonists, such as Ovid, represent it as that confused, shapeless mass out of which the universe was formed into a *kosmos*, or harmonious order. Hesiod makes Chaos the mother of Erebus and Nyx. In Gen. i. 1-2, after God created heaven and earth, the earth was yet 'waste and void' (*tōhū va-bōhū*), and darkness was upon the face of the deep' (*tēhōm*, the Chaldean *tuamat*). See ADAM AND EVE, CREATION.

**Chapala**, a lake of Mexico, on the high plateau of Jalisco, surrounded by steep, bare mountains. It has an estimated area of 1300 sq. m., contains many islands, and is traversed by the Río Grande de Santiago.

**Chap-books** are little stitched tracts written for the people, and sold by chapmen, or travelling pedlars, whose representative Autolycus is so vividly brought before our eyes by Shakespeare in *Winter's Tale*. The literary wares of the chapman were mostly ballads or other broadsides, but he also dealt in these stitched booklets. Popular literature has naturally become scarce on account of the vicissitudes to which it is subject, and few of the older chap-books exist at the present day. Samuel Pepys collected some of considerable interest which he bound in small quarto volumes and lettered *Vulgaria*. Besides these he left four volumes of chap-books of a smaller size which he lettered *Penny Merriments*, *Penny Witticisms*, *Penny Compliments* and *Penny Godlinesses*. The small quarto chap-books are the descendants of the black-letter tracts of Wynkyn de Worde, Copland, and other famous printers, and were probably bought from booksellers as well as from chapmen. With the 18th century came in a much inferior class of literature, which was printed in a smaller size, and forms the bulk of what is known to us now in collections of chap-books. These tracts were printed largely in Aldermary Churchyard, and afterwards in Bow Churchyard, as well as at Northampton, York, Newcastle-on-Tyne, Stokesley, Warrington, Liverpool, Banbury, Aylesbury, Durham, Birmingham, Wolverhampton, Coventry, Whitehaven, Carlisle, Worcester, Penrith, Cirencester, &c., in England; at Edinburgh, Glasgow, Falkirk, Paisley, Dumfries, Kilmarnock, Stirling, &c., in Scotland; and at Dublin. As ballads are frequently reduced versions of romances, so chap-books usually contain vulgarised versions of popular stories. The subjects of the chap-books are very various; first and foremost are the popular tales, such as *Valentine and Orson*, *Fortunatus*, *Reynard the Fox*, *Jack and the Giants*, *Patient Grissel*, *Tom Thumb*, and *Tom Huchathrift*; then come the lives of heroes, historical abridgments, travels, religious treatises, and abstracts of popular books like *Robinson Crusoe* and *Don Quixote*. Besides these there are the more modern inventions of hack writers. Dougal Graham (1724-1779), bellman to the city of Glasgow, was a popular writer who is supposed to have done much to give a special character to Scottish chap-book literature. Motherwell has styled him 'the vulgar Juvenal of his age.' His works were reprinted at Glasgow in 2 vols. in 1833.

The chap-books of the 17th century are valuable as illustrations of manners; but little is to be learned from those of the 18th century, which are altogether of an inferior character. An instance of this may be taken from the story of Dick Whittington. The earliest version of this tale which has come down to us is a small quarto tract entitled 'The Famous and Remarkable History of Sir Richard Whittington, three times Lord Mayor of London, who lived in the time of King Henry the Fifth in the year 1419, with all the remarkable passages, and things of note, which happened in his time: with his Life and Death.' It is without a date, but was probably published about 1670. In this the historical character of the subject is fairly kept up, although the dates are somewhat mixed, and to this the widespread folk-tale of the cat is added. In the later chap-book versions the historical incidents are ruthlessly cut down, and the fictitious ones amplified. The three chief points of the story are (1) the poor parentage of the hero, (2) his change of mind at Highgate Hill by reason of hearing Bow Bells, and (3) his good fortune arising from the sale of his cat. Now these are all equally untrue as referring to the historical Whittington, and the second is apparently an invention of the 18th century. In the 17th-century story we learn

that Whittington set out before daybreak on All-Hallows' Day, and before he got as far as Bunhill he heard Bow Bells ring out. Holloway replaced Bunhill in the later versions, and hence arose the myth connected with Whittington Stone on Highgate Hill.

Hannah More's Repository Tracts, and afterwards the publications of the Useful Knowledge Society, Chambers's *Miscellany of Tracts*, and the growth of cheap magazines, greatly reduced the popularity of chap-books; but Catnach, a London printer, kept up the supply in the early portion of the 19th century, and even now chap-books are still produced in England and elsewhere.

The influence of chap-books can never have been very great in Britain from the inferiority of their literary character, but not so in other countries, and the curious fact has been discovered that the Pastorales or Basque dramas owe their origin to the chap-books hawked about the country (see BASQUES).

For British chap-books, see J. O. Halliwell-Phillipps, *Notices of Fugitive Tracts and Chap Books and Descriptive Notices of Popular English Histories* (1849); John Ashton, *Chap-books of the Eighteenth Century* (1882); C. Hindley, *History of the Catnach Press* (1886); E. Pearson, *Banbury Chapbooks* (1890); W. Harvey, *Scottish Chap-book Literature* (1903); five of the most interesting of the old chap-books were reprinted in 1885 by the Villon Society, with introduction by Sir L. Gomme and H. B. Wheatley. A valuable and standard work on the chap-books of France was published in 1854, entitled *Histoire des Livres Populaires, ou de la Littérature du Colportage*, by M. E. Ch. Nisard. For German chap-books, see Karl Simrock, *Die deutschen Volksbücher* (55 parts, Berlin and Frankfurt, 1839-67), and Gotthard Oswald Marbach, *Altdeutsche Volksbücher* (44 vols. Leip. 1838-47).

**Chapel** (through Fr. from a late Latin *capella*, which, according to Brachet, already in the 7th century had the sense of a chapel, but earlier meant the sanctuary in which was preserved the *cappa* or cope of St Martin, and was next expanded to mean any sanctuary containing relics). The term now signifies a building erected for the purposes of public worship, but not possessing the full privileges and characteristics of a church. In this sense all places of worship erected by dissenters are now called chapels in England, and the term is also applied to supplementary places of worship, even though in connection with the established church—such as parochial chapels, chapels of ease, free chapels, and the like. In former times it was applied either to a domestic oratory, or to a place of worship erected by a private individual or a body corporate. In the latter sense we speak of chapels in colleges. But its earliest signification was that of a separate erection, either within or attached to a large church or cathedral, separately dedicated, and devoted to special services (see CHANTRY). Chapels had no burying-ground attached to them, and the sacrament of baptism was not usually administered in them.—The name is also given to a printer's workshop, hence to a union of the workmen in a printing-office—said to be so applied because Caxton set up his press in a chapel at Westminster.

**Chapelain**, JEAN, a somewhat curious figure in the gallery of French authors, was born in 1595, and died in 1674. He was a learned, industrious writer, who passed for a time as a poet, and was accepted as the dominant authority in the world of French letters between the literary dictatorships of Malherbe and of Boileau. He produced one of the abortive epics which it was the fashion to write during the regency of Mazarin. This work, the

*Pucelle*, dealt with the story of Joan of Arc, in twenty-four books. Its appearance covered its author with ridicule. Chapelain was gibbeted in the satires of Boileau, whose severity was amply justified by the dullness and grotesque absurdities of the work which he attacked. Chapelain also wrote odes, one of which, in honour of Richelieu, is not without merit. Twelve books of the *Pucelle* were published in 1656. The last twelve remained in manuscript until 1832. He was one of the original members of the Académie, which he helped to keep alive. See *Lettres* (1880-83), ed. De Larroque; and Fabre, *Chapelain et nos deux premières Académies* (1890).

**Chapel Royal**, in England, consists of a dean, sub-dean, chaplains, priests in ordinary, and a numerous lay choir, styled gentlemen of the chapel, with a clerk of the closet, deputy-clerks of the closet, and an organist. The chaplain's duty is preaching, a certain number being appointed beforehand to take duty each month of the year; the liturgical offices are performed by the dean, sub-dean, and priests in ordinary. The establishment is bound to attend the sovereign wherever the court happens to be; but in fact the services of the chapel are confined to London—formerly to the chapel at Whitehall, later to the small oratory in St James's Palace.

THE CHILDREN OF THE CHAPEL ROYAL, afterwards Children of the Queen's Revels, acted in Blackfriars Theatre, and were prominent in the stage history of Elizabeth and James's reigns.

THE CHAPEL ROYAL OF SCOTLAND was an ancient foundation originally located in Stirling Castle, founded by Alexander I., and liberally endowed by his successors. In the reign of Queen Mary the Chapel Royal was transferred to Holyrood House. After the Reformation 'the minister of the king's household' conducted service in it, and the chapel was used as their parish church by the people of the Canongate. It was endowed with the tithes of various churches, and the revenues of the abbey of Dundrennan. During the period of Episcopal church government the Chapel Royal of Holyrood was presided over by a dean, generally one of the bishops, and served by a number of chaplains (see HOLYROOD). After the Revolution the revenues of the Chapel Royal were bestowed on various ministers and chaplains. Since 1863 the whole revenues have gone to augment the income of several professors of divinity, among whom they are divided. The Dean of the Order of the Thistle is appointed by his commission from the crown the Dean of the Chapel Royal of Scotland. Neither the dean nor the chaplains in ordinary, who are appointed during the pleasure of the crown, receive any of the revenues of the Chapel Royal, which have been all disposed of in the manner stated, and their duties are purely honorary.

**Chaperon**, a hood or cap worn by knights of the Garter. Such a hood was at one time in general use, but was latterly appropriated to doctors and licentiates in colleges. A person who acts as a guide and protector to a lady at public places is called a chaperon, probably from this particular piece of dress having been used on such occasions. The name was also applied to devices which were placed on the heads of horses at pompous funerals.

**Chaplain**, originally an ecclesiastic who accompanied an army, and carried the relics of the patron saint (see CHAPEL). It now signifies a clergyman employed to officiate at court, in the household of a nobleman or bishop, in prisons, with troops, and on board ship. Such officials appear first in the palaces of the Byzantine emperors. For the royal chaplains, see CHAPEL ROYAL. For prison and workhouse chaplains, see PRISONS, POOR-LAW.

An ARMY CHAPLAIN, in Britain, is a clergyman especially commissioned to do duty with troops. The office was at one time regarded as a saleable perquisite; but the system was reorganised and improved in 1796. The Chaplains Department, a part of the charge of the civil member of the Army Council, is under a Chaplain-general, ranking as major-general; and the chaplains are divided into classes ranking—and paid—as colonels, lieutenant-colonels, majors, and captains. There are Roman Catholic and Presbyterian chaplains for regiments where these faiths are in a majority. There is a special clerical establishment for the forces in India. Chaplains are sent on active service with the troops, and in peace are allotted to the various military stations. Their duties are to conduct divine service in camp or barracks, officiate at burials, baptisms, and churchings, visit the hospital and barrack-rooms, give religious instruction in the schools, and generally treat the soldiers and their families as though they were their parishioners. Where the number of troops is small, the parish clergyman is appointed acting chaplain, performs these duties, and receives head-money. Soldiers who do not belong to the Church of England are marched to the nearest place of worship belonging to their denomination, and head-money is granted to the minister in charge. In the United States army, regimental chaplains and post-chaplains may be of any of the regular denominations. They mostly have the rank of captain.

NAVY CHAPLAIN.—Every large ship in commission has a chaplain belonging to the Church of England, who may also act as a naval instructor. The chaplains perform divine service on shipboard, visit the sick sailors, and assist in maintaining moral discipline. In the United States navy, chaplains on the active list are of various relative ranks, from that of lieutenant to that of captain.

**Chaplin**, HENRY, VISCOUNT (cr. 1916), born in 1841, and educated at Harrow and Christ Church, Oxford, became Conservative M.P. for Sleaford (1868-1906), Wimbledon (1907-16), Chancellor of the Duchy of Lancaster (1885), President of the Board of Agriculture (1889) and Local Government Board (1895-1900), and tariff commissioner (1904). A lifelong Protectionist, he was titular leader of the Opposition during the Asquith Coalition Government, 1915-16. He died 29th May 1923.

**Chapman**, a trader, but popularly applied in a more limited sense to a dealer in small articles, who travels as a pedlar or attends markets. Our familiar *chap*, 'a fellow,' is a mere shortening of the name, which is derived from O.E. *céap*, 'trade,' seen in *Cheapside*, *Eastcheap*, and in cognate form in *Copenhagen*. See CHAP-BOOK.

**Chapman**, GEORGE, dramatist and translator of Homer, was born near Hitchin, Hertfordshire, about 1559. He is supposed to have studied at Oxford University, and to have afterwards proceeded to Cambridge. From a passage in his earliest poem, *The Shadow of Night* (1594), it has been somewhat hastily inferred that he served as a volunteer under Sir Francis Vere in the Netherlands. To Lawrence Keymis's *Relation of the Second Voyage to Guiana* (1596) he prefixed a spirited poem, *De Guiana, Carmen Epicum*. His earliest extant play, *The Blind Beggar of Alexandria*, which has little merit, but was very popular, was produced in February 1595-96, and printed in 1598. The excellent comedy, *All Fools*, printed in 1605, was probably produced in 1599; and about this time he wrote other plays, which have perished. In 1598 he completed Marlowe's unfinished poem, *Hero and Leander*. The first of his Homeric translations was *Seven Books of the Iliads of Homer* (1598). It is a translation of books i. ii. vii.-xi., and is

written in rhymed verses of fourteen syllables. The dedicatory epistle to the Earl of Essex admirably illustrates the writer's dignified temper. Later in 1598 he published *Achilles' Shield*, translated from the eighteenth book of the *Iliad*. In this translation he used rhymed verses of ten syllables, the metre that he afterwards employed in his rendering of the *Odyssey*. It was not until 1610 or thereabouts that he published *Homer, Prince of Poets: translated according to the Greeke in twelve Bookes of his Iliads*, with a fine dedicatory epistle in verse to Prince Henry. The complete translation of *The Iliads of Homer, Prince of Poets*, in rhymed verses of fourteen syllables, appeared in 1611. In the Preface to the Reader he states that the last twelve books had been translated in less than fifteen weeks. Having finished the *Iliad*, he set to work on the *Odyssey*, and in 1616 appeared *The Whole Works of Homer, Prince of Poets, in his Iliads and Odysseys*, which was followed (about 1624) by *The Crowne of all Homer's Workes, Batrachomyomachia, or the Battaille of Frogs and Mice His Hymns and Epigrams*. In spite of all harshnesses, obscurities, and conceits, Chapman's translation of Homer is a noble achievement. He was not a profound scholar, and has often missed the sense where a schoolboy could set him right. But the work is instinct with life, full of heat and energy. By his contemporaries—Jonson, Drayton, Daniel, and the rest—it was applauded, and in later days it has never lacked admirers. Pope acknowledged its merits; Coleridge declared that it was such a poem as Homer might have written if he had lived in England in the time of Elizabeth; Lamb admired it enthusiastically; and Keats wrote a famous sonnet in its praise. While he was busy with his Homeric labours, Chapman was also writing for the stage. He joined Jonson and Mauston in the composition of *Eastward Ho* (1605), and in 1606 published a graceful comedy, *The Gentleman Usher*. In 1607 appeared *Bussy d'Ambois a Tragedie*; and *The Revenge of Bussy d'Ambois* followed in 1613. These tragedies contain much inarticulate bombast intermingled with exalted poetry. Heavy and undramatic though they were, they held the stage for many years by reason of their impassioned earnestness. Two other tragedies, *The Conspiracie and Tragedie of Charles, Duke of Byron* (1608), are also undramatic, but abound in fine poetry. Lamb was of opinion that of all the Elizabethan dramatists Chapman came nearest to Shakespeare 'in the descriptive and didactic, in passages which are less purely dramatic.' Chapman's other plays are *The May Day* (1611), *The Widow's Tears* (1612), and *Cæsar and Pompey* (1631). Two posthumous tragedies, published in 1654, *Alphonsus and Revenge for Honour*, bear his name, but their authorship is uncertain. *The Ball*, a comedy, and *The Tragedie of Chabot* were published in 1639 as the joint work of Chapman and Shirley. Among Chapman's non-dramatic works are *Enthymiaæ Raptus* (1609), *Petrarch's Seven Penitentiall Psalmes* (1612), *The Divine Poem of Musæus* (1616), and *The Georgicks of Hesiod* (1618). Chapman died in the parish of St Giles's in the Fields, 12th May 1634. Wood describes him 'as a person of reverend aspect, religious and temperate, qualities rarely meeting in a poet.' He was sewer in ordinary to Prince Henry from about 1604 to the prince's death (1612); but was imprisoned, with Jonson, for a supposed insult to the Scots in *Eastward Ho*. The passage complained of, at least as it has come down to us, is laudatory on the whole. Much of his later life seems to have been spent in poverty. See Parrott's edition of his original works (1910 *et seq.*), and Swinburne's *Contemporaries of Shakespeare* (1919).

**Chapone**, HESTER (1727–1801), daughter of

Thomas Mulso, was born at Twywell, Northamptonshire. She wrote for the *Rambler* (No 10), *Adventurer*, and *Gentleman's Magazine*, and soon became known to a literary circle, including Richardson; but she is now chiefly remembered by her *Letters on the Improvement of the Mind* (1772). She married in 1760, but next year was left a widow. See her *Works with Life* (4 vols. 1807).

**Chapped Hands**, a form of inflammation of the skin of the back of the hands characterised by abnormal dryness and roughness, with the formation of cracks or fissures. It is caused by exposure to cold, and can generally be prevented or cured by carefully drying the hands after they are washed, and applying glycerine, vaseline, or other simple ointment. The hands should also be protected in cold weather by warm gloves.

**Chappell**, WILLIAM, F.S.A., the author of the most learned work on ancient English music, was born November 20, 1809. Most of his life he lived in London, where he was for some years a member of a great music publishing house. His first work of importance was *A Collection of National English Airs, consisting of Ancient Song, Ballad, and Dance Tunes* (2 vols. [1838–40]). This work, which contained 245 airs, ultimately grew into the greater and entirely rewritten work, containing over 400 airs, re-harmonised on a consistent plan by Macfarren, *Popular Music of the Older Time; a Collection of Ancient Songs, Ballads, and Dance Tunes, illustrative of the National Music of England* (2 vols. 1855–59; new ed. by Wooldridge, 1893). The first volume, containing 200 airs, is a complete collection of English airs, so far as known, down to the reign of Charles I.; the second is rather a selection, containing, however, all the more interesting or important airs of later date. Mr Chappell took a principal part in the foundation in 1840 of the Musical Antiquarian Society and the Percy Society, and edited some of Dowland's songs for the former and several rare collections for the latter. He published a few papers in the *Archæologia*, contributed invaluable notes to Hales and Furnivall's reprint of the *Percy Folio MS.* (1867–68), and annotated the first three volumes (1869–79) of the Ballad Society edition of *The Roxburghe Ballads* (continued by his friend Mr Ebsworth). Mr Chappell published in 1874 the first volume of a *History of Music*. He died in London, 20th August 1888.

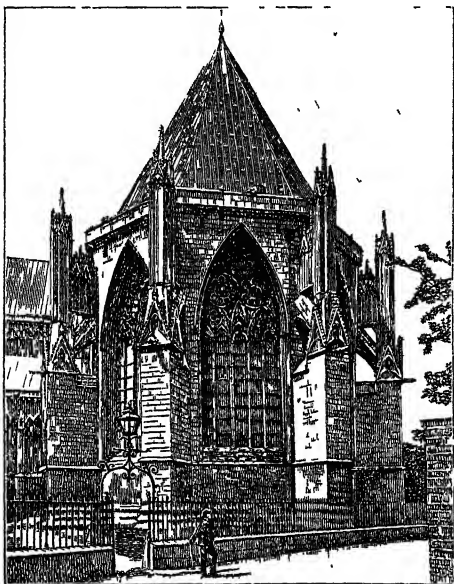
**Chapra**, a town in Bihar, on the Gogra, 1 mile above its confluence with the Ganges. It is capital of the district of Saran. Pop. (1911) 42,373.

**Chaptal**, JEAN ANTOINE, COMTE DE CHANTELOUP, French statesman and chemist, was born at Nogaret, Lozère, 4th June 1756, and studied at Montpellier, where in 1781 the states of Languedoc founded for him a chair of Chemistry. A considerable fortune left him by his uncle he devoted to the establishment of works for the manufacture of mineral acids, alum, soda, &c. He was made a member of the Institute in 1798, and in 1800 Minister of the Interior. He resigned in 1804, but in 1811 was made a count by the emperor. During the Hundred Days he was a minister of state and director of commerce and manufactures; after the Restoration he withdrew into private life, but was admitted to the chamber of peers by Louis XVIII. in 1819. He died in Paris, 30th July 1832.

**Chapter**. See CANON, CATHEDRAL.

**Chapter-house** (Fr. *salle capitulaire*), the building in which the monks and canons of monastic establishments, and the dean and prebendaries of cathedral and collegiate churches, meet for the management of the affairs of their order or society (see CATHEDRAL). Chapter-houses frequently exhibit the most elaborate architectural adornment,

as, for example, those of York, Southwell, and Wells. The original stained-glass windows remain at York, and are of exquisite beauty. On the walls of that of Westminster the original painting has been discovered. Chapter-houses are of various forms: those at York and Westminster are octagonal; those at Oxford, Exeter, Canterbury,



Chapter-house, York.

Gloucester, &c. are parallelograms; Lichfield is an oblong octagon; Lincoln, a decagon; and Worcester a circle. In France the chapter-house is generally square. They are always contiguous to the church, and are not generally placed to the west of the transepts. They sometimes open into the church, or are entered by a passage, but are more frequently in connection with the cloisters. In some instances there are arches or windows between the chapter-house and the cloisters to enable those standing in the latter to hear what goes on in the chapter-house. A stone seat on a raised step generally runs round the apartment. Chapter-houses were often used as places of sepulture, and have sometimes crypts under them, as at Wells and Westminster.

**Chapultepec**, a rock 2 miles SW. of the city of Mexico, rising to a height of 150 feet, and crowned by a castle, which was erected by the Spanish viceroy in 1785 on the site of the palace of Montezuma.

**Char**, a fish. See CHARR.

**Chara.** The Charophytes or Stoneworts are a small group of common aquatic plants found growing in large tufts, or even covering large expanses on the bottoms of fresh-water ponds and shallow lakes, brackish or even salt-water lagoons, &c., and of which the systematic position has undergone the most extraordinary and instructive vicissitudes. The early botanists, with K. Bauhin, had no hesitation in describing them as horsetails (*Equisetum*). In 1719 Vaillant proposed for them a separate genus (*Chara*), while Linnaeus, although at first disposed to regard them as *Algæ*, as their habitat suggests, decided that the small red male reproductive body must be a stamen, and the larger green female one a pistil, and accordingly placed them as flowering plants among the *Monocotyledonae*. His pupils

at most ventured to remove these to the *Monandria Monogynia*, while De Jussieu regarded them as a genus of *Naiadaceæ* (q v.), an order of monocotyledonous aquatics with much reduced flowers. In similar opinions he was followed by De Candolle and other eminent systematists: and it was not until 1851 that a careful re-examination of their structure and mode of reproduction by Thuret finally disproved the phanerogamous view, and established their cryptogamic nature. Since that time the group has attracted great attention, and is now on grounds of peculiar instructiveness, both morphological and physiological, one of the classical toms usually presented to the beginner, not only in cryptogamic botany, but general biology.

Commencing with the vegetative system, we find this apparently consisting of a stem with regular whorls of leaves arising at definite points (nodes) of the stem. The internodes, or distances between these, are at first considerable; but as we approach the apex these are shorter and shorter, and at length we lose sight of them in the crowded terminal bud. The resemblance to a young shoot of *Equisetum* is so far satisfactory, and the mineral incrustation (in some species so abundant as to lead to the substitution of the plant for scouring metal) appears to confirm this. The incrustation, however, is calcareous, not siliceous. Even under microscopic examination we may at first sympathise with the old observers, and seem to see in the stem a multicellular structure, even a cortex; nay, to see under our very eyes the actual circulation of the sap. More careful scrutiny, however, enables us to repeat the work of later and more accurate observers. We see that this movement is not the circulation of the sap in a stem, but a streaming of the protoplasm within what is simply a single enormous cell stretching from one node to the next (see CELL). The apparent cortex is a single



Fig 1.  
Shoot of *Chara*.

layer of cells covering this internodal cell; and the whole vegetative structure is unravelled when we roughly dissect out the terminal bud, harden, stain and imbed this in paraffin, and thus cut a fine longitudinal section (fig. 2). An apical cell is seen which continually segments off a lower one; this divides (still

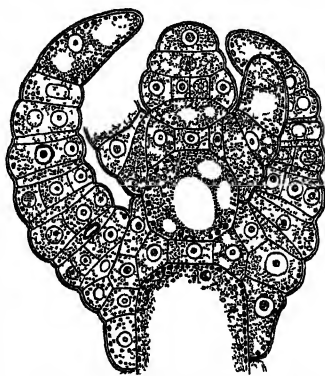


Fig 2—Longitudinal Section of the apical bud of *Chara*.

transversely to the axis) into two new ones; and the lower of these henceforth steadily lengthens as the internodal cell, while the upper undergoes repeated division, until a plate of nodal cells is formed. In the simpler genus *Nitella* the internode thus consists of a single naked cell; in the higher *Chara* this is inclosed by the so-called cortex, a layer of smaller cells proceeding from the nodes, and formed from the basal cells of the lateral axes;

and itself showing a minor nodal and internodal arrangement. In all cases, from the nodal cells there divide off, parallel to the outer surface of the stem, a new set of apical cells, which proceed, like the parent one, to form the 'leaves,' reproducing, that is to say, the stem structure, until they lose the power of division, and end in a single enlarged vegetative cell. A branch may arise from a new formed apical cell cut off in the axil of the oldest 'leaf' of any whorl, while the so-called roots, which fix the plant in the mud, are produced from the superficial cells of buried nodes. They are segmented and branched like the axis.

The apparently very complex and characteristic reproductive organs arise also at the nodes of the stem or leaves, in positions and numbers varying with the species. Commencing with the female (fig. 3a), which arises in the position of a branch,

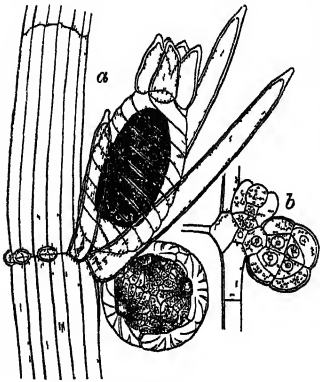


Fig. 3.—Node, bearing reproductive organs:  
a, Mature; b, developing. The upper in each case is the female.

we find this to be obviously a shortened and modified one. Its apical cell forms only an internode and node, then ceases division, and becomes enlarged and filled with a store of starch and other reserve material to form an egg-cell; while the spirally wound tubes inclosing this are readily seen to be a mere modification of the familiar cortex. In the male apparatus, or antheridium, the branch structure is further modified: its apical cell similarly remains all but sessile, forming only a short node and internode; but segmentation now begins, thus recalling the behaviour of a nodal cell—with which, in having below it an internodal, and not as in the case of the egg-cell, a nodal cell (fig. 3b), it so far corresponds. Eight quadrant-like cells are formed, but these now segment off new cells in the interior of the spherical mass, and in the growth and development of these the nodal and internodal alternation of ordinary vegetative growth can still be traced. Soon, however, a number of long segmented filaments are developed, and the protoplasm of these undergoes rejuvenescence, and becomes modified into a ciliated spermatozoid. When the reproductive organs are ripe, the antheridium (or properly antheidiophore) is easily broken, and its filaments spread free in the water; the spermatozooids escape in a myriad, and some reach the egg-cell of the oogonium by means of a small opening that is left in the corona which ends the spirally wound wall of the oogonium. After a period of rest, the fertilised ovum germinates, producing, however, not directly a new Chara plant, but a simple filament of cells called a pro-embryo, of which one cell segments into a node, and the oldest cell of this becomes the growing point of the new plant. A few species are dioecious, but as a rule the Charophytes are monoecious.

The affinities and systematic position of the group thus still afford ground for discussion, although now within narrower limits than formerly; granting that they are a very aberrant group of thallophytes, some systematists have insisted on their resemblance to the archegoniate cryptogams (see VEGE-

TABLE KINGDOM). Affinities with the mosses must be rejected. Probably they are derived from the green algae; in some respects they resemble the brown algae. The fruits of what seem to have been Charophytes occur in the Jurassic and Wealden, if not earlier, and ordinary Charophyta are abundant in the Tertiary strata. See Groves and Bullock-Webster, *British Charophyta* (vol. 1, 1920; vol. 2, 1924).

#### Characin'idae. See SALMONIDÆ.

**Character**, a form of literature, generally in prose, consisting of a short and highly finished description of a type of human character, with examples of what a man of such a type might be expected to say or do in various situations. The extraordinary development of this form in modern literature began with Isaac Casaubon's edition of the brilliant 'Characters' attributed to Theophrastus. Joseph Hall led the way in English, but he did little more than translate and adapt Theophrastus. Overbury, Breton, Earle, Butler, and hundreds of others followed. Characters of places, objects, and abstract qualities were written. The Theophrastian model was gradually departed from, and the character essay became a close-packed mass of conceits. Earle, however, has insight and humanity, and Breton a delicate humour. Satire tended to take the character form; and the comedy of humours was so near allied that Jonson introduced some of his plays with characters of his persons, and made them speak full-length character-essays on one another. The character influenced the subsequent development of the essay, and through it that of the novel. For the great French character essayist, see LA BRUYERE.

#### Characteristic. See LOGARITHMS.

**Character to Servant.** The master is under no legal obligation, either in England or in Scotland, to give a character to his servant, however long, faithfully, or efficiently he may have served him; but, if given, the character must be such as the master honestly believes to be true. If the character is given in good faith, the fact that it contains statements which are libellous will not render the master liable in damages; for such a communication is clearly privileged. Even if it turn out that the master was mistaken in some of his statements, a character still has the protection of a privileged communication. On the other hand, if a master, out of anger or ill-feeling against the servant, gives a servant a bad character when he knows the servant deserves a good one, he is acting maliciously, and all privilege is lost. So, too, if from any wrong motive he makes statements about the character or work of the servant which he does not know to be true, or in utter recklessness whether they be true or false, this is tantamount to malice, and prevents the character from having the protection afforded to privileged communications.

The uttering of a forged 'character' or testimonial is an offence at common law.

By an Act of 1792 (32 Geo. III. chap. 56), any person personating a master, and thus giving a false character to a servant, or asserting in writing that a servant has been hired for any period of time or in any capacity, contrary to truth, commits an offence punishable on conviction with a fine of £20. The same penalty is also provided by the act in the case of a person, offering himself as a servant, pretending to have served where he has not served, or producing a forged certificate of character or altering a certificate formerly given. It is doubtful whether this act applies to Scotland.

**Charade** is an amusement which consists in dividing a word into its component syllables, or

letters, predicating something of each and of the whole, and asking the reader or listener to guess the word. As a specimen of the charade depending upon syllables we adduce the following :

'My *first* is ploughed for various reasons, and grain is frequently buried in it to little purpose. My *second* is neither riches nor honours, yet the former would generally be given for it, and the latter are often tasteless without it. My *whole* applies equally to spring, summer, autumn, and winter; and both fish and flesh, praise and censure, mirth and melancholy, are the better for being in it. *Ans. Sea-son*'

As a specimen of the second class, we take :

Quatre membres font tout mon bien,  
Mon dernier vaut mon tout, et mon tout ne vaut rien.

The word is *zéro*.

But besides charades of this nature there is another kind rather popular at evening-parties—the *acted* charade. Half-a-dozen or so of the company retire and select a certain word; let us suppose *Memento*. The next thing done is to take the first syllable, *Me*, and arrange a little scene and dialogue, each member taking a certain part. This being accomplished, the amateur actors return to the drawing-room, and commence their performance, the rest of the company constituting the spectators. Care is taken to mention conspicuously, and yet not obtrusively, in the course of the dialogue, the word *Me*, which is the subject of the scene. On its conclusion, they repeat the process for the syllables *Men* and *To*, and for the whole word *Memento*. The company are then asked to guess the word.

**Charadriidæ**, a large family of birds, placed among the so-called Grallatores, including about 120 species, distributed throughout the world, and especially frequenting the shores of lakes and rivers. They run and fly with equal success, are often seen in migratory flocks, use simple excavations for nests, and feed, often at night, on worms, insects, molluscs, and amphibians. Plovers (q.v., *Charadrius*), Oyster-catchers (*Hæmatopus*), Turnstones (*Streptilas*), Crocodile-birds (*Pluvianus*), and Sandpipers (*Ægialitis*) are good examples of the family.

**Charbon.** See ANTHRAX.

**Charbon Roux.** See CHARCOAL (WOOD).

**Charcoal** is a term most frequently applied to charred wood, or coal produced by charring wood. Formerly, charcoal was the name for charred sea-coal or mineral coal; and the word is popularly used for the carbonaceous residue of vegetable, animal, or mineral substances when they have undergone smothered combustion.

**ANIMAL CHARCOAL, BONE-BLACK, or IVORY-BLACK**, is prepared from bones (residue of the glue and gelatine industries) by heating in close retorts till they undergo destructive distillation, when combustible gases and water, the vapours of various salts of ammonia, and oil, are given off, and bone-black is left in the retort. It is generally reduced to coarse grains from about the size of small peas down to large pin-heads, and is extensively used in the arts for decolourising liquids, such as the syrup of sugar, and solutions of argol (impure cream of tartar) and of the alkaloids, as also in Filters (q.v.) for separating chemical impurities from water. The general mode of using the bone-black is to allow the coloured liquid to percolate through a layer of the charcoal, when all colour is arrested, and the syrup or water runs clear and colourless from under the stratum of charcoal. This power of absorbing colouring matters is also observable in vegetable (peat or wood) charcoal, but not to such an extent as in bone-black. The application of heat to the liquids before filtration greatly facilitates the decolourisation, and where the volume of liquid to be operated upon is not great, the most expeditious method is to boil the liquid and bone-

black together, and then strain through filtering-paper or cloth. The composition of bone-black in 100 parts is 10 of pure charcoal, associated with 90 of earthy salts—i.e. in the proportion of one of pure charcoal in 10 of the commercial bone black. The power of absorbing colours appears to be due to the porosity of the substance, and is not resident simply in the pure charcoal; indeed, the earthy matters (principally phosphate of lime and carbonate of lime) can be dissolved out of the bone-black by dilute hydrochloric acid, and the pure charcoal thus obtained only possesses about one-third the decolourising power of the total amount of bone-black it was obtained from. Thus, if 100 parts of ordinary bone-black have the power of arresting the colour from *ten* volumes of a given coloured liquid, then the 10 parts of pure charcoal which can be obtained from the 100 parts of bone-black will be found to decolourise only *three* volumes of the same coloured liquid; so that it is apparent the earthy matters in the bone-black influence and increase the absorption of the colouring matter, and thus render a given weight of the charcoal of greater commercial value. When syrup of sugar and other liquids have been run through bone-black for some time, the pores of the latter appear to get clogged with the colour, and the clarifying influence ceases, and then the bone-black requires to undergo the process of *revivification*, which consists in reheating it carefully in ovens, or iron pipes inclosed in a furnace, when the absorbed colour is charred, and the bone-black can be of service once again as an arrester of colour. After several re-burnings, the bone-black becomes of very inferior absorptive quality, and is then disposed of for the manufacture of bone-ash and dissolved bones (see BONE MANURES). Its use has been much diminished by the development of cheaper and easier methods of decolouring and purifying liquids. It has a great power of absorbing odours, and can thus be employed where animal matter is passing into a state of active putrefaction.

**WOOD CHARCOAL** is the most important, though not the purest kind of Carbon (q.v.). Wood consists of carbon, hydrogen, and oxygen, the last two being in the proportion to form water. When heated in the open air, it burns completely away, with the exception of a small white ash; but if the supply of air be limited, only the more volatile matters burn away, and most of the carbon remains. This is the principle of the process of charcoal-burning in countries where wood is abundant. Billets of wood are built up vertically in two or three rows into a large conical heap, which is covered over with turf or moistened charcoal-ash, and holes left at the bottom for the air to get in. An open space is also left in the middle of the heap to serve as a flue. The heap is set on fire by putting burning wood into the top of the central opening. The combustion proceeds gradually from the top to the bottom, and from the centre to the outside of the heap; and as the central portions burn away, fresh wood is continually thrown in at the top, so as to keep the heap quite full. The smoke is thick and white when the process is going on properly; if it becomes thin, and especially if a blue flame appears, the wood is burning away too fast, and the combustion must be checked by closing the holes at the bottom, or by heaping fresh ashes on the top and sides. As soon as the combustion is completed, the heap is completely covered with turf or ashes, and left to cool for two or three days. It is then taken to pieces, and the portions still hot are cooled by throwing water or sand upon them. It is found that 100 parts of wood yield on the average from 61 to 65 parts by measure, or 24 parts by weight, of charcoal. The charcoal thus prepared

is the best suited for fuel. In England a large quantity of charcoal is obtained in the dry distillation of wood in cast-iron cylinders, for the preparation of crude acetic acid. The charcoal thus prepared is preferable for making gunpowder, but is inferior for other purposes. A peculiar kind of charcoal of a reddish-brown colour, and hence termed *charbon roux* or *red charcoal*, is frequently prepared for the manufacture of the gunpowder used for sporting purposes, by subjecting wood in iron cylinders to the action of superheated steam under a pressure of two atmospheres. Powder made with this charcoal absorbs moisture more rapidly than ordinary gunpowder.

The general properties of wood-charcoal are, that it is black and brittle, and retains the form of the wood from which it is derived; it is insoluble in water, infusible and non-volatile in the most intense heat; its power of condensing gases is noticed under Carbon (q.v.); and from its power of destroying bad smells it has been regarded as possessing considerable antiseptic properties. It is frequently stated that charcoal is a bad conductor of heat, but a good conductor of electricity. These properties depend upon the nature of the charcoal, the lighter wood, such as willow, yielding a porous charcoal, with little power of conducting heat or electricity; while boxwood yields a very compact charcoal, which is a good conductor of heat and electricity, and is admirably adapted for the exhibition of the electric light. Charcoal never consists entirely of pure carbon, the degree of purity varying directly with the temperature at which it is formed; thus, charcoal charred at 480° (249° C.) contains 65 per cent. of carbon, while that charred at 750° (399° C.) contains 80, and that charred at 2730° (1499° C.) contains 96; but the loss of charcoal occasioned by these high temperatures is very great, the percentage yield of charcoal corresponding to these temperatures being 50, 20, and 15.

The uses of wood-charcoal are numerous and extensive. It is very largely employed as a fuel, taking the same place in many countries that coal occupies here. From its being proof against all ordinary chemical agencies, superficial charring is often employed to protect wood from decay, as in the case of fence-posts, of telegraph poles, or of piles which are driven into mud or into the beds of rivers to serve as foundations. With the same design it is not unusual to char the interior of tubs and casks destined to hold liquids. In a finely-divided state it is commonly regarded, as has been already stated, as an antiseptic; and there is no doubt that the offensive effluvia from animal matter in an advanced stage of putrefaction disappear when the putrefying substance is covered with a layer of charcoal; but in reality the decay goes on, without the emission of any odour, till at length the whole of the carbon is dissipated as carbonic acid gas, and the hydrogen as water, while the nitrogen remains as nitric acid. It has been shown that the action consists in a rapid process of oxidation, dependent upon the power which finely-divided charcoal possesses of condensing oxygen. In a finely-divided state, charcoal not only condenses gases to a marvellous extent, but has the power of absorbing colouring matters, bitter principles, &c.; and hence it is of extensive use in the laboratory. From the rapidity of its absorbing action, the use of a respirator filled with charcoal has been suggested to protect the mouth and nostrils in an infected atmosphere; trays of powdered wood-charcoal in dissecting-rooms, in the wards of hospitals, and in situations where putrescent animal matter is present, exert a most beneficial influence in sweetening the atmosphere, by absorbing and decomposing the offensive gases. Charcoal is accordingly valuable in filters, not only

for decolourising purposes, but likewise for assisting in purifying water for domestic use. It is also successfully used to prevent the escape of noxious vapours at the ventilating openings of sewers, as it allows the free passage of air, but condenses the offensive effluvia in its pores, where they are destroyed by a process of oxidation. Besides its employment in the manufacture of gunpowder it has many applications in the arts. In medicine it is used to destroy fetor, applied in the form of powder or poultice to gangrenous sores, ulcers, &c.; it is also largely employed in tooth-powders. In indigestion accompanied by flatulence it may be given in doses of two or three teaspoonfuls suspended in water, or as charcoal-biscuits (see BISCUITS). For the charcoal blacks, see BLACK.

**Charcot**, JEAN MARTIN (1825-93), pathologist, was born at Morvan (in Nièvre), studied at Paris, where he became a professor, doctor at the Salpêtrière hospital, and a member of the Institute. He contributed much to our knowledge of chronic and nervous diseases, their diagnosis and pathology, and made hypnotism a scientific study.

**Chard**, a municipal borough of Somersetshire, 15 miles SSE of Taunton; pop. 4300.

**Chardin**, JEAN BAPTISTE SIMÉON (1699-1779), was an eminent Parisian still life and genre painter. See books by Schefer (1905) and Furst (1911).

**Chardin**, SIR JOHN (1643-1713), traveller, was born in Paris, traded in jewels in India, Persia, Armenia, Turkey, and published his *Voyages* (4 vols.) in 1686-1711. To escape persecution as a Protestant, he settled in England in 1681, became court-jeweller, was knighted, and for some years lived in Holland as agent of the East India Company.

**Charente**, a department of France, formed chiefly out of the old province of Angoumois; area, 2285 sq. m.; pop. (1866) 378,218; (1921) 316,279. It is generally level, with granite offshoots of the Limousin range in the north, and chalk-hills in the south, abounding in marine deposits; and it is watered by the river Charente and its tributaries, with the rivers Vienne and Dronne. The hills are in many places clad with chestnut forests. The climate is generally mild and healthy, and a sixth of the surface is devoted to vines, which flourish in the dry, hot limestone soil. The vines grown are spirituous and fiery in flavour, and are chiefly distilled into brandy, which forms the most important of the exports. Truffles grow abundantly in several parts. The principal manufactures besides brandy are paper, leather, felt, and pottery. Charente is divided into the five *arrondissements* of Angoulême, Cognac, Ruffec, Barbezieux, and Confolens. Angoulême is the chief town.

**Charente-Inférieure**, a maritime department of France, formed principally from the former provinces of Saintonge, Aunis, and a small portion of Poitou. The Bay of Biscay washes its western boundary. Area, 2625 sq. m. Pop. (1866) 479,529; (1921) 418,310. It is watered on its boundaries by the Sèvre-Niortaise and the Gironde, and in the centre by the navigable Charente and the coast-stream Seudre. The surface is level; the soil, near the coast protected from the sea by dikes, is mostly chalky and sandy, but very fertile. The commerce is mainly in brandy and sea-salt; the evaporation from the salt-marshes from which the latter is taken renders some parts of the coast very unhealthy. The oyster and pilchard fisheries are important. The chief harbours are those of Rochefort and Tonnay-Charente. La Rochelle is the chief town.

**Charenton-le-Pont**, a town in the French department of Seine, on the right bank of the

Marne, 4 miles SE. of Paris. The bridge over the river, which is important from a military point of view, is defended by two forts forming a part of the fortifications of Paris. At the other side of the river is the National Lunatic Asylum. Pop. 21,000

**Charge** is the exposition of the law made by the judge to the jury, in which he comments on the evidence and instructs the jury as to the application of the law to the facts. Charge is also the exhortation of a bishop or archdeacon to the clergy.

**Chargé d'Affaires** is a fourth-class diplomatic agent, accredited, not to the sovereign, but to the department for foreign affairs; he also holds his credentials only from the minister. See AMBASSADOR.

**Chariot**, in ancient times a kind of carriage upon two wheels used both in peace and in war. The Roman form, the *currus*, was entered from behind, was closed in front and uncovered. It was drawn by two, three, or four horses, and carried either one or two persons, both standing. The word *biga* is often applied to a two-horse chariot for battle or for racing; *triga* was a name for a chariot drawn by three horses yoked abreast, of which two drew from the pole; while the *quadriga* was drawn by four horses abreast, the two centre ones (*jugales*) only yoked, the two outside ones (*funales*) being attached by ropes. The last was a form common in the racing chariot of the circus, and in processions. The *currus triumphalis*, in which the Roman generals rode during their triumphal entrance into the city, was a chariot of particular form, being quite round and without any side open, while its panels were richly decorated with carvings in ivory. The Roman writers speak of the use among the Britons and some other foreign nations of war-chariots carrying iron blades or scythes fixed to the end of the pole and axle-tree. The war-chariot of the Homeric heroes (*harma*) was somewhat lighter than the Roman *currus*, being partly formed of open rail-work instead of paneling. The oldest war-chariots of which we read are those of Pharaoh (Exodus, xiv. 7). All the eastern nations used them, and many Assyrian tablets represent heroes, such as Sennacherib or Esarhadon, riding in triumph at the head of their armies in chariots much heavier but otherwise not unlike the Roman forms of chariots with which we are familiar. Two fine four-wheeled chariots with rich ornamentation in bronze-work were dug up by Dr Petersen in a peat-bog in Jutland in 1881 and 1883, and dated by him a hundred years before Christ. See ASSYRIA.

**Charities** are associations by which persons in the community, out of their common love or consideration, arrange that charitable acts, supported by their own free-will and effort, shall be done to the community or some class of its members continuously. Charities are of two kinds: (1) endowed; (2) voluntary. An endowed charity derives its income from the assignation of the property of a single individual to some definite and lasting purpose; a voluntary charity obtains its resources from the voluntary gifts (subscriptions, bequests, &c.) of a number of individuals with some common end in view.

Charities, endowed and voluntary, have certain characteristics in common. (1) They spring from love, though, except in the remote sense that they must be in accord with public policy, no legal connection is recognised between 'a charity' and the so-called virtue. (2) Their object is the common good. (3) They are essentially associations, though in the case of an endowed charity the element of association is limited to the appointment of trustees and administrators to continue

the payment of the bequest. (4) They enjoy continuity of existence: in an endowed charity trusteeship passes on to successors; in a voluntary charity the members of one generation take up the responsibilities of their predecessors, and continuity may legally be assured under the Companies Act, 1867, and the Friendly Societies Act, 1896. (5) They are by nature independent of aid from the state—distinct, that is to say, from institutions or societies supported out of rates and taxes payable on compulsion. Points of contact with the activities of the state of course there must be, and in practice no hard-and-fast line can be drawn. Thus, in the United States, in New Zealand, and in certain cases in Australia state grants are made to bodies inherently charitable. In this way, however, difficulties of administration have been found to arise, while the result has been generally detrimental to the sustentation of charitable effort. In England the problem has been differently met; homes and other institutions, suitable for state purposes, are certified by the authorities, and payment made by them for the care and maintenance of persons for whom they obtain admission; at the same time, from the other side as it were, there has been a growing tendency to the appointment of voluntary committees to manage certain branches of quasi-charitable government work.

**Endowed Charities.**—The Charitable Uses Act of Elizabeth (43, chap. 4) still furnishes the definition of the scope of endowed 'charities.' This is now generally reduced to four headings: (1) the relief of poverty and disability, including relief in sickness; (2) the aid of children who are under legal disabilities; (3) the promotion of religion; and (4) the benefit of the public.

The law relating to endowed charities is embodied in the main in the English Charitable Trusts Acts, 1853 to 1869, and in the Mortmain and Charitable Uses Acts. The former were the outcome of much investigation by commissioners between 1819 and 1837, and a commission of 1849; the latter contain the modern application of the laws of Mortmain. That the *morte main* or dead hand should hold land was, and in a measure is still, held to be contrary to the public good. The presumption of the law, so far as land is concerned, is still in favour of the living hand; and all kinds of property may be disposed of in favour of charity, excepting lands and tenements and hereditaments. These, if left to a charity by will, subject to the needs of the charity for the actual occupation of the land, have to be sold, though the money realised by the sale remains to the charity.

Of the four headings mentioned above under the Charitable Uses Act of Elizabeth, the second, except apprenticeship not directly connected with schools and education, is now merged in the duties of the Board of Education. The others fall within the functions of the Charity Commission. The commission was appointed to safeguard the property of the charities, to supervise the development of their estates, to provide a more simple process for these purposes and for the appointment of trustees than used to be available in the Court of Chancery, and to provide by schemes for the adjustment of the resources of charities, when the objects for which they were established had become obsolete. In all these ways it has been of great service. Its direct intervention is limited, however, to charities having an income of less than £50 a year. In other cases it can only act on the invitation of the trustees of the charity. For the preservation of the estates of charities, an official trustee of charity lands was appointed under the Act of 1853, to hold such property as a bare trustee on the charities' behalf; there are also official trustees

of charitable funds to hold stock and securities on the same conditions.

The adjustment of the charities to new needs is made generally on the lines of *Cy-près* (q.v.). Under this process the endowed charities of a town may be consolidated, reallocated, and applied to *cy-près* purposes, consistently with the general policy that charities should not be available for persons in receipt of Poor Law relief, but for the 'second poor'—that is, for the poor above that line. By statutory intervention, as, for instance, in the case of the parochial poor funds of the city of London, the doctrine of *cy-près* (1883) has been pushed to the point of alienation, the alienation of moneys left for the relief of the poor to entirely different uses.

*Voluntary Charities.*—Before the Reformation, probably from the 12th century onwards, the principal form of local associative charity was the guild, a society of members maintained by their contributions, and instituted chiefly for their mutual help and edification. The guild sometimes helped non-members also. The almshouses at the monasteries were also centres of relief and help. The indoor relief was principally supplied by religious hospitals of many kinds, supported by the rentals of the donor's gift of land, supplemented by voluntary contributions. At and after the Reformation endowed and personal and associative charities were brought into some degree of co-operation under the municipality, and supplemented by it; and in England in 1601 a systematic Poor Law was finally established. In these circumstances many local endowments were bequeathed, serving the purpose of a relief of the poor parallel to that of the Poor Law. The dates of the establishment of charities often supply fair indications of the trend of the social thought of the time. This may be traced, for instance, in the charities instituted after the Commonwealth. In Westminster, in 1688, was established the Blue Coat School, which 'claims to be the first established at that time against the influence of popery.' It is one of the group of 'charity schools.' Some of the others were the Green Coat and the Grey Coat Hospitals; and a society of patrons supervised them and attended to their interests. They were for the instruction of the children of the 'poorest and meanest of the people.' All were taught the catechism. 'Boys were fully taught to read and write and cast up accounts,' and were put out to service on some handicraft trade. Girls were bred up so as to be fit for menial service. Similarly may be traced the growth of the modern 'hospital,' which in its later meaning marks the gradual specialisation of the hospital, as guest house, alms house, school, or what not, to the hospital as a centre for the treatment of acute cases of illness, apart from the care and treatment of the chronic sick and infirm. A group of hospitals was established between 1719 and 1745; after the French war another group, between 1819 and 1839; and so on. The dispensary movement, due in part to fear of hospital fever, in part to a desire to treat the poor in their homes and to prevent decrease of population, at its first stage covers the period from 1774 to 1801. After 1840 are further developments. So in turn may be taken the movement of the 18th century for the care of women and children as represented by lying-in hospitals, the Foundling and the Magdalen Homes, and so on.

In France the liberty to establish voluntary charities is limited and controlled in various directions, but not so in Germany (under the constitution of 1919), or in England. In England a definite legal status may be obtained by voluntary charities by registration under the Companies Act, 1867, and under the Friendly Societies Act, 1896,

but comparatively little use is made of these provisions.

There is an impression that charities are extravagantly managed, and that much relief is wasted. An examination of the accounts and work of many institutions does not support the former charge; expenses of administration are reckoned by the Charity Organisation Society as 11 per cent. of gross expenditure. Waste of relief may be said to be wholly eliminated in the many cases where principles of charity organisation are accepted and applied. In the charities of competing sects and missions there is, however, often needless overlapping; waste occurs, too, in outpatients' departments at hospitals. Relief funds distributed to meet some sudden emergency by untrained workers are frequently indiscriminately and harmfully expended.

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THE CHARITY ORGANISATION SOCIETY.—This society was established in London in 1869. It arose out of a consciousness of the evils of indiscriminate charity, and out of a recognition of the necessity for some general organisation of charitable effort. Its avowed object was the improvement of the condition of the poor (1) by bringing about co-operation between the charities and the Poor Law, and between the various charities themselves; and (2) by securing due investigation and fitting action in all cases. In the local development of the society the ideas of Dr Chalmers and the method of the Elberfeld system had an influence. The society consists of a central council with district committees federated with it and represented in it. Each district committee has an honorary or paid secretary, or both, and an inquiry officer. These serve as the nucleus of a group of voluntary workers. The system has undoubtedly raised the level of responsibility and efficiency in charity. Co-operation with the officers of the Poor Law, and a systematic interchange of information with them, prevails in almost every union of the metropolis. The method of registering at one centre in a district all cases dealt with by the official and voluntary agencies within it has, since the Report of the Poor Law Commission of 1909, made great progress.

The society's larger policy of promoting measures for the improvement of the condition of the people, and preventing measures that would lead to the loss of their independence, has been actively pursued throughout its career. The first Artisans' Dwellings Act was based largely on the report of a Special Committee, which reported in the earlier years of the society; and many other reports and papers of the society, with the active measures that accompanied them, have had a marked influence in promoting changes in the treatment of the blind, the care and control of the mentally defective, the care of children, the better aid of outpatients at hospitals, and numerous other branches of social work. The society has also been active in the promotion of thrift and the advocacy

of the friendly society movement. The increasing intervention of the state has very greatly affected the old field of charity and the Poor Law, but the Charity Organisation Society has, with its body of trained workers, been enabled to break new ground in various ways. There is a large number of corresponding charity organisation and kindred societies throughout Great Britain, in the colonies, and in the United States of America.

See 'The Origin of the London Charity Organisation Society,' *Charity Organisation Review* (October 1892); Mrs Bosanquet, *History of the Charity Organisation Society* (1914); the reports and other publications of the society.

**Charity, SISTERS OF.** See **SISTERHOODS.**

**Charivari** is a French term used to designate a wild tumult and uproar, produced by the beating of pans, kettles, and dishes, mingled with whistling, bawling, groans, and hisses, expressive of displeasure at the person against whom it is directed. Its etymology is obscure; the Germans translate it by *Katzenmusik*, to which in English *Cat's-concert* corresponds. In France, during the middle ages, a charivari was generally raised against persons contracting second nuptials, in which case the widow was specially assailed. On these occasions the participants in it, who were masked, accompanied their hubbub by the singing of satirical and indecent verses, and would not cease till the wedding couple had purchased their peace by ransom. Charivari answers to the English concert upon 'marrow-bones and cleavers,' popularly termed 'rough music,' with which it was customary to attack a married couple who lived in notorious discord. It was also got up against an unequal match, such as where there was great disparity in age between the bride and bridegroom. The charivari or 'shiveree' is not uncommon in the frontier districts of the United States.

Sometimes these customs were of such a licentious and violent character as to require military interference. As early as the 14th century the church was forced to threaten punishment, and even excommunication, against those who participated in them. In more recent times the charivari, from its suggesting derision, ridicule, and satire, came to be employed as a name for satirical journals, notably one which, from its foundation at Paris in 1832 till the restoration of the empire, supported opposition politics. *Punch* adopted the word for its sub-title.

**Charjui**, a town of Bokhara, on the Amu-Daria, or Oxus, where the Transcaspian railway between Merv and Bokhara crosses the river by a great bridge opened in 1888, rebuilt 1900-1.

**Charkov'.** See **KHARKOV.**

**Charlemagne**, i.e. Charles the Great, king of the Franks (768-814), and Roman emperor (800-14), was born on 2d April 742, perhaps at Aix-la-Chapelle, and was the eldest son of Pepin the Short, the first Carolingian (q.v.) king of the Franks, and grandson of Charles Martel. On Pepin's death in 768, Charles and his brother Carloman jointly succeeded to the throne; and by Carloman's death, and the exclusion of both his sons from the throne, the former became sole king in 771. In 772 it was resolved in the Diet at Worms to make war against the Saxons, for the security of the frontiers, which they continually threatened, and for the extension of the Christian religion. Charlemagne advanced as far as the Weser in 772, securing his conquests by castles and garrisons. Pope Adrian I. now called him to his aid against Desiderius, king of the Lombards. Charlemagne had married the daughter of Desiderius, and had sent her back to her father because she bore him no children, and married Hildegarde, daughter of the Swabian duke, Godfrey. Desiderius had sought

revenge by urging the pope to crown the sons of Carloman, and on the pope's refusal had laid waste the papal territory. Charlemagne crossed the Alps from Geneva, with two armies, by the Great St Bernard and Mont Cenis, in 773, and overthrew the kingdom of the Lombards in 774. The Lombard dukes acknowledged him as their king, and he secured the pope's favour by confirming the gift which Pepin had made to the papal see of the exarchate of Ravenna. In 775 he was again employed in the most northerly part of his dominions, reducing the Saxons to subjection; in 776 he suppressed an insurrection in Italy; in 777 he so completed his victory over the Saxons that their nobles generally acknowledged him as their sovereign in an assembly at Paderborn. Being now invited to interpose in the wars of the Arabs and Moors in Spain, he hastened to that country in 778, and added to his dominions the region between the Pyrenees and the Ebro. From Spain he was summoned in haste by a new insurrection of part of the Saxons, who had advanced almost to Cologne, but whom he drove back to the Elbe. In 781 he went to Italy, where the pope crowned his second son, Pepin, king of Italy, and his third son, Louis, a child three years old, king of Aquitaine. The Saxons, once more rising in arms, defeated and destroyed a Frankish army in 782, which Charlemagne, after a new victory, fearfully avenged by causing no fewer than 4500 prisoners to be executed as rebels in a single day. A more general rising of the Saxons followed, but in 783-785 the Frankish monarch succeeded in reducing them completely to subjection, and in persuading their principal chiefs to submit to baptism and to become his faithful vassals. In 788 Bavaria was absorbed in the empire of Charlemagne, an event which brought the Franks into contact with the Avars. They, too, were now subdued, and the Frankish dominions extended to the Raab. The eastern 'mark,' the nucleus of the Austrian empire, was established to defend the frontier in that direction (798).

In 800 Charlemagne undertook an Italian campaign which was attended with the most momentous consequences. Its immediate purpose was to support Pope Leo III. against the rebellious Romans. When Charlemagne, on Christmas Day 800, was worshipping in St Peter's Church, the pope unexpectedly, as it appeared, set a crown upon his head, and amidst the acclamations of the people, saluted him as Carolus Augustus, emperor of the Romans. Although this added nothing directly to his power, yet it greatly confirmed and increased the respect entertained for him, such was still the lustre of a title with which were associated recollections of all the greatness of the Roman empire. A scheme for the union of the newly revived Western Empire with the Empire of the East by Charlemagne's marriage with Irene (q.v.), the Byzantine empress, failed by reason of Irene's overthrow. The remaining years of his reign were spent in further consolidating his vast empire, which extended from the Ebro to the Elbe. Bishops were founded in the Saxon country, many of the Slavs beyond the Elbe were brought into dependence on the empire, and the Eider was recognised as the boundary between the Frankish dominions and Denmark. The empire was divided into districts ruled by counts; counts specially called *markgrafen*, or counts of the marches, defended the frontiers against attack; and the unity of rule was maintained by officers, the *missi dominici*, who were sent out in all directions as the organs of the imperial will. This organisation was promoted also by a great annual military muster and by an annual assemblage of the high officials of the empire. Charlemagne

zealously endeavoured to promote education, agriculture, arts, manufactures, and commerce. He projected great national works, one of which was a canal to connect the Rhine and the Danube; but he deemed nothing beneath his attention which concerned the interests of his empire or of his subjects. He required his subjects to plant certain kinds of fruit-trees, the cultivation of which was thus extended northward in Europe. His own domains were an example of superior cultivation. He had a school in his palace for the sons of his servants. He built sumptuous palaces, particularly at his favourite residences, Aix-la-Chapelle and Ingelheim—for he had no fixed capital—and many churches. Learned men were encouraged to come to his court. He himself possessed an amount of learning unusual in his age; he could speak Latin and read Greek. He attempted to draw up a grammar of his own language. Charlemagne was of more than ordinary stature, and of a noble and commanding presence. He was fond of many exercises, particularly of hunting. His fame spread to all parts of the world: in 798 Haroun Al-Raschid sent ambassadors to salute him. He enjoyed good health till shortly before his death, 28th January 814. He was buried at Aix-la-Chapelle (q.v.), in a church which he had built there. The greatness of his dynasty terminated with his own life. The rule of Charlemagne was a noble attempt to consolidate order and Christian culture among the nations of the West. It was a mighty task which could have been continued and consummated only by a succession of sovereigns of like energy and sagacity with himself. As his successors were weaklings, his empire fell to pieces; yet in many ways he has had a permanent influence on European history. He established much of what were destined to be the beginnings of a new order. Besides his *Capitulaires* (q.v.), there are extant letters and Latin poems ascribed to him. His life was written by his secretary Eginhard (q.v.). It should be remembered that his family stock was Gallo-Roman rather than Teutonic.

See works by Cutts (1882), Mombert (1889), Hodgkin (1897), Wells (1898), and Carless Davis (1900); also *CHANSONS DE GESTE*, *HUON*, and *ROMANES*.

**Charleroi**, a town in the Belgian province of Hainaut, on the Sambre, 35 miles S. by E. of Brussels, manufacturing hardware, glass, woollen-yarn, &c. The district is rich in coal, and the number of smelting-furnaces and nail-factories in the neighbourhood is very great; whilst the huge ironworks of Couillet lie within a mile of the town. The fortifications, begun by the Spaniards in 1666, fell next year into the hands of the French, and were completed by Vauban. After six exchanges of ownership between the French and Spaniards, the peace of Aix-la-Chapelle (1748) left Charleroi in the possession of Austria. In 1794, after a protracted and desperate resistance, it capitulated to the French, when the fortifications were dismantled. Its strategic importance became apparent during the campaign of 1815, when, three days before Waterloo, Charleroi was occupied by Napoleon, and the fortifications were restored; but in 1866 they were finally demolished. The French were driven back from Charleroi by the Germans, 21st–22d August 1914. Pop. 30,000.

**Charles**, surnamed **Martel** ('the Hammer'), was the natural son of Pepin of Heristal, mayor of the palace under the last Merovingian kings, and was born about 688. After his father's death in 714, he was chosen as their duke by the Austrasian Franks, and at the close of a struggle with the Neustrian Franks became in 720 undisputed mayor of the palace and real ruler of the Franks, the titular kings being mere puppets in his hands. He had much hard fighting with the Saxons and other

stubborn Teutonic races, as the Alemanni and Bavarians, but his great service to Christendom and to civilisation was that he rolled back the surging tide of Moslem conquest. The Saracens had already taken Bordeaux, overrun the duchy of Aquitania, and advanced to the Loire, when Charles met them between Tours and Poitiers (732), and after a desperate battle, in which their leader, Abd-ur-Rahmān, fell, completely defeated them. This was one of the most important victories in the world's history, and saved western civilisation from hopeless retrogression and ruin. 'But for it,' says Gibbon, 'perhaps the interpretation of the Koran would now be taught in the schools of Oxford, and her pulpits might demonstrate to a circumcised people the sanctity and truth of the revelation of Mahomet.' Charles finished his work by defeating the Saracens again in 737, when they had advanced in the Burgundian territories as far as Lyons, and by driving them out of Languedoc. He died on 22d October 741 at Quiercy on the Oise, leaving the government of the kingdom to be divided between his two sons—Carloman and Pepin the Short.

**Charles I.**, second son of James VI. of Scotland and I. of England, born at Dunfermline on 19th November 1600, was a sickly child, unable to speak till his fifth year, and so weak in the ankles that till his seventh he had to crawl upon his hands and knees. Except for a stammer, he outgrew both defects, and became a skilled tilter and marksman, as well as an accomplished scholar and a diligent student of theology. He was created Duke of Albany at his baptism, Duke of York in 1605, and Prince of Wales in 1616, four years after the death of his dear brother, Prince Henry, had left him heir to the crown of three kingdoms. The Spanish match had been mooted as early as 1614; but it was not till 17th February 1623 that, with Buckingham, his inseparable friend, Charles started on the romantic incognito journey to Madrid, its objects to win the hand of the Infanta, and to procure the restitution of the Palatinate to his brother-in-law, Frederick. Both he and his father swore to all possible and many impossible concessions to the Catholics, but nothing short of his own conversion would have satisfied the Spanish and papal courts; and on 5th October he landed again in England, eager for rupture with Spain. The nation's joy was speedily dashed by his betrothal to the French princess, Henrietta Maria (1609–69); for the marriage articles pledged him, in violation of solemn engagements to parliament, to permit her and all her domestics the free exercise of the Catholic religion, and to give her the upbringing of their children till the age of thirteen.

On 27th March 1625 Charles succeeded his father, James I.; on 13th June he welcomed his little bright-eyed queen at Dover, having married her by proxy six weeks earlier. Barely a twelvemonth was over when he packed off her troublesome retinue to France—a bishop and 29 priests, with 410 more male and female attendants. Thenceforth their domestic life was a happy one; and during the twelve years following the murder of Buckingham (1592–1628), in whose hands he had been a mere tool, Charles gradually came to yield himself up to her unwise influence, not wholly indeed, but more than to that of Strafford even, or Laud. Little, meddlesome Laud, made archbishop in 1633, proceeded to war against the dominant Puritanism, to preach passive obedience, and uphold the divine right of kings; whilst great Strafford, from championing the Petition of Right (1628), passed over to the king's service, and entered on that policy of 'Thorough' whose aim was to make his master absolute. Three parliaments were summoned and dissolved in the first four years of the

reign; then for eleven years Charles ruled without one, in its stead with subservient judges and the courts of Star Chamber and High Commission. In 1627 he had blundered into an inglorious French war; but with France he concluded peace in 1629, with Spain in 1630. Peace, economy, and arbitrary taxation were to solve the great problem of his policy—how to get money, yet not account for it. Not that Charles cared for money in itself, or had far-reaching projects of tyranny (he failed to enter into Strafford's scheme). But he had inherited a boundless egoism, and, content with his own petty self, had little sympathy with the dead heroism of the Tudor age, none at all with the nascent ardour of democracy. The extension of the ship-tax to the inland counties was met by Hampden's passive resistance (1637); Laud's attempt to Anglicise the Scottish Church, by the active resistance of the whole northern nation (1639). Once more Charles had to call a parliament: two met in 1640—the Short Parliament, which lasted but three weeks, and the Long, which outlasted Charles.

It met to pronounce Strafford's doom; and, his plot with the army detected, Charles basely sacrificed his loyal servitor, his own kingly word, to fears for the queen's safety: no act weighed heavier on him afterwards. The same signature that sent Strafford to the block gave assent to a second bill by which the existing parliament might not be dissolved without its own consent. That pledge, as extorted by force, Charles purposed to disregard; and during his visit to Edinburgh, in the autumn of 1641, he trusted by lavish concessions to bring over the Scots to his side. Instead, he got entangled in dark suspicions of plotting the murder of the Covenanting lords, of connivance even in the Ulster massacre. Still, his return to London was welcomed with some enthusiasm, and a party was forming in the Commons itself of men who revolted from the sweeping changes that menaced both church and state. Pym's 'Grand Remonstrance' justified their fears, and Charles seemed to justify the 'Grand Remonstrance' by his attempt to arrest the five members (4th January 1642); but that ill-stricken blow was dictated by the knowledge of an impending impeachment of the queen herself. On 22d August he raised the royal standard at Nottingham; and the four years' Civil War commenced, in which, as at Naseby, he showed no lack of physical courage, and which resulted at Naseby in the utter annihilation of his cause (14th June 1645).

No need here to track him through plot and counterplot, with Catholics, Presbyterians, and Sectaries, with the Scots and the Irish, with the parliament and the army; enough, that, quitting his last refuge, Oxford, he surrendered himself on 5th May 1646 to the Scots at Newark, and by them in the following January was handed over to the parliament. His four months' captivity at Holmby House, near Northampton; his seizure, on 3d June, by Cornet Joyce; the three months at Hampton Court; the flight on 11th November; the fresh captivity at Carisbrooke Castle, in the Isle of Wight—these lead up to the 'trial' at Westminster of the 'tyrant, traitor, and murderer, Charles Stuart.' He had drawn the sword, and by the sword he perished, for it was the army, not parliament, that stood at the back of his judges. Charles faced them bravely, and with dignity. Thrice he refused to plead, denying the competence of such a court; and his refusal being treated as a confession, on the third day fifty-five out of seventy-one judges—sixty-four more never were present—affixed their names and seals to his 'death-warrant'; four days later, sentence was pronounced.

No need here to tell the well-known story of his meekness towards his persecutors, of the pathetic

parting from two of his younger children, of his preparation for a holy death; or how, on the morning of the 30th January 1649, he passed to that death on the scaffold in front of Whitehall, with a courage worthy of a very martyr. On the snowy 7th of February they bore the 'white king' to his grave at Windsor in Henry VIII.'s vault. Six children survived him—Charles and James, his successors; Mary, Princess of Orange (1631–60); Elizabeth (1635–50); Henry, Duke of Gloucester (1639–60); and Henrietta, Duchess of Orleans (1644–70), the last born ten weeks after Charles's final parting from his queen. At the Restoration Charles II. appointed, on his sole authority, a 'form of prayer, with fasting, for the day of the martyrdom of the Blessed King Charles I.,' to be annexed to the Common Prayer-book; with the other 'state-services,' it kept its place there till 1859. Convocation added Charles to the calendar of saints of the Church of England in 1915.

A far stronger man than Charles might scarcely have extricated himself from the difficulties that beset him; true, those difficulties were largely of his own creating. But was he right in abandoning Strafford? should he also have sacrificed wife, faith, and crown? If yes, then was he wholly in the wrong; if no, he was partly—for once at least—in the right. Vices, other than duplicity, he had none, as we use the word. He was vague, vacillating, obstinate; unable to lead or be led; superstitious, heedful of omens; unsympathetic and reserved where he did not love; intolerant of opposition to his will. But he was a good husband, a good father, a good churchman—no man so good was ever so bad a king; no man so fallible believed so honestly in his infallibility. For Charles was honest to his own convictions. His very duplicity was due sometimes to schooling in 'kingcraft,' but oftener to inability to see two sides of a question. Now he saw one, and now the other, but never both sides at once; and, just as he saw, so he spoke. He was not a liar because he loved a lie.

See the articles EIKON BASILIKE, HENRIETTA MARIA, ENGLAND, SCOTLAND, IRELAND, LAUD, STRAFFORD, ELIOT, HAMPDEN, PRYNN, PYM, CROMWELL, BRADSHAW, &c.; the Histories of Clarendon, Hallam, Green, Guizot, and Ranke; I. D'Israeli's *Commentaries on the Life and Reign of Charles I.* (5 vols. 1828–30); *Letters of Charles I. to Henrietta Maria* (Camden Soc. 1856); *Chancellor's Charles I., 1600–25* (1886); *Calendar of State Papers, 1625–45* (20 vols. 1858–90); the sumptuous *Life of the Martyr King* (1894); and, specially, S. R. Gardiner's *Puritan Revolution* (1876), *History of England, 1603–42* (10 vols. 1863–82; new ed. 1883–84), and *History of the Great Civil War, 1642–49* (3 vols. 1886–91).

**Charles II.**, born at St James's on 29th May 1630, was present at Edgehill (1642), and in 1646, after a twelvemonth in the western counties, escaped to France by way of Scilly and Jersey. He got little good from two years spent in Paris; then he passed on to Holland, where he met with a better reception, and whence in 1648, with nineteen English royalist war-ships, he made an expedition to the Thames. His father beheaded—Charles did his utmost to save him, even sending a *carte blanche* to the English parliament—and his hopes disappointed from Ireland and Montrose, in 1650 he accepted the terms of the Scottish commissioners, and landed on 23d June at the mouth of the Spey. That was a dreary time of prayers, fastings, and sermons (six sermons a day) for the gay young prince. Less a king than state-prisoner, he must sign and re-sign the two Covenants, must put away his old friends, must acknowledge the sins of his house, his father's blood-guiltiness and mother's idolatry. But the defeat at Dunbar and his 'start' for the Highlands gained Charles somewhat more liberty; and, having on 1st January 1651 been

crowned at Seone, in the following August he suddenly marched, with 10,000 men, into England. Few joined the Scots, and, catching them up at Worcester, Cromwell utterly routed them on 3d September. For six weeks Charles wandered a fugitive, a thousand pounds set on his head, through the western and southern counties, now hiding in the oak at Boscobel, now riding disguised as a serving-man, anon lurking at Stonehenge. More than forty persons were privy to his secret, yet on 15th October he embarked at Shoreham for Normandy. Then followed nearly three years of exile in France, nearly two at Cologne, then three in the Low Countries, needy everywhere, everywhere profligate; but at last, on 26th May 1660, Charles landed at Dover, recalled to the throne by the fall of the Protectorate, and the nation's dread of military despotism. 'It must be my own fault,' he jested, 'that I did not come sooner back, for I find no one but tells me he has always longed for my home-coming.'

Of the four parliaments that succeeded the Convention, the first or 'Cavalier' parliament lasted through nearly two-thirds of the entire reign, from May 1661 to January 1679; from March 1681 Charles ruled without one. The first seven years (1660-67) were the period of Clarendon's ascendancy, of constitutional loyalty to church and state, as anti-Catholic as it was anti-Puritan. Next came the Catholic-Presbyterian Cabal, broken up by the Test Act of 1673; and then the fierce struggle between the Court and Country factions, in which Shaftesbury played the chief part, and from which, in the end, Charles issued victorious.

As early as 1661 he accepted a secret subsidy from France, and no act of his reign was more unpopular than the sale next year of Dunkirk. In 1665 a naval Dutch war, due to commercial jealousy, was forced on by Clarendon's enemies, who saw in it a chance of ousting him. In spite of two English victories, with an indecisive engagement between (Lowestoft, Downs, and North Foreland), in June 1667 De Ruyter sailed up the Thames, and burned several war-ships lying at Chatham—that night Charles was very merry in his harem. The peace of Breda (21st July), which in August was followed by Clarendon's downfall, left both nations exhausted, and France the sole gainer. Temple's Triple Alliance (23d January 1668), between England, Holland, and Sweden, was on Charles's part a mere bid for popularity, a means too of raising his price with Louis XIV.; and by the secret Treaty of Dover (20th May 1670) he entered on an offensive alliance with France, became its pensioner, and undertook to effect the conversion of England. A sea-fight with the Dutch in Southwold Bay (1672) was bloody but indecisive; and the strong anti-French feeling forced Charles to conclude a peace (1674), and to consent to the marriage of his niece Mary with his nephew William of Orange (1677). Still, by two other secret treaties (1676-78), and by also intriguing with the opposition, Louis secured his end, to cut England off from continental politics.

At home, the abortive Savoy Conference was followed by the ejection of nearly 2000 Nonconformist ministers (24th August 1662); the Great Plague (May to December 1665) carried off nearly seventy thousand Londoners; and the Great Fire (2d to 6th September 1666) consumed 13,200 houses, St Paul's, and 86 churches. Sir John Coventry, for plain speaking, got his nose slit by Charles's bullies (1670); the 'stop of the Exchequer' (1672) plunged the chief city bankers in bankruptcy; and Charles's two Declarations of Indulgence (1662-72) were met by the Conventicle and Test Acts, the Dissenters themselves declining to share toleration with the Catholics, for whom such

toleration was designed. Clarendon's foes had cause to dread Clarendon's son-in-law, the king's brother, James, Duke of York; and his open profession of Catholicism (1672) gave a pretext for Shaftesbury's Exclusion Bill, and colour to Oates's trumped-up 'Popish Plot' (August 1678 to December 1680), which Shaftesbury fostered, and which cost the lives of fifteen Catholic victims. Himself, if anything, at heart a Catholic, Charles sacrificed them basely to his fears; still, honour, brotherly affection, or French gold, would not let him acknowledge Monmouth for his heir. But the tide had already turned. Men's shame at that shameful panic, and disgust at the thought of a bastard on the throne, caused a Tory reaction; and the Tory reaction drove the Whigs on to open resistance—the Rye-house Plot (1683). Shaftesbury died beyond seas, Lord Essex by his own hand in the Tower, and Russell and Sidney by the headsman's axe.

What English king so absolute as Charles, that Sunday evening, when Evelyn saw him 'toying with his concubines in the glorious gallery' of Whitehall? But on the morrow he was struck with apoplexy, and for three days lay in a stupor. When he came to himself on the Thursday, he would not receive the communion from Bishop Ken; but, thanks to the Duchess of Portsmouth, a priest who had aided him in his escape from Worcester was brought to his bed-side, and by him he was reconciled to the Catholic Church. Then he blessed his children; blessed, too, the Protestant bishops; and at last passed away on Friday the 6th of February 1685. On the night of the 14th he was buried in Westminster Abbey.

So ended the worst reign in English history, whose sole great measure was the Habeas Corpus Act (1679), and whose tortuous politics are generally referable to one or other of the following motives: Charles's fear of again being sent on his travels, the nation's fear of a second great civil war, its hatred of Popery and hatred of the French, the littleness of men's aims and greatness of their greed, and 'backstairs' influence, omnipresent, omnipotent. Such as the reign was, such was Charles himself. With a taste for the arts and for science, he was able, shrewd, affable, easy-going, active of habit, physically brave. His talents serve but to enhance his vices of utter selfishness and abject sensualism. And yet with his subjects, though they may have disapproved some of his ways, he seems to have been popular, as 'The Merry Monarch' and other such kindly or playful names attest.

On 22d May 1662 Charles had married poor plain Catharine of Braganza (1638-1705). The marriage was childless, and her influence on English politics was slight as compared with that of his numberless mistresses. Of these, before the Restoration, two only call for notice—'brown, beautiful, bold, but insipid' Lucy Walter (1630-58), the mother of James, Duke of Monmouth and Buccleuch (1649-85); and Catherine Peg, the mother of Charles Fitzcharles, Earl of Plymouth (1657-80). Then came the splendid termagant, Barbara Villiers or Palmer (1640-1709), whom Charles made Countess of Castlemaine in 1661, Duchess of Cleveland in 1670, and who was mother of the three Fitzroy Dukes of Southampton and Cleveland (1662-1730), Grafton (1663-90), and Northumberland (1665-1716). By 'pretty, witty' Nell Gwynn (1650-87) Charles was father of Charles Beauclerk, Duke of St Albans (1670-1726); almost his last words were 'Let not poor Nelly starve.' There were, besides, 'La belle Stewart' (Duchess of Richmond), the Duchess of Mazarin, and many more, with, last but not least, the hated 'Madame Carwell,' i.e. Louise de Kéroualle (1649-1734), the subtle, 'baby-faced' Breton. Duchess

of Portsmouth in 1672, French Duchesse d'Aubigny in 1684, she was the mother of Charles Lennox, Duke of Richmond (1672-1723).

See the articles ENGLAND, SCOTLAND, MONK, LAUDERDALE, LEEDS (Danby), HALIFAX, &c.; the writings of Clarendon, Burnet, Pepys, Evelyn, Grammont; Masson's *Life of Milton*; the *Calendars of State Papers*, 1649-67 (21 vols. 1860-87); P. Cunningham's *Nell Gwynn* (1852; new ed. 1893); Molloy's *Royalty Restored* (1885); Williams's *Rival Sultanas* (1915); books by Harris (1766), Hoskyn (1854), Fea (1897), Airy (1901, 1904), Scott (1905, 1907), Crawford (1909); and histories of the time.

**Charles** (KARL FRANZ JOSEF), emperor of Austria and king of Hungary, last of the Habsburg monarchs, was born 17th August 1887 at Peisenburg, Lower Austria. He studied science and law, and in the Great War had commands on the Italian and eastern fronts, but had had little political experience when he succeeded his great-uncle Franz-Josef in 1916. In a situation of great difficulty, national, military, and dynastic, he made a secret offer to France, abandoning the German cause in Alsace-Lorraine for the sake of peace, and sought with some vacillation to maintain the integrity of Austria-Hungary and the Habsburg régime. In 1918 he renounced temporarily all share in the government of Austria and Hungary, but not the crown, and withdrew to Switzerland. Two attempts to re-establish himself in Hungary (1921) failed. In the second *putsch* he was defeated and taken, handed over to the British, and sent to Madeira, where he died, 1st April 1922.

**Charles VII.**, the third son and successor of Charles VI. of France, was born 22d February 1403. On his father's death (1422) his army held possession of the southern provinces; Paris and the north being in the hands of the English, who proclaimed Henry VI. of England king of France, and appointed the Duke of Bedford regent. For some time the events of war were unfavourable to Charles, who was compelled to evacuate in succession Champagne and Maine. In 1426 the Count Dunois gained the first victory over the English at Montargis; but in the year following the latter laid siege to Orleans, a place of great importance to the French, as securing a connection with the north. At this time also, Joan of Arc, the famous Maid of Orleans, by her wonderful courage and confidence of a heavenly mission, roused the fervour both of nobles and people. The siege of Orleans was raised in May 1429; the English retired disheartened, and gradually lost all they had gained in France, while their cause finally became hopeless after the treaty concluded at Arras (1435), between the French king and the Duke of Burgundy. Bayonne, the last stronghold in the south, fell in 1451, and with the death of Talbot under the walls of Castillon in 1453, the whole south finally passed to France, and the Hundred Years' War came to an end. Nothing now remained to the English across the channel but Calais, with Havre and Guines Castle. In 1436 Charles entered Paris. He next devoted himself to the reorganisation of the government, in which everything had fallen into confusion, and under his rule France recovered in some measure from the effects of the terrible calamities which it had endured. His last years were embittered by the conduct of his son, the Dauphin, afterwards Louis XI. He died at Melun on 22d July 1461. See the great work by De Beaucourt (6 vols. 1881-92).

**Charles IX.**, king of France (1560-74), the second son of Henry II. and of Catharine de' Medici, was born at St Germain-en-Laye in 1550, and succeeded his brother, Francis II., in 1560. He was a proficient in manly exercises, possessed much physical energy, and considerable literary accomplishments. But weak and wavering, with all his

cruelty and cunning, he was completely subject to the will of his mother, whose counsels drove him to authorise an act so diabolical that all Europe still shudders at the recollection. The atrocious massacre of St Bartholomew's Day, 24th August 1572, was the culmination of a series of disgraceful treacheries towards the Huguenots. Its consequences politically were the very reverse of favourable to the Catholic cause, while scarce two years later (May 30, 1574) the wretched king died miserably, with all the horrors of hell before his eyes. See BARTHOLOMEW (MASSACRE OF ST.).

**Charles X.**, king of France (1824-30), third son of the Dauphin Louis, and grandson of Louis XV., was born at Versailles, 9th October 1757. He received the title of Comte d'Artois, and in 1773 married Maria Theresa of Savoy. The taking of the Bastille on July 14, 1789, prevented the success of a *coup d'état* planned by Artois and the court party. The first emigration headed by Artois and Condé then followed, and a more disastrous policy was never conceived. The attempts of the *émigrés* to restore the old state of things in France by means of foreign intervention did more than any single event to insure the fall of the monarchy. After taking a small part in the war of 1792, Charles went to St Petersburg; thence in May 1793 to England. In spite of the failure of the expedition to Quiberon Bay in June 1795, another was attempted under Artois' leadership in October, but he had not courage to land and place himself at the head of the insurgents, whom he basely left to the vengeance of Hoche and the republicans. After this he lived in obscurity, partly at Holyrood and partly at Hartwell, until the allies entered Paris in 1814, when he appeared in France as lieutenant-general of the kingdom, and issued a proclamation announcing the end of despotism, of conscriptions, and of oppressive taxes. After the second restoration, in alliance with the priests, he headed the party of the Ultras in their struggle with the Constitutionalists. The accession of Villèle to office and the unconstitutional character of the latter part of Louis XVIII.'s reign attested the success of Artois' reactionary policy. The death of Louis, on 16th September 1824, brought him to the throne as Charles X. He took the oath of adherence to the Charte, and was at first popular with all parties; but he soon displayed his intention of restoring as much as possible the absolutism of the old French monarchy. Popular discontent rapidly increased. The victory of the opposition at the elections of 1827 was followed by the resignation of Villèle. A ministry of compromise, headed by Martignac, a moderate politician, succeeded in January 1828, but in August 1829 Charles called to the head of affairs the Prince Polignac, an extreme royalist. A royal speech, of a threatening character, on 2d March 1830, was followed by an address of remonstrance, signed by 221 deputies, upon which the king dissolved the chambers. The deputies who signed the address were all re-elected, but the court taking fresh courage from the success of the expedition to Algiers, the celebrated five ordinances of 25th July were signed by the king, putting an end to the freedom of the press, already largely curtailed, appointing a new mode of election, and dissolving the recently elected chamber. Paris took up arms, the guards were repulsed, the revolution was accomplished in three days, and the king found himself compelled to retire to Rambouillet. As a last resource, he abdicated the throne on 2d August 1830 in favour of his grandson, the little Comte de Chambord. But it was too late; the revolution was completed, and Louis-Philippe, Duke of Orleans, was chosen king of the French. Charles then travelled through France to Cherbourg, and embarked for England in an American ship. He

resided for some time at Holyrood again, and afterwards at Prague, taking no part in the political intrigues and attempts of the Duchess de Berri. He died of cholera at Görz on 6th November 1836.

**Charles V.**, emperor of Germany, by the extent of his dominions and by virtue of his own genius the greatest European potentate of the 16th century, was born at Ghent in 1500. From his father Philip, the son of the Emperor Maximilian and Mary of Burgundy, he inherited the dominion of the Low Countries, the county of Burgundy, and a strong claim to the imperial crown; from his mother, Joanna, the daughter of Ferdinand and Isabella, he also inherited the kingdoms of Spain and Naples, and the Spanish acquisitions in America. Charles's education was intrusted to Adrian of Utrecht, afterwards pope under the title of Adrian VI., and William de Croy, an experienced politician, who early initiated his pupil into the arts of government, and gained an ascendancy over him which determined Charles's policy during the early years of his rule. To Adrian Charles owed little, and to the end his scholastic acquirements were but meagre. His grandfather, Ferdinand, died in 1516, and the next year Charles left the Netherlands for Spain, where he was acknowledged joint ruler with his mother Joanna, who was incurably insane. On the death of his grandfather, Maximilian, in 1519, he was elected to the imperial crown from a number of competitors, little, however, to the satisfaction of his Spanish subjects, who saw in this honour a blow at their own interests and importance. The following year Charles was crowned emperor at Aix-la-Chapelle, and a few months later (1521) presided at the famous Diet of Worms. The main question he had here to settle, the question of the respective claims of the Catholics and the followers of Luther, was to the end of his reign the great problem which Charles had to settle in Germany. At this his first diet, he displayed the policy which, whenever it was in his power, he ever afterwards pursued—the restoration of Germany to the papal see. The finding of this diet was an edict against Luther and his opinions, and by this edict Charles, at the outset of his reign, leagued himself with Rome against the national sentiment of Germany.

The history of Western Europe during the next quarter of the century is in large degree the history of the rivalry of Charles and Francis I. of France. According to their respective interests, Henry VIII. of England and the successive popes now favoured the one, and now the other; and the result of the conflicting interests of all these potentates was almost continuous war during the whole of that period. The Treaty of Madrid (1526), the Ladies' Peace of Cambrai (1529), and the Peace of Crespy (1544) may be regarded as marking the successive steps in the struggle. The points in dispute between Charles and Francis were these: Charles laid claim to the duchy of Burgundy as having been unjustly appropriated by Louis XI., and also to the duchy of Milan as a fief of the empire. Francis, on his part, maintained his right to these territories, demanded homage of Charles for Flanders and Artois, and made it a ground of offence that Spain had dispossessed Jean d'Albret of his kingdom of Navarre. It was in Italy that the war between the two monarchs was carried on most vigorously; and during the first period the result was altogether in Charles's favour. Mainly at the instance of Wolsey, Henry VIII. actively aided the emperor, who was still further strengthened by Francis' quarrel with his greatest subject, the Constable Bourbon, who formed a league with Charles and Henry VIII. for the complete subjugation of France.

In 1524 the troops of Charles drove the French out of Italy, invaded Provence, and unsuccessfully besieged Marseilles. Next year Francis, in the endeavour to recover the duchy of Milan, was defeated and taken prisoner at Pavia, and afterwards conveyed to Madrid. In 1526 he was released after signing a treaty in which he yielded to Charles on all the points at dispute between them. In this year Charles married Isabella, sister of John III. of Portugal, to whom he was much devoted. Meanwhile, there was a growing alarm at the successes of Charles, and the Holy League was formed against him by Pope Clement VII., Henry VIII., Francis, and the Venetians. In 1527 a motley army of Spaniards, Italians, and Germans, led by Bourbon, who fell in the assault, sacked Rome, and imprisoned the pope, to the horror of all Christendom. Charles was denounced as the author of the sacrilege, and cartels of defiance were sent to him by Henry and Francis. He disclaimed all part in the affair; yet it was altogether in his interest that it should have happened, as the pope was then the most active of his enemies. The failure of Francis to seize the kingdom of Naples led to the Peace of Cambrai (1529), by which Charles was left master of Italy, and was relieved from his homage for Flanders and Artois.

During all these years Charles had been resident in Spain, where, on his arrival from Germany, he had found things in an extremely unsettled state owing to certain encroachments lately made on the privileges of the great cities. A general insurrection had taken place during his absence, which only after a protracted struggle had been quelled by the help of the nobles. Charles, by his tact and policy, succeeded in completely putting down the sedition; and, while largely increasing the power of the crown, contrived to render himself highly popular throughout the country. All through his reign, however, he had great difficulty in extorting from the Spanish Cortes the funds necessary to carry on his foreign schemes. In 1529 Charles proceeded to Italy, and at Bologna was crowned by the pope king of Lombardy and emperor of the Romans. As he was on his way to Germany, where the religious difficulty was still the burning question, he urged the pope, though unavailingly, to call a general council which should settle once for all the points at issue. At the Diet of Augsburg (1530) Charles confirmed the Edict of Worms, and the Protestants (now first so called), in self-defence, formed the League of Schmalkald. The threat of an invasion by the Turkish sultan, however, forced Charles to make important concessions, and with the support of the appeased Protestants he was enabled to take the field against the Turks. No battle ensued, but the sultan was forced to retire; and Charles was again at liberty to return to Spain by way of Italy, where once more he earnestly urged on the pope the necessity of a general council. In 1535 Charles achieved in person the most brilliant of all his exploits—the destruction of the power of the great corsair Barbarossa, and the capture of Tunis. Meanwhile, Francis was still in active hostility against him; and in 1536 Charles himself once more proceeded to Italy and invaded Provence with a large army. By making the country a desert, Francis forced his enemy to retire without effecting any actual conquest. As another expedition into Picardy had also miscarried at the same time, this was the most disastrous year that Charles had yet experienced. War, however, still proceeded; and Francis, in desperation, and to the disgust of Christian Europe, called in the aid of the Turk. In 1538, both parties being now exhausted, the pope (Paul III.), Francis, and Charles

met at Nice, and agreed to a ten years' truce on the condition that they should retain the possessions then in their hands.

The year 1539 was for Spain one of the most important during Charles's rule. To meet his extraordinary expenditure, Charles held in that year a meeting of Cortes with the view of gaining its consent to the imposition of new taxes. As at this meeting the nobles were especially refractory, they were thenceforward excluded from the Cortes; and from this time dates the decline of their power in the state. In the same year, by the romantic courtesy of Francis, Charles travelled through France to the Low Countries, where the insurrection of Ghent, on account of a certain illegal tax, called for his presence. After having quelled this insurrection with the utmost severity, and stripped the town of all its ancient privileges, Charles proceeded to Germany, where another diet held to settle the religious differences was as unsuccessful as its predecessors. During this journey also Charles engaged in the most disastrous of all his enterprises. In the autumn of 1541, against the advice of his most experienced seamen, he conducted from Italy a fleet against Algiers, whose piracies had been the terror of the south of Europe. A succession of storms completely destroyed the fleet, and Charles himself with difficulty reached the coast of Spain. A new quarrel having arisen between Charles and Francis regarding the duchy of Milan, the ten years' truce fell through, and war again went on for the next three years. The most notable event of the war was the wintering of the Turkish fleet at Toulon, by arrangement with the French king, at which Henry VIII. was so indignant that he concerted with Charles an invasion of France, when the emperor actually came within two days' march of Paris. By this double invasion Francis was again forced to make an unfavourable peace—that of Crespy (1544), by which he once more renounced all claims to Italian territory, and agreed in conjunction with Charles to make war on the Turks.

Having thus triumphed over Francis, whose death in 1547 left his hands freer than they had ever been since the beginning of his reign, Charles now sought to carry out the policy he had always had at heart with regard to Germany. In this policy he had two objects—the suppression of Protestantism and the succession of his son Philip to the imperial crown. The news that Charles had made a league with the pope for the extinction of heresy drove the Protestants to arms, but two campaigns saw their power broken, and two of their most important leaders, the Landgrave of Hesse and the Elector of Saxony, taken prisoners. The Augsburg Interim (1548) followed as a temporary arrangement till a general religious council should settle all difficulties. This arrangement did not satisfy the Catholics, but it was especially objectionable to the Protestants, upon whom it was forced with great violence. Charles's severe enforcement of the Interim, his cruel treatment of the Landgrave of Hesse and the Elector of Saxony, and his evident design to make himself absolute master of Germany, led to the overthrow of all his plans. Maurice of Saxony, a young man of extraordinary talents and great ambition, who, although a Protestant, had hitherto seemed to support Charles in all his schemes, saw that the emperor's power rested in reality on a most insecure foundation. By a subtle line of policy Maurice contrived to gather round him a large army, while Charles, still trusting in his fidelity, had dismissed the troops by whose aid he had lately had Germany at his feet. The emperor all but fell into the hands of Maurice, who was now in a position to command the most favourable con-

ditions for the Protestants. Accordingly, by the Treaty of Passau (1552), and, after the death of Maurice, by the Peace of Augsburg (1555), Protestantism received legal recognition, and Charles saw his life's schemes finally baffled. In his other object he was equally unsuccessful. He had tried in vain to persuade his brother Ferdinand to waive his claims to the empire in favour of Philip, and the princes of Germany, Catholic as well as Protestant, refused to entertain Charles's suggestion. Thus disappointed in his dearest hopes, and broken in health by repeated attacks of the gout, to which he had been subject since his 29th year, Charles resigned his kingdoms to his son (1555-56), whom he had married the previous year to Mary of England, and the empire to the electors (1556). Retiring to the monastery of Yuste in Estremadura, he spent the rest of his life in complete seclusion; but he never ceased, almost till his death on 21st September 1558, to take the keenest interest in affairs of state, and his advice, still given in emergencies, was received by his son with the greatest respect.

Charles V. and Luther, the two most prominent figures of the 16th century, are also the best representatives of its great conflicting principles. The religious revolution, and the spirit of nationality which that revolution evoked wherever it was realised, are the ideas associated with the name of Luther. The aim of Charles was a great empire in Western Europe, of which the pope should be the spiritual, the House of Austria the temporal, head. In opposing this aim, and thus preserving the balance of power as well as the individuality of the Western nations, Francis, according to Ranke, was justified in calling in the Turks. Charles had a mind and heart equal to great undertakings; yet he not only failed to achieve his purpose during his life, but bequeathed to his son a policy attended by the most disastrous results. It was in carrying out this policy that Philip lost the Netherlands to Spain, and that he arrested Spain itself in its national development. The position also in which Charles left the religious question by the Peace of Augsburg inevitably led to the Thirty Years' War, with all its frightful consequences to Germany. Charles's personal qualities were such as to win him the affection of his immediate dependents, and to render him popular with all classes of his subjects among all the peoples under his sway. He was sincerely devoted to the church, and religious motives greatly influenced him in all his counsels. His private morals bear a favourable comparison with those of contemporary princes. In person he was slight and graceful, and his manners were marked by singular refinement and dignity; but throughout all his life he was haunted by the dread of his mother's mental affliction. Don John (q.v.) of Austria was an illegitimate son of Charles V.

See Robertson and Prescott, *Life of Charles V.*; Ranke, *Reformation in Germany*. Stirling-Maxwell, *Cloister Life of Charles V.*; Mignet, *Charles-Quint*; Armstrong, *Charles V.*; C. Hare, *A Great Emperor* (1917).

**Charles X.**, or CHARLES-GUSTAVUS, king of Sweden (1654-60), the son of John Casimir, Count Palatine, and Catherine, sister of Gustavus-Adolphus, was born at Nyköping, 8th November 1622. After his studies at Uppsala, he took part in the Thirty Years' War under Torstensson. On the abdication of his eccentric cousin, Queen Christina, whom he had wooed in vain, Charles succeeded as next heir to the throne of a kingdom which the folly and extravagance of the queen had reduced to an almost bankrupt condition. Charles was the second of the three great warrior-monarchs of Sweden, but unlike his uncle, who could plead religious grounds, and his grandson, who was at

first forced to fight for self-preservation, Charles seemed to make war principally for war's sake. He was now free to gratify his passion for war. First he attacked Poland in July 1655, because the Polish king had not resigned his claim to the Swedish throne, and in a few weeks overran the whole country. Next he forced the Great Elector of Brandenburg to acknowledge his lordship over the duchy of Prussia, then crushed the forces of the Polish king anew in a terrible three-days' battle at Warsaw (July 28-30, 1656). He next assailed the Danes, who had declared war against him, crossed the Great and Little Belt on the ice, and speedily made himself master of all the continental possessions of Denmark. Marching from isle to isle over the frozen sea, he extorted the Treaty of Roeskild (7th March 1658), which gave to Sweden Halland, Scania, Blekinge, Bornholm, and the other Danish possessions beyond the Sound, and emancipated Sweden from the Sound Dues. His offers to the Dutch and English to share in the partition of Denmark being declined, he invaded Zealand alone in 1659, and attacked Copenhagen, but was beaten off by the Danes, aided by the Prussians and Dutch. Soon after he died suddenly at Gothenburg, February 23, 1660. He was succeeded by his son, Charles XI. (who reigned 1660-97), then only four years old. See SWEDEN.

**Charles XII.**, king of Sweden (1697-1718), was the son of Charles XI., and was born at Stockholm, 17th June 1682. On the death of his father in 1697 he ascended the throne, and notwithstanding his youth the States declared him of age to assume the reins of government. The neighbouring powers thought this a favourable time to humble Sweden, then the great power of the north; and Frederick IV. of Denmark, Augustus II. of Poland, and the Czar Peter the Great concluded a league for this object. The Danes began by invading the territory of the Duke of Holstein Gottorp, husband of the eldest sister of Charles. The young king at once flung an army into Zealand, and in concert with Sir George Rooke's Anglo-Dutch squadron so threatened Copenhagen both by land and sea that the king was fain to sue for peace. Charles now hastened to meet the Russians, who lay under the walls of Narva, 50,000 strong, stormed their camp with but 8000 Swedes, and routed them with great slaughter, 30th November 1700. He next dethroned Augustus II., and procured the election of Stanislaus Leszczyński as king of Poland. Augustus supposed himself safe at least in Saxony, his hereditary dominion, but was followed thither, and humbling terms of peace were dictated at Altranstadt in 1706. Patkul, born a Livonian, but now the Czar's ambassador at Dresden, Charles caused to be broken on the wheel for treason, after a form of trial. In the autumn of 1707 he had collected an army of 43,000 men in Saxony, and in the January of the following year suddenly burst into Russia, and almost captured the Czar at Grodno. He next drove the Russians before him, and had already forced the Beresina and won a battle at Smolensk, which opened up to him the road to Moscow, when he suddenly turned southwards to the Ukraine, trusting to the promises of the Cossack *hetman* Mazeppa. But Mazeppa failed to bring forward his 30,000 Cossacks, and the king's reinforcements from Sweden were cut off by the watchful Czar, so that the Swedes had no alternative but to endure the hard winter of 1708-9 in the midst of an impoverished and hostile country. In spring Charles, with a force reduced to 23,000 men, laid siege to Pultowa, but the Czar hastened to oppose him, and defeated him after a desperate struggle, on the 8th July. Charles fled with a handful

of attendants across the Turkish frontier to Bender.

Augustus now revoked the treaty of Altianstadt, and the Czar and the king of Denmark in concert assailed the Swedish territories. But the regency in Stockholm adopted measures of effective resistance, and Charles prevailed upon the Porte to commence a war against Russia, in which Peter seemed at first likely to suffer a severe defeat. But Russian agents succeeded in inspiring the Turks with suspicions concerning the ultimate designs of their impracticable guest, and accordingly Charles was seized, resisting desperately sword in hand, and conveyed to Demotica. At last he contrived to escape, and made his way through Hungary and Germany in sixteen days, till he reached Stralsund on the 21st of November 1714. A month later the town was forced to capitulate to an allied army of Danes, Saxons, Prussians, and Russians, on which the king crossed to Lund. His passion for war led him to attack Norway early in 1716; and soon after, under the advice of the Baron von Görtz, he formed a scheme which commended itself to his love of fighting and his vast ambition. He was to make terms with the Czar by surrendering the Baltic provinces of Sweden, then conquer Norway, next land in Scotland and replace the House of Stuart on the English throne, with the help of the Jacobite party within and that of Cardinal Alberoni without. No sooner had he purchased his peace with the Czar than he burst into Norway. In November 1718 he commenced the siege of Frederikshald, and while hastening on the works in the dead of winter with all his characteristic impetuosity, was killed (11th December) by a musket-shot from the fortress. Some writers have maintained that his death was due to treachery, and a somewhat unscientific examination of his skull in 1746 seemed to give some colour to the belief; but a new examination by command of Charles XV. in 1859 proved conclusively that the fatal shot must have been fired from a height downwards, and that therefore the king's death was due to his own reckless exposure of his person to the fire of the enemy.

The character of Charles was full of strange contradictions. He was brave to the pitch of reckless folly, determined to the point of foolish obstinacy. Pleasure had no attractions for him: he shared the coarsest food and severest labour of the common soldier with an easy cheerfulness that won him the passionate devotion of his men. All external marks of rank he despised: his dress was simple, and Swedish in form and colour—a loose blue coat, with turned-down collar, and large plain brass buttons; buff-coloured waistcoat; a black kerchief, doubly folded round his neck; coarse felt hat, and high broad-toed riding boots with massive steel spurs. His hardy frame defied alike fatigue and the extremes of heat and cold. He was able and sagacious in counsel, and had a mind capable of the vastest designs. But his ambition was fatal to his country, and after his death, Sweden, exhausted by his wars, ceased to be numbered among the great powers. The strange vicissitudes of his career are reviewed in thirty of the finest lines of Johnson's noble poem, *The Vanity of Human Wishes*—the concluding passage is as well known as anything in English literature:

His fall was destin'd to a barren strand,  
A petty fortress, and a dubious hand.  
He left the name at which the world grew pale,  
To point a moral, or adorn a tale.

Voltaire's well-written *Histoire de Charles XII.* will continue to be the chief life, spite of its errors. An eloquent sketch of his career, read by King Oscar II., then Duke of Östergötland, at the

inauguration of a statue on the 150th anniversary of his death, was translated by Apgeorge, 1879. See Lives by Bain (1896) and O. Browning (1899), and the *Cambridge Modern History*, vol. v. (1907).

**Charles XIV.**, king of Sweden and Norway (1818-44), originally JEAN BAPTISTE JULES BERNADOTTE, was born at Pau, in the south of France, January 26, 1764, and was the son of a lawyer. He entered the French army in 1780 as a common soldier; became an ardent partisan of the Revolution, and fought his way up to the command of a division in 1794, and a marshal's baton in 1804. He distinguished himself greatly in the German campaigns in 1796, and the year after under the eye of his great chief himself in Italy. In 1799 he was minister of war, and for his conduct at Austerlitz was named in 1805 Prince of Pontecorvo. In the campaigns of 1806 he commanded the first army corps. After Jena he pursued the Prussians to Halle, cut off the reserve under the Prince of Wurtemberg, next pursued the redoubtable Blücher to Lübeck, and compelled him to surrender (November 7). He received the command of the French troops in North Germany and Denmark, and led the Saxon troops at Wagram in the war against Austria. But he had never been liked or trusted by Napoleon, whose jealousy and dislike now became so apparent that Bernadotte left the army in disgust, and returned to Paris. He was afterwards sent by the ministerial council to oppose the British, who had landed at Walcheren, but meantime the breach between the emperor and him grew wider. In 1810 he was elected crown prince and heir to the throne of Sweden. Almost the only condition imposed on him was that of joining the Protestant Church. He changed his name to Charles John; and the health of the Swedish king, Charles XIII., failing in the following year, the reins of government came almost entirely into his hands. He refused to comply with the demands of Napoleon, which were opposed to the interests of Sweden, particularly as to trade with Britain, and was soon involved in war with him. He took part in the great and final struggle of the allies with Napoleon at Leipzig, but showed much reluctance to join in the invasion of France, and was tardy in his progress southward. There seems good reason to believe that the French throne was within his own ambition, and that his disinclination to act against his native country was due as much to policy as to patriotism. He became king of Sweden on the death of Charles XIII. in 1818, and won for himself the character of a wise and good king. He promoted education, agriculture, manufactures, commerce, and great public works, as well as the military strength of the kingdom. He died 8th March 1844. See *French Life* by Schiefer (1899), and books by Sir D. P. Barton (1914, 1921, 1925).

**Charles d'Orléans**, son of Louis d'Orléans, a duke who was murdered by the Burgundians, and of Valentina of Milan, was born in May 1391. He was the grandson of Charles V. of France, and the father of Louis XII. He was taken prisoner at Agincourt, and kept in captivity in England from 1415 to 1440, when he was ransomed. He wrote a number of lyrics while in prison and after his return to France. At Blois, where he held his court, he gathered together the chief French writers of his time, and took part with them in poetical tournaments, in one of which François Villon competed successfully. He died in 1465. He has been termed the father of French lyric poetry, but he has no claim to the title. His light and graceful lyrics are the last flowering of the courtly poetry of the middle ages; they show no trace of the modern spirit which appears so strongly in the works of his con-

temporary Villon (q.v.). His favourite themes are love and the spring-time; his favourite form is the *rondelet*, with two rhymes, of which he is considered the chief master, as Villon is of the *ballade*, and Voiture of the *rondeau*. See Guichard's edition (1842), Héricault's (1874); a work on his manuscript (1907) and a *Life* (1911) by Champion.

**Charles the Bold**, Duke of Burgundy (1467-77), son of Philip the Good of Burgundy and of Isabella of Portugal, was born at Dijon on 10th November 1433, and bore, during his father's life, the title of Count of Charolais. From his youth he was a declared enemy of Louis XI. of France, the nominal feudal superior of Burgundy, and he early formed an alliance with the Duke of Brittany and some of the great nobles of France for the maintenance of feudal rights against the crown. Their united forces ravaged Picardy and Isle-de-France, threatened Paris, defeated the king at Monthermé, and extorted from him favourable terms. In 1467 Charles succeeded his father as Duke of Burgundy. Richer and more powerful than any prince of his time, he conceived the design of restoring the old kingdom of Burgundy, and for this purpose of conquering Lorraine, Provence, Dauphiné, and Switzerland. Whilst he was making preparations for war, Louis invited him to a conference, and while his rival hesitated, by his agents stirred up the citizens of Liège to revolt. Charles next consented to the conference, and the news coming of what had taken place at Liège, he seized the king, and had not he been withheld by his councillor Comines, would have put him to death. He compelled Louis, however, to accompany him to Liège, and sanction by his presence the cruelties which he inflicted on the citizens. War raged between them afterwards with little intermission till 1475. In September of that year Charles turned anew to his favourite scheme of conquest, and soon made himself master of Lorraine. Next year he invaded Switzerland, stormed Granson, and hanged and drowned the garrison; but was soon after terribly defeated by the Swiss near that place, and lost his baggage and much treasure. Three months later he appeared again in Switzerland with a new army, and laid siege to Morat, where he sustained another and more terrible defeat (June 22, 1476). The news that the young Duke René of Lorraine was attempting to recover his territories roused him from despair. He laid siege to Nancy; but his army was small, and his Italian mercenaries went over to the enemy. Charles fought in vain with all his wonted recklessness and courage, and perished in the battle, January 5, 1477. His daughter and heiress, Mary, married the Emperor Maximilian I. Charles's great size and strength, his immense ambition, and reckless audacity, combined to make him the most striking figure of his time. With his life ended the long successful resistance of the great French vassals to the central power of the monarchy. See Comines, *Mémoires*; De Barante's *Histoire des Ducs de Bourgogne*; and books by Kirk (3 vols. Lond. 1863), Hoch (Basel, 1876), Putnam (1908), and Haggard (1913).

**Charles** (KARL LUDWIG JOHANN), Archduke of Austria and Duke of Teschen, third son of the Emperor Leopold II., was born at Florence, 5th September 1871. Already, spite of his youth, a distinguished soldier, he was intrusted in 1796 with the chief command of the Austrian army on the Rhine. He fought with great success against Moreau at Rastadt, defeated Jourdan in several battles, drove the French over the Rhine, and concluded his victories by taking Kehl in the winter. In 1799 he was again at the head of the army on the Rhine, was several times victorious over

Jourdan, and even successfully opposed Massena. Next year bad health compelled him to retire from active service; but he accepted the governor-generalship of Bohemia, where he soon formed a new army. After the battle of Hohenlinden he was again called to the chief command, and succeeded in staying the rapid progress of Moreau until the armistice which preceded the peace of Lunéville. In 1805 he commanded the army opposed to Massena in Italy, and fought the hard battle of Caldiero; but upon bad tidings from Germany, made a masterly retreat from the left bank of the Adige to Croatia. In 1809 he won the great battle of Aspern, which first showed to Europe that Napoleon was not invincible; but Napoleon soon retrieved his fortunes at Wagram, and the archduke had to give way before the enemy, till he reached Znaim, where an armistice was concluded. In the campaigns of 1813-14 he had no part; and he died 30th April 1847. See his *Ausgewählte Schriften* (6 vols. 1893-94).

**Charles Albert**, king of Sardinia (1831-49), born 29th October 1798, was the son of the Prince Charles Emmanuel of Savoy-Carignan, and in 1800 succeeded to his father's title and estates in France and Piedmont. In 1817 he married Maria Theresa, daughter of the Archduke Ferdinand of Tuscany. When the revolutionary movement took place in Piedmont in 1821, he was made regent, upon the abdication of Victor Emmanuel, until Charles Felix, the brother of the late king, should arrive to assume the sovereignty. In 1829 he was appointed viceroy of Sardinia, and on the death of Charles Felix in 1831 he ascended the throne. His prudent moderation brought upon him the impatient denunciations of Mazzini, but earned him the applause of all moderate and far-sighted men throughout the peninsula, who began to see that the salvation of Italy could be worked out through the house of Savoy alone. The king's zeal for the cause of a united Italy was no mere selfish eagerness for the aggrandisement of his house, but a feeling as enlightened and patriotic as the sagacious calculation of Cavour, the fiery and reckless valour of Garibaldi, or the prophetic ardour of Mazzini. In the March of 1848 he declared war against Austria; but gradually lost ground in the struggle, until, after the fatal battle of Novara, 24th March 1849, to save his kingdom he had to resign the crown in favour of his son, Victor Emmanuel II. He next retired to Portugal, where he died, broken-hearted and misunderstood, at Oporto on 28th July of the same year. See books by Cibrario (1861), Cappelletti (1891), Beauregard (1889-90).

**Charles Edward.** See STEWART.

**Charles Martel.** See CHARLES.

**Charles's Wain.** See URSA MAJOR.

**Charleston**, a port of entry and important commercial centre, capital of a county of its own name, and the largest and most historic city of South Carolina, is situated on a tongue of land between the rivers Ashley and Cooper, which unite immediately below the town and form a beautiful and spacious harbour, communicating with the ocean at Sullivan's Island, a popular sea-bathing resort, 7 miles below. It is 118 miles NE. of Savannah, 580 miles SW. of Baltimore, and 540 miles SSW. of Washington. The ground on which the city is built is elevated 8 or 9 feet above the level of the harbour at high tide, which rises about 6 feet, flowing by the city with a strong current, thus contributing to its salubrity. It has a water front of 9 miles. A shifting sandbar extends across the mouth of the harbour, affording, however, two entrances, of which the deeper is near Sullivan's Island. Jetties to give an increased depth of water

on the bar (32 feet) were constructed after 1878, affording safe entry to vessels of 30 feet draught. The harbour is defended by Castle Pinckney and Fort Sumter, each on an island, the former 2 and the latter 6 miles below the city, and also by Fort Moultrie, on Sullivan's Island, and Fort Johnston on James Island. At the entrance of the harbour is a lighthouse with a flashing light. Charleston is a naval station. There is a dry dock for large ships.

Charleston, 6 sq. m. in area, is regularly built. It has a copious water-supply from a large artesian well (1970 feet in depth). The streets, many of which are broad and bordered with shade trees, pass, for the most part, parallel to one another, from the Cooper to the Ashley River, and are intersected by others nearly at right angles. Many of the houses are of brick, some of them of superior elegance; others are of wood, neatly painted, and embowered during the summer season amid a profusion of foliage. Among the public buildings are the custom-house, the city hall, the court-house, the citadel, the academy of music, the arsenal, the orphan asylum, and the police barracks. The custom-house is a handsome edifice, built of granite and white marble. At the southern extremity of the city is a small park called the Battery or White Point Garden, with a fine promenade on the sea-wall. The most important educational and literary institutions are the Charleston College (non-sectarian), which was founded in 1785 and reorganised in 1837; the Medical College of South Carolina (1833); the State Military Academy, also called the Citadel; the South Carolina Historical Society; and the Charleston Library (1748). The Charleston College has an excellent museum of natural history. There are good public, private, and parochial schools for white and coloured children. Charleston is the seat of an Episcopal and a Roman Catholic bishop, and contains many churches. St Michael's Church (Episcopal) is a brick structure, with a steeple 180 feet high, and a chime of bells imported from England in 1764. Among the benevolent institutions are the city hospital, the Confederate Home for Widows, the almshouse, the asylum for the aged and infirm, and the orphan asylum, which is liberally endowed, and can accommodate three hundred children. There are also Catholic orphan asylums and a convent.

Charleston is the chief commercial city of South Carolina, and has an advantageous position for trade. Steamships ply regularly between this port and New York, Philadelphia, Baltimore, and Florida; and three railroads meet here, with a large wharf frontage, elevators, and every facility for through shipments and the quick despatch of freight. The coastwise trade far exceeds the foreign in extent and importance. Charleston was formerly the chief cotton port of the United States, but after the civil war it did not develop. The principal export is still cotton, other articles being rice, fertilisers, lumber, and naval stores. There is a considerable trade with the interior cities. The chief imports consist of salt, iron, kainite, and fruits from the West Indies. Of the industrial establishments, the chief are for cotton-compressing and the manufacture of fertilisers, of which large deposits are found on the Ashley River; as also cotton, rice, and flour mills, carriage factories, timber manufactories, &c.

The city was founded in 1680; a few years later a company of French Huguenots, exiled for their religion, settled at this place. On the 28th June 1776 a British squadron attacked the garrison on Sullivan's Island, consisting of 400 men under Colonel Moultrie, who defended the place with success. Charleston was afterwards besieged by Sir Henry Clinton from 1st April 1780

to 12th May, when it was surrendered by General Lincoln. On the 12th of April 1861 the Confederates initiated the civil war by the bombardment of Fort Sumter, which they took the next day. In 1861 about half the city was destroyed by fire, and a considerable part was not rebuilt until after 1865. In April 1863 a Federal fleet of nine ironclad vessels, commanded by Admiral Dupont, attacked the fortifications of Charleston without success. The place was evacuated on the approach of Sherman's army 17th February 1865. On 31st August 1886 the city was visited by a severe earthquake; nearly 7000 buildings were either destroyed or seriously injured, and several lives were lost. The earthquake was followed by a very general reconstruction of the business part of the city. Pop. (1800) 18,711; (1820) 24,780; (1840) 29,261; (1860) 40,522; (1870) 48,956; (1880) 49,984; (1900) 55,807; (1910) 58,833; (1920) 67,957 (about half coloured). See three works on the history of South Carolina by McCrady (1897-1901), and Mrs Ravelle's *Charleston* (1906).

**Charleston**, or KANAWHA, capital of West Virginia and of Kanawha county, is situated on the great Kanawha River, at the mouth of the Elk, 232 miles WNW. of Richmond. Large quantities of bituminous coal, petroleum, natural gas, and salt are got near by. The town is a great lumber centre. It was made state-capital in 1885, as it had been in 1870-1875. Pop. (1880) 4192; (1920) 39,608.

**Charlestown** (Massachusetts). See BOSTON and BUNKER HILL.

**Charlet**, NICOLAS TOUSSAINT, a French painter and engraver, born at Paris in 1792, held a clerkship under the Empire, but lost it at the Restoration (1815), and in consequence betook himself to art. After studying a while under Gros, he gradually formed for himself a style in which he had no rival. The Béranger of caricature, he was especially successful in his sketches of children and military incident. His drawings numbered about 2000. Charlet died 29th October 1845. See his *Life* by Lacombe (1856) and the study by Dayot (1892).

**Charleton**, WALTER, M.D. (1619-1707), born at Shepton Mallet, studied at Oxford, was physician to Charles I. and Charles II., a friend of Hobbes, and senior censor 1698-1706 in the College of Physicians in London. He wrote many works on theology, natural history, natural philosophy, medicine, and antiquities. He was a disciple of Van Helmont, and his medical theories were as speculative as his arguments for the immortality of the soul. In his *Chorea Gigantum* (1663) he maintained the Danish origin of Stonehenge, in opposition to Inigo Jones, who still more absurdly believed it to be a Roman temple. Charleton held it was a place of assembly, and the scene of the coronation of the Danish kings of England. His *Brief Discourse concerning the Different Wits of Men* (1675) contains lively and accurate sketches of character.

**Charleville**, a town in the French department of Ardennes, on the Meuse, opposite Mézières, with which it communicates by a suspension bridge. It has manufactures of hardware, leather, and beer; and the Meuse affords facilities for trade in coal, iron, slate, wine, and nails. Pop. (1891) 17,344; (1921) 21,689.

**Charlevoix**, PIERRE FRANÇOIS XAVIER DE (1682-1761), a French Jesuit traveller, was born in St Quentin, twice visited Canada, and voyaged down the Mississippi to New Orleans. He published his journal, histories of San Domingo, Japan, and Paraguay, and an *Histoire de la Nouvelle France* (1744; Eng. trans. New York, 6 vols. 1865-72).

**Charlock**. See MUSTARD, RADISH.

**Charlotte**, capital of Mecklenburg county,

North Carolina, 225 miles ENE. of Atlanta, the seat of North Carolina Medical College, and the terminus of several railways, has manufactures of carriages, cotton goods, tobacco, &c.; pop. (1880) 7094; (1900) 18,091; (1910) 34,014; (1920) 46,338.

**Charlotte**, PRINCESS, born at Carlton House, London, 7th January 1796, was the only child of the future George IV. and Caroline of Brunswick, who parted immediately after her birth. A bright, lively, warm-tempered girl, she was brought up in strict seclusion, under various governesses and sub-governesses, seeing her father rarely, and her mother only for two hours a week. Her six months' engagement to Prince William of Orange she herself broke off in June 1814, greatly to George's fury; had the match come off it might have been as momentous in its consequences as that of the Princess Mary to another Prince William of Orange. On 2d May 1816 she married Prince Leopold of Saxe-Coburg; but the marriage, a happy one, was cut short on 5th November 1817 by her death, after giving birth to a still-born boy. See works by Lady Rose Weigall (1874), Mrs Jones (1885), and C. E. Pearce (1911).

**Charlotte Amalie**, the capital of the West Indian island of St Thomas (q.v.).

**Charlottenburg**, a town of Prussia, on the Spree, since 1920 part of Berlin, with which it is connected by a road leading through the *Tiergarten*. Its palace, founded in 1696 for Sophie Charlotte, the second wife of Frederick I., has a fine park, and a mausoleum; here are the tombs of Frederick William III. and Queen Louisa (with statues by Rauch), of the Emperor William I. and Augusta. In the town are several colleges, including a great technical school, and a porcelain factory, and there are manufactures of iron-wares, machinery, glass, paper, leather, and chemicals. Pop. (1880) 30,483; (1890) 76,859; (1900) 189,290; (1910) 305,978.

**Charlottetown**, the capital of Prince Edward Island, on the south coast, stands on the Hillsborough estuary, which forms a secure and commodious harbour for the largest vessels. The town has two colleges, an iron-foundry, a woollen factory, and shipbuilding yards. Pop. 12,000.

**Charm**, properly a form of words, generally in verse, supposed to possess some occult power of a hurtful, a healing, or a protective kind, which it exerts by being recited, or by being written and worn on the person. In this latter case charms may be classed with Amulets (q.v.). The nature of this superstition will be considered under INCANTATION; see also MAGIC.

**Charmes**, FRANCIS (MARIE JULIEN JOSEPH FRANÇOIS, 1848-1916), French political journalist, born at Aurillac, Cantal, was editor of the *Journal des Débats*, and, after Brunetière, of the *Revue des Deux Mondes*. He was deputy for Cantal, and from 1900 a senator.

**Charnel-house**, a chamber situated in a churchyard or other burying-place, in which the bones of the dead which were thrown up by the grave-diggers were reverently deposited. It was often a chapel with a vault beneath.

**Charnock**, JOB, went to India about 1655, and, as head of the factory at Hugli, transferred the headquarters to Calcutta (thus founding the city) in 1686-90. He died in 1693.

**Charnwood Forest**. See LEICESTERSHIRE.

**Charolais** is a district in the French department of Saône-et-Loire, noted for its fine cattle.

**Charon**, in classical mythology, the son of Erebus and Nox, is first mentioned by the later writers of Greece. His duty was to ferry the shades of the buried dead across the rivers of the

under-world. For this service he exacted an *obolus* from each, and consequently this coin was placed in the mouth of the dead. If this rite was neglected, Charon refused to convey the unhappy shade across, and it was doomed to wander restlessly along the shores of Acheron. He is generally represented as a gloomy old man, with a rough beard and wretched clothes. In the Etruscan monuments he holds a hammer. In the folklore of modern Greece Charon still survives as a kind of shadowy representative of death and a mysterious under-world. (The Greek is *chárōn*; the English pronunciation, *kārōn*.)

**Charophyta.** See CHARA.

**Charpentier, GUSTAVE**, composer, was born at Dieuze, in Lorraine, in June 1860. After the Franco-German war he removed to Tourcoing, and later to Lille. At Paris Conservatoire he turned from violin-playing to composition, encouraged by Massenet, and won the Prix de Rome in 1887. He composed *Didon*, *Impressions d'Italie*, *La Vie du Poète*, *Fleurs du Mal* (Baudelaire), *La Couronnement de la Muse*, the operas *Louise* and *Juhen*.

**Charpentier, LOUIS EUGÈNE** (1811-90), French battle-painter, was born in Paris, and taught at Versailles.

**Charpentier, MARC ANTOINE** (1634-1702), composer, was born in Paris, and studied in Rome. He composed operas and afterwards church music.

**Charqui.** See JERKED BEEF.

**Charr**, or **CHAR** (*Salvelinus*), a genus of beautiful and palatable fishes in the family Salmonidæ, differing from salmon and trout in minute characters, such as the restriction of the vomer teeth to the head of that bone. The ruddy belly, the smaller scales, and the absence of black or brown spots may serve to distinguish char from trout. There are many different kinds of char in northern parts of Europe and America, and Tate Regan distinguishes fifteen species in Great Britain and Ireland. Whether these are species, sub-species, elementary species, or 'varieties' is a matter of opinion and convenience; their constant differential characters are as great as those that distinguish many generally admitted species of fishes. The evolutionary interest is this: char are northern or arctic salmonids; during the glacial epoch they spread farther south than now, ascending the rivers in the autumn to spawn, descending to the sea in spring, as they still do in the arctic regions; the numerous kinds of char in Windermere, the Highlands, Ireland, Orkney, Shetland, &c. represent isolated lacustrine colonies. The so-called Brook Trout (*Salvelinus fontinalis*) of Canada and the northern United States is a char which has been introduced (see PISCICULTURE) into English streams. See C. Tate Regan, *British Fresh-water Fishes* (1911).

**Charron, PIERRE** (1541-1603), a French moralist and theologian, born at Paris. He studied for the law, but after being called to the Paris bar, entered the church, and became a conspicuous member of the *politiques*, or party of moderate Catholics. He assailed the League in his *Discours Chrétiens* (1589), vindicated Catholicism against Protestantism in his treatise *Les Trois Vérités* (1594), and in his chief work, the treatise *De la Sagesse* (1601), took a sceptical attitude towards all forms of religion. He was a friend and disciple of Montaigne, to whom he was, as a writer, immeasurably inferior, and from whose essays he borrowed freely.

**Chart**, a marine or hydrographical map, exhibiting a portion of a sea or other water, with the islands, coasts of contiguous land, soundings, currents, &c. (see MAP). Chart-making has been

traced back to about the beginning of the 13th century; now most civilised countries have their system of charts. In the English service, when coasts have been surveyed by the Admiralty, charts are engraved, and are sold below cost price, the object being to encourage their general use as much as possible. The navigating charts, showing the dangers of coasts with sufficient clearness to enable mariners to avoid them, are generally on the scale of half an inch to a mile; those of larger size show all the intricacies of the coast. The merchant-service is supplied with charts by agents, who receive a stock from the Admiralty, and keep them on sale. The preparation of charts is part of the duty of the Hydrographical Department at the Admiralty. See GEOGRAPHY, SEA, SOUNDING, CHALLENGER EXPEDITION, &c.

The United States coast survey, a vast undertaking, was begun in 1807, carried on intermittently till 1845, and since then more systematically, save during the civil war. In the American service, the coasts of the United States are surveyed and the charts produced by the coast and geodetic survey attached to the Treasury Department, and the unsurveyed foreign coasts are surveyed by the Bureau of Navigation, the charts being produced by the Hydrographic Office, Navy Department. The charts are obtainable at coast and geodetic survey agencies at all seaports of the United States. They exhibit accurate and minute topography as far inland as will supply landmarks for the navigator, or serve for purposes of defence; the shore line at high-water and sanding to mean low-water; soundings, contours, and material of bottom at different depths; bars, channels, sailing ranges and directions; true meridian and compass variation, rocks, reefs, buoys, beacons, lights; tide establishment, detailed explanation of lighthouses and signal stations. They are carefully corrected for every substantial change in any of those features. They range in scale from  $\frac{1}{100,000}$  (30·401 inches to the nautical mile) to  $\frac{1}{1,000,000}$  ( $\frac{1}{100}$  of an inch to the nautical mile), and comprise sailing charts exhibiting vast areas, general charts, coast charts, and harbour charts.

The term chart is also given to a graphical representation, by curves or otherwise, of the fluctuations of any varying magnitude—temperature, barometric pressure, population, prices, &c. See GRAPHIC METHODS, TEMPERATURE, STORMS, &c.

**Charta, MAGNA.** See MAGNA CARTA.

**Charte**, a charter or system of constitutional law, embodied in a single document. The first such charter in France is known as the *Grande Charte*, or the Charter of King John (in 1355). But the constitution to which the term Charte is most frequently applied is that in which Louis XVIII. solemnly acknowledged the rights of the nation on his restoration in 1814. This Charte was ever after considered the fundamental law of constitutional monarchy while that form of government existed in France. A modification of it was sworn to, 29th August 1830, by Louis-Philippe, in which the sovereignty of the people is explicitly recognised. This Charte in its turn became a nullity by the revolution of February 1848.

**Charter** (Lat. *charta*; Gr. *chartē*, 'paper,' or 'anything written upon,' from *charassō*, 'I scratch' or 'write'). In its most general signification, charter is nearly synonymous with *deed* and *instrument* (see DEED), and is applied to almost any formal writing, in evidence of a grant, contract, or other transaction between man and man. In private law its most important use is in the alienation of real estates, the writing given to the new proprietor by the old, in proof of the transference title, being usually called a charter. In public law the name

is given to those formal deeds by which sovereigns guarantee the rights and privileges of their subjects, or by which a sovereign state guarantees those of a colony or other dependency (see CHARTER, MAGNA CARTA, CHARTISM, FOREST LAWS). There is another sense of the term in which it is in a measure intermediate between the two we have mentioned—viz. where we speak of the charter of a bank or other company or association. In this sense it signifies an instrument by which powers and privileges are conferred by the state on a select body of persons for a special object (see BANKING, CORPORATION, COMPANY, &c.).

This is the general use of the term in the United States. It is a grant of authority from the state or the United States, creating a corporation, defining its powers, privileges, rights, and franchises. A charter of a private corporation, on the faith of which property has been given, is a contract within the meaning of the United States Constitution, Article I., sect. 10, which declares that no state shall make a law impairing the obligation of contracts. And while the state legislatures have no power to set aside or essentially modify charters that come within this prohibition, without the consent of the corporators, it is confined to transactions involving property and rights which may be asserted in a court of justice. This prohibition does not debar the state from exercising the right of eminent domain, nor prevent the exercise of its general police power. Charters of municipal and public corporations are not beyond legislative control; and the power to change and adapt them to the purposes for which they were created is implied in every enactment creating them. But most of the charters in the United States have in them a clause reserving to the state the power to alter, amend, or repeal them at pleasure. In some states the courts have power to grant charters to social, charitable, and religious organisations, while the state officers are authorised by law to grant charters for manufacturing, mining, railroad, and other corporations for purposes of trade.

Royal Charters, generally written in Latin, are of two kinds: I. Grants of lands, houses, honours, or liberties to persons who did not previously possess them; II. Charters confirming grants previously made, and therefore called 'Charters of Confirmation.' Confirmation charters are of three kinds: (1) Charters confirming previous grants, without reciting them; (2) Charters of simple confirmation, without addition of anything new; (3) Charters reciting previous charters and confirming them, with addition of something new. These last two classes of charters are called charters of 'Inspeximus,' or 'Vidimus,' from the word used by the granter in saying that he has seen the charter which he confirms. Royal charters generally contain seven clauses: (1) The 'Premises'—i.e. the name and style of the granter, the persons to whom the charter is addressed, the name and style of the grantee, the reason why the grant is made, and the description of the thing granted; (2) the 'Tenendum and Habendum'—i.e. the way in which the thing granted is to be held and had; (3) the 'Reddendo,' the return of rent or service which is to be made to the granter by the grantee; (4) the 'Quare Volumus,' or order that the grantee should have the thing granted, under certain penalties; (5) the 'Sealing' or 'Signature' clause, setting forth the seal, signature, or subscription by which the charter is authenticated; (6) the 'His Testibus,' or testing-clause, enumerating the persons present as witnesses to the granting of the charter; (7) the 'Date,' setting forth the time when, and the place where, the charter was granted.

Charter in the law of Scotland is the written

evidence of a grant of heritable property under the conditions imposed by the feudal law—viz. that the grantee, or person obtaining, shall pay at stated periods a sum of money or perform certain services to the granter, or person conferring the property. The granter of a charter, in virtue of the power which he thus retains over the property and its proprietor, is called the superior; and the grantee, in consequence of the services which he undertakes to render, the vassal; whilst the stipulated sum to be paid, or service to be rendered, is called the duty.

Charters are either blench or feu, from the nature of the service stipulated—a *me* or *de me*, from the kind of holding or relation between the granter and grantee; and were formerly original or by progress, from being first or renewed grants. Charters by progress, however, were abolished in 1874.

*Blench and Feu Charters.*—The duty which the superior required of his vassal in former times was almost always military service, and the vassal was then technically said 'to hold waid'—to hold on condition of warding or defending his superior. But subsequent to the rebellion of 1745, in which the dangerous tendencies of the feudal relation were experienced, this holding was abolished (20 Geo. III. chap. 50), and the only duties which it has since been lawful to insert in charters are *blench* and *feu* duties. The former is a merely nominal payment—a penny Scots, a red rose, or the like, *si petatur tantum* (should it be asked); the latter is a consideration of some real value. Original blench charters having lost all object, except as a means of keeping up restrictions on the lands, and having the effect of subjecting superiors to expense in keeping up their titles, have become rare in modern practice. The forms of charters, varying according to the circumstances in which they are granted and the relations established between the granter and grantee, are of a technical nature.

The *Charter of Resignation* proceeded upon the formal surrender of the lands or other rights into the hands of the superior for the purpose of obtaining a new grant in favour of the resigner, with some change of the destination, or in favour of a purchaser or other disponee. This was termed a resignation *in favorem*. But when the property is surrendered in order to remain with the superior, the resignation is then said to be *ad remanentiam*. In older times resignations were transacted with solemn formality by delivery of a staff or baton, as the symbol of surrender, into the hands of the superior, who, if the purpose was *in favorem*, returned the symbolic staff to the person to be invested with the lands, or to his attorney, the whole transaction being recorded in the form of a notarial instrument.

Crown charters of resignation or confirmation proceeded upon the warrant of the Barons of Exchequer, as the royal commissioners in Scotland since the union of the crowns, for receiving resignations and granting new infeftments to crown vassals. The charter was preceded by the *signature* or order under the royal superscription, with consent of the barons, setting forth the terms in which the charter was to be expressed. After several other proceedings, the charter was finally completed by sealing. Previous to 1707 the Great Seal of Scotland was appended to crown charters, but by the treaty of union another seal was substituted. The royal charters of Scotland are recorded in the Register of the Great Seal, which is extant from about 1300 A.D., and continued to the present time. There are, however, numerous charters by the early Scottish kings not recorded in the Register, but extant in private collections and in the chartularies of religious houses. Ancient charters are usually remarkable for the excellence

of their writing and the brevity and conciseness of their style.

**Chartered Companies.** See COMPANY, COLONY, DARIEN SCHEME, EAST INDIA COMPANY, HUDSON BAY COMPANY, BORNEO, NIGERIA, RHODESIA, ZANZIBAR (for the East Africa Company).

**Charterhouse** (a corruption of *Chartreuse*, 'Carthusian') is the name of a famous hospital and school which occupied a joint-building in Charterhouse Square, London, till 1872, when the school was transferred to Godalming in Surrey. The Charterhouse was instituted in 1611 by Thomas Sutton, of Castle Camps, Cambridgeshire. The site had been occupied by a Carthusian monastery (founded in 1371), but on the dissolution of the monasteries by Henry VIII. it was made a place of deposit for his nets and pavilions. After undergoing many alterations, and passing into the possession of various distinguished persons, it was finally purchased from Lord Suffolk for £13,000 by Thomas Sutton, who endowed it with the revenues of upwards of twenty manors, lordships, and other estates in various parts of England. This 'master-piece of Protestant English charity,' as old Fuller calls it, serves three uses—it is an asylum for poor brethren, an educational and a religious institution; hence Bacon terms it a 'triple good.' The *poor brethren* are fifty-five in number. None are admitted under sixty years of age, and only those who have been householders are eligible. Each brother has a separate apartment, a share of attendance from domestics, an ample though plain diet, and an allowance for clothes and other matters, and four weeks' holiday every autumn. The brethren must be bachelors or widowers, and members of the Church of England. Among the poor brethren in bygone years were Dryden's antagonist, Elkanah Settle; John Bagford, antiquary; Isaac de Groot, a descendant of Grotius; Alexander Macbean, who assisted Johnson in his Dictionary; John Grey, electrician; and—one could not omit him—Colonel Newcome.

The school is open to boys between twelve and fourteen years of age who pass the common public schools entrance examination, the old system of direct nomination by the governors having been wholly abolished. There are also a number of entrance scholarships, and five annual exhibitions of £80 for four years for boys leaving school. In addition to the scholars a large number of boys are sent to the Charterhouse because of its reputation. These either board with the masters or attend simply during the day. The number of boarders is now about 600. The institution is under the direction of the king, a body of governors, and the master. The hospital has now a separate governing body. Among the eminent persons educated in the Charterhouse School have been Isaac Barrow, Sir William (Judge) Blackstone, Addison, Steele, John Wesley, Bishop Thirlwall, George Grote, Thackeray, John Leech, and Sir Charles Eastlake. The new school at Godalming, designed by Hardwick, forms a large quadrangle, with a gatehouse tower 130 feet high, and a chapel rich in stained glass. A hall and other buildings and cloisters have been added. The old school premises were sold to the Merchant Taylors' School, which is now installed there in handsome new school buildings erected in 1870-72. The quaint Charterhouse hospital and chapel still remain on the old site. The chapel contains Sutton's tomb. See works by Dr Haig Brown (1879), Eardley-Wilmot and Streetfeild (1894), A. H. Tod (1900), Marsh and Cripp (1913), Davies (1921).

**Charter-party** (*charta partita*)—as being originally written in duplicate on one parchment, which was then divided by a straight line, so

that the parts should tally) is the common written form in which the contract of affreightment is expressed—viz. the hiring of the whole or part of a ship for the conveyance of goods. The case of carriage of passengers at sea is under different regulations. The carriage of goods is often left to rest on bills of lading, or even mere oral arrangement, but a charter-party with a sixpenny stamp is the proper and safe arrangement. It is executed by the owner or his accredited agent; abroad, the master has authority to sign. It identifies the ship by name, by tonnage measurement, and by place. The obligations of parties are generally expressed with fullness. The chief of these are that the ship is seaworthy, and is furnished with necessary tackle, and with a fit master and crew. Unseaworthiness may be caused by the manner of stowage. The master's knowledge of the particular ports and perils on the voyage is included in his fitness. The ship is also bound to have the proper papers and clearances. The ship must be ready to receive cargo at the time specified; and in general, delay on the part of the ship would entitle the charterer to cancel the contract. The voyage must be performed according to the rules of good seamanship, necessity being required to justify any deviation from the route. The matter of compulsory pilotage depends upon the Merchant Shipping Acts. Due care is to be shown in loading and unloading, and the goods must be safely delivered at the port of discharge. On the other hand the freighter must have a lawful cargo ready at the time agreed upon; in this case also delay would generally entitle the shipowner to cancel the contract, or at least to claim damages for detention. The freight is sometimes a lump sum for the voyage: sometimes so much per ton or per week.

The execution of a charter-party does not supersede the granting of Bills of Lading (q.v.) or receipts for the cargo, which are not only useful in fixing the condition and quantity of the goods, but are the documents of title by which the ownership of cargo may be transferred during voyage. In the case of general ships, which are advertised for a certain voyage, the shipowner becomes a common carrier, bound to carry goods tendered subject to the conditions of the advertisement, but in this case no charter-party is executed. In coasting voyages mere receipts, not formal bills of lading, are often used. In settling freight at the port of discharge, the weight or measurement of cargo there is *prima facie* the criterion, but it may be shown that the weight, &c. has altered during voyage. Where an advance or partial prepayment of freight is made, the law of Scotland is that this may be recovered if the vessel is lost; in England, on the other hand, such advance freight is not recoverable, and the shipper in practice covers the risk of its loss by insurance. It is common under a *cesser* clause for the charterer to stipulate that his personal liability for freight and demurrage shall cease when the loading is completed, and in that case the master looks to his lien for security. When the goods arrive damaged, the consignee is bound to take them, and settle the freight subject to a claim for damages; he cannot abandon the goods for the freight. If the freighter take the goods at an intermediate port, the ship being unable to proceed farther, a proportion of freight may be due, if there is a new contract to that effect, either express or implied from the circumstances, but not otherwise. Except on a time charter, the duration of a voyage, which may depend on closing of navigation by ice, &c., is entirely at the risk of the shipowner. Dead freight is paid for unoccupied space in the ship where a full cargo has been promised. Apart from stipulation, the shipowner is liable for the goods shipped in their

original condition, except where that condition is altered by the act of God, the king's enemies, or inevitable accident. It is now common, however, by indemnity clauses in charter-parties to protect the owner from liability for every damage that can be covered by insurance. By statute, owners are not liable for fire, or for the fault of a compulsory pilot; and in case of collision their maximum liability is £15 per ton of the ship's measurement. It is always an important question whether the arrangements made about the ship place the charterer in the position of an owner, or whether the owner retains such a possession and control of the ship as to be able to exercise a lien for freight, and on the other hand to incur liability for repairs and supplies, and for damages caused by negligence of the master or crew. When the charterer has complete control over the voyage, he is generally considered the owner for the voyage. But if the charter-party lets only the use of the vessel, the owner retaining possession and control over its navigation, the charterer is regarded as merely a contractor for a particular service, and the rights and duties of the owner are unchanged. The usual printed parts of a charter-party are construed like covenants in a deed, but charter-parties are often informal instruments, and are therefore construed as liberally as other mercantile contracts, preserving the intention of the parties. The courts incline to construe a charter-party as a contract for affreightment, charging the shipowners as carriers.

In the United States the common law rules as to charter-parties are similar, but there are important statutory differences.

**Charters Towers**, a mining township of northern Queensland, 82 miles from its seaport Townsville, with which it is connected by rail, and 820 miles N.W. of Brisbane. It dates from the gold discovery of 1871-72, and was incorporated in 1877. Pop. 10,000.

**Chartes**, ÉCOLE DES, a famous school of diplomacy established at Paris in 1821-29.

**Chartier**, ALAIN, who was born at Bayeux about 1394, and died probably about 1440, lived at the court of Charles VI. and Charles VII. as secretary. According to a famous (but quite unhistorical) story, the Dauphine Marguerite, daughter of James I. of Scotland, and herself a poetess, once kissed him as he lay asleep, in token of her admiration of his verses. His chief poetical piece is the *Livre des Quatre Dames*, which was written shortly after Agincourt, and in which four ladies alternately bewail the deaths of their lovers who fell in the battle. The sentiment of the poem is sincere, and the expression is often graceful and dignified. Chartier showed considerable skill in handling the *ballade* and other lyrical forms, but he is more interesting as a prose-writer than as a poet. In his own day he was known as the 'father of eloquence.' His chief prose works are *Le Curial*, an exposure of the vices of the court; *L'Espérance*, an attack on the corruption of the clergy; and the *Quadrilogue Invecitif*, a noble appeal to Frenchmen to unite for the deliverance of their land from the foreigner. Chartier was a sincere patriot, and his writing often rises into grave and moving eloquence. He bravely espoused the cause of the oppressed labouring class, and he did much to re-animate his countrymen in their struggle with England. 'It is the eternal glory of Alain Chartier,' says M. Gêruzeux, 'to have announced the mission of Jeanne d'Arc.' His writings summoned his countrymen to the task which they performed under the Maid of Orleans. He has not received the attention which he deserves. There is no better edition of his works than Duchesne's (1617). See mono-

graphs by Delaunay (1876) and Joret-Desclousies (1877).

**Chartism**, a movement in Great Britain for the extension of political power to the working-classes, rising out of widespread national distress and popular disappointment with the results of the Reform Bill of 1832. Before that period the middle classes had sought popular aid towards obtaining their own enfranchisement. The assistance was given, the people expecting to receive help in their turn. After the passing of the Reform Bill, agitation ceased for a time, and the members returned to parliament were indifferent, or opposed, to any further change in the political arrangements of the country. The middle classes were satisfied with their own success, and generally looked with small favour on projects for the further extension of political influence among the masses. Lord John Russell especially deprecated further change as a breach of faith with those who had carried the Reform Bill of 1832. This political discontent on the part of the workmen was greatly increased by the misery due to failing harvests and to a season of commercial depression which set in about 1837. Food became dear, wages fell, factories were closed, and work was scarce. The people associated their sufferings with their want of direct influence upon the government, and agitation for an extended franchise began.

In 1838 the representatives of the working-men drew up a programme embodying their views on political reform, and called the 'People's Charter.' Its six 'points' were: (1) Manhood suffrage; (2) equal electoral districts; (3) vote by ballot; (4) annual parliaments; (5) abolition of property qualification for members of the House of Commons; and (6) payment of members of parliament for their services. The programme thus drawn up was received with enthusiasm. Immense meetings, attended by enormous crowds of people, were held all over the country. The most prominent leader of the Chartist agitation was Feargus O'Connor, an Irishman, whose paper the *Northern Star* had a circulation of 50,000. Others were Attwood, Lovett, Stephens, Vincent, Ernest Jones, and Thomas Cooper. The mass of the working-men in the industrial centres supported the movement; and while many of them exclusively advocated an appeal to moral force, a great number insisted on violent methods. A body calling itself the National Convention, elected by the Chartists throughout the kingdom, met in London and afterwards in Birmingham in 1839. It proposed to the people various means of coercing the legislature into submission, recommending, among other things, a run on the savings-banks for gold, abstinence from excisable articles, exclusive dealing, and in the last resort, universal cessation from labour. During its sittings a collision took place with the military in Birmingham. Public meetings were forbidden, and alarming excesses were committed by the irritated mob. In June 1839 a petition in favour of the Charter was presented to the House of Commons signed by 1,280,000 persons. The House refused to name a day for its consideration, by a majority of 237 to 148, and the National Convention retaliated by advising the people to cease from work throughout the country. However, this advice was not followed; but the disturbances increased, and in November an outbreak at Newport, in Monmouthshire, took place, which resulted in the death of ten persons and the wounding of great numbers. For taking part in this wild insurrection, three of its leaders were sentenced to death, but their punishment was afterwards commuted to transportation. In 1842 great riots took place in the northern and midland districts, not directly originated by the Chartists, but encouraged

and aided by them after the disturbances began. It is a strong proof of the revolutionary spirit which animated the Chartist, that they opposed the agitation for the Repeal of the Corn Laws as a measure likely to make food cheap, to keep wages down, and thereby to benefit only the middle classes. In 1848 the Chartist movement came to a head through the agitation consequent on the revolution in France. Great uneasiness prevailed, especially at many of the industrial centres, and risings were feared. But the greatest demonstration of the movement took place in London, where a gigantic meeting on Kennington Common was announced for the 10th of April. It was to be attended by half a million of men, who were to carry to parliament a petition for reform signed by six million names. Such rumours excited great alarm. The procession was forbidden. Military measures were taken by the Duke of Wellington to prevent violence, and about 200,000 special constables were enrolled (amongst whom was Louis Napoleon, afterwards emperor). After all this preparation the demonstration proved a failure. Only 50,000 gathered on Kennington Common, and their leaders shrank from a conflict with the authorities. On examining the monster petition it was found that the signatures were fictitious to an unheard-of extent, yet the genuine ones amounted to nearly two millions.

Since 1848 Chartism has gradually died out. Its political principles were not new. The Duke of Richmond in 1780 introduced a bill into the House of Lords to give universal suffrage and annual parliaments, and earlier than this John Cartwright (q.v.) had advocated earnestly not only these but also vote by ballot. In 1780 Charles James Fox declared himself in favour of the identical six points which were afterwards included in the Charter. And in 1792 Grey, Erskine, Mackintosh, and many others, formed a 'Society of Friends of the People,' which aimed at obtaining a very large extension of the franchise.

But while the political side of Chartism was the most prominent, it should be recognised that the essence of it was economic and social. As one of its leaders said, it was a 'knife and fork question.' The movement was primarily due to economic suffering, and many of the remedies proposed were strongly socialistic in tendency. The reviving and increasing prosperity of the country after the collapse of Chartism in 1848 deferred a return of the same spirit of discontent. This prosperity was due not only to the Repeal of the Corn Laws, but to the great industrial and colonial expansion of Britain which took a fresh start about the same time. Through the Reform Bills of 1867 and 1885, the Ballot Act of 1872, and later legislation practically all the demands of the Charter have been substantially conceded. Industrial prosperity and political reform, with the development of trade-unions and of the co-operative system, worked a decided change in the position of the working-classes as contrasted with their wretched lot in the period about 1840. See COOPER and O'CONNOR; *Cooper's Life, written by Himself*; Carlyle's *Chartism*; Kingsley's *Atton Locke*; Walpole's *History of England*; and books by Gammage (1894), Hovell (1918), and West (1920).

**Chartres**, the capital of the French department of Eure-et-Loir, 55 miles SW. of Paris, is built partly at the base and partly on the declivity of a hill overlooking the river Eure, which is here divided into two channels, one flowing within, and the other without the former ramparts, which are converted into agreeable promenades. It consists of an upper and lower town, connected by very steep streets; and the highest point is crowned by the glorious cathedral of Notre Dame—in Street's

opinion, the finest in France. Built chiefly between 1194 and 1260, it has two spires, of which the south-western is 342½ feet high, and the north-western, 371; the latter, built in 1507–14, being, 'on the whole, the most beautiful spire on the Continent.' Other features are the three rose-windows, the splendid portals, and the 13th-century stained-glass that fills no fewer than 130 windows. The church of St Pierre (12th century), the Porte Guillaume (14th century), and the obelisk to the memory of General Marceau, are also noteworthy. The weekly corn-market is one of the largest in France, and is remarkable as being under a corporation of women. It has manufactures of woollen, hosiery, and leather. Chartres usually gave the title of Duke to the eldest son of the Orleans branch of the Bourbons (see BOURBON). Population, 23,000. The *Autricum* of the Carnutes, Chartres in 1594 was the scene of the coronation of Henry IV. See books by Massé (1900), Heaullam (1902), M. and E. Marriage (1909).

**Chartreuse**, LA GRANDE, the original Carthusian monastery, founded by St Bruno c. 1084, is situated in the French department of Isère, 14 miles NNE. of Grenoble, in a wild and romantic valley, at an altitude of 4268 feet above the sea. The convent is a huge ungainly structure, dating mostly from the 17th century, earlier buildings having been several times destroyed by fire. The monks, who long manufactured a famous green, yellow, or white liqueur from various herbs, had at one time considerable property, but they were despoiled at the Revolution, being exiled from 1793 till 1816; and in November 1880 they declined to accept indulgence from the decrees for the expulsion of the religious orders. The rigorous application after 1902 of the laws against the unauthorised orders at last evicted the brothers, who were scattered in Italy, England, and Spain. At Tarragona they still make the liqueurs, of which a sort is produced by a French manufactory. The monastery buildings again became a centre of learning under the university of Grenoble (1921). *Charterhouse* is from the French name; the Italian *Certosa* is direct from the Latin. See CARTHUSIANS.

**Chartulary**, a collection of charters. Possession of a considerable number of charters would obviously suggest the advantage of having them classified and copied into a book or roll. Such book or roll has generally received the name of a Chartulary. Mabillon traces chartularies in France as far back as the 10th century, and some antiquaries think that chartularies were compiled even still earlier. But it was not until the 12th and 13th centuries that chartularies became common. They were kept not only by all kinds of religious and civil corporations, but also by private families. Many of them have been printed, and their contents generally are of the greatest value in historical, archaeological, and genealogical inquiries. The name is in Scotland applied to the record of feu-charters kept by the superior's law-agent.

**Charybdis**. See SCYLLA.

**Chase**, SALMON PORTLAND, American statesman, born at Cornish, New Hampshire, 13th January 1808, in 1830 settled as a lawyer in Cincinnati, where he acted as counsel for the defence of numerous fugitive slaves. An uncompromising opponent of slavery, his political course was for many years guided by the attitude of the two great parties towards this question. In 1841, foreseeing as little assistance from the Whigs as from the Democrats, he was largely instrumental in founding the Liberty party, which in 1844 brought about Clay's defeat. Chase was returned to the United States senate in 1849 by the Ohio Democrats, but separated from the party in 1852 when it

committed itself to slavery. He was twice elected governor of Ohio by the Republicans (1855-59), and in 1861-64 was secretary of the treasury. His management of the country's finances during these trying years has met with nothing but praise: taking office at a time when public credit was low, and the revenue barely adequate for the needs of the government in time of peace, he secured loans on reasonable terms, issued treasury notes ('greenbacks') bearing no interest, and obtained the establishment of national banks. In 1864 he was appointed by Lincoln chief-justice of the United States, in which capacity he presided at the trial of President Johnson (1868). Unsuccessful efforts were made to secure for Chase the Republican presidential nomination in 1860 and 1864, and the Democratic nomination in 1868. He died at New York, 7th May 1873. See his *Life* by J. W. Schuckers (1874).

**Chasidim** (Heb., 'pious'), the name by which the Jewish party afterwards known as the Pharisees was first distinguished. The Chasidim first took definite form as a *party* in the course of the struggle between Judaism and Hellenism during and immediately before the Maccabean period. When in 167 B.C. the great majority of the Jewish people rose against their heathen masters, the Chasidim joined in the conflict, though separated from the other adherents of Judas Maccabeus as a closer community of those who were distinguished by especial 'piety'—i.e. especial strictness in the observance of the law. They took part in the struggle only so long as the freedom of religion was the question really involved; at a later time, when this was no longer the case, they seem to have withdrawn from it, for under Judas's brothers Jonathan and Simon (160-135 B.C.) they are not mentioned. Under Simon's successor, John Hyrcanus (135-105 B.C.), they appear for the first time in history under the name of Pharisees, and here we already find them in opposition to the family of the Maccabees or Hasmoneans, with whom they had originally pursued a common interest. See PHARISEES.—The modern Chasidim are not, like those in the times of the Maccabees, marked by any peculiar spiritualistic tendency in religion, but rather by a strict observance of certain traditional forms and a blind subservience to their teachers. Their doctrine was promulgated in the middle of the 18th century by Israel of Podolia, called *Baal-Shem* ('Lord of the Name,' so called because he professed to perform miracles by using the great cabalistic name of the Supreme Being). Though condemned by the orthodox rabbis, this new teacher had great success in Galicia, and when he died (1760) left 40,000 converts. They are now broken into several petty sects; their religion is utterly formal, and its ceremonies are coarse and noisy.

**Chasing.** Metal casting and other raised metal-work, whether stamped or *repoussé*—i.e. hammered or punched up—may be defective in sharpness, or detail, or finish. When such defect is remedied by hand-cutting, as with a chisel or graver, such finishing is called chasing, but this term is not properly applied to the raising of the figures themselves. The backs of watches are sometimes elaborately chased in floral or other designs. When similar work is applied to flat surfaces, such as salvers for example, it is called either chasing or engraving. It was called *celatura* by the Romans; in modern Italian, *ceselatura*; in French, *ciselure*; in German, *ziselierung*—i.e. 'chiselling' in each case.

**Charles, MICHEL**, was born near Chartres on 15th November 1793. He entered the Ecole Poly-

technique in 1812, and on leaving was classed among the engineers; but with rare generosity he renounced his place as an officer in order to assure a career to one of his unsuccessful comrades. In December 1829 he addressed to the Brussels Academy a memoir on two general principles of geometry, duality and homography. The introduction to this memoir expanded into the well-known *Aperçu historique sur l'Origine et le Développement des Méthodes en Géométrie*, the first edition of which was published in 1837. In 1841 he was appointed to the chair of Machines and Geodesy at the Ecole Polytechnique, and in 1846 to that of Higher Geometry, which had just been instituted at the Sorbonne. In 1852 appeared his *Traité de Géométrie supérieure*; in 1860, *Les Trois Livres de Porismes d'Euclide rétablis pour la Première Foix*; in 1865, the *Traité des Sections Coniques*; in 1870, the *Rapport sur les Progres de la Géométrie*. These, his principal works, are geometrical and historical. His contributions to the *Comptes rendus* of the Academy of Sciences and to other scientific publications are extremely numerous, and though in the main geometrical, are not exclusively so. In particular he treated in several memoirs the question of attraction, and gave the first systematic demonstration of a celebrated theorem of Maclaurin on the attraction of ellipsoids. Two of his memoirs on the properties of cones of the second degree, and on the spherical conics, were translated into English, and published, with additions, by Charles Graves in 1841. The best account of Charles's writings is that given by himself in the *Rapport* above mentioned. During his long life he was the recipient of many scientific distinctions, and he will always be cited as one of the great geometers of the 19th century. He died at Paris on 18th December 1880. An unfortunate episode in his life was that of the autographs. In 1867 he reported to the Academy that he had come into possession of autographs of Pascal's which proved that Pascal had anticipated Newton's greatest discoveries. Ultimately, however, he had to admit that these and about 27,000 other autographs (including letters from Sappho, Cleopatra, Julius Caesar, Mary Magdalene, Lazarus, St Luke, Dante, and Shakespeare) were forgeries. The forger, Vrain-Lucas, a clerk who knew neither Latin nor Greek, was convicted and punished. See Farrer's *Literary Forgeries*.

**Charles, PHILARETE**, a voluminous French writer, was born near Chartres, 8th October 1798, and apprenticed at fifteen to an ardent Jacobin bookseller, along with whom he was sent to jail after the Restoration. Released by Chateaubriand's influence, he went to England, where he found employment in a bookseller's shop, and during his seven years' residence laid the foundation of his large knowledge of English literature. After his return to France he contributed reviews of English books to the *Revue encyclopédique*. In 1824 his *Discours sur Jacques Auguste de Thou*, and in 1828 his *Tableau de la Langue et Littérature Française, 1500-1610*, were crowned by the Academy. In 1837 Charles became librarian of the Bibliothèque Mazarine, and in 1841 professor of Northern Languages at the Collège de France, which chair he filled until his death, at Venice, July 18, 1873. Besides showing indefatigable activity as a journalist, he published books on Charles I., Cromwell, the middle ages, the 16th century in France, and studies on Spain, on Germany, on the 18th century in England, 19th-century manners, Shakespeare, Mary Stuart, and Aretino. His *Mémoires* fill two volumes (1876-78).

**Chassé, DAVID HENDRIK, BARON**, a famous Dutch soldier, was born at Thiel, in Guelders, March 18, 1765, began his military career when but ten

years of age, became a lieutenant in 1781, and captain in 1787. After the failure of the revolutionary movement he took French service; was appointed lieutenant-colonel in 1793; and two years later found himself marching towards the Netherlands under the command of Pichegru. He afterwards fought with the French in Germany and Spain, gaining great distinction, and from Napoleon himself, from his fondness for bayonet charges, the name of 'Général Baonette'. He was made a baron by Louis Bonaparte in 1809. As lieutenant-general of the Dutch forces in 1815 Chassé did good service at Waterloo against his old comrades, the French. As governor of Antwerp he became famous by his heroic three-weeks' defence of the citadel with 5000 men against 60,000 Belgians and French (1832). He died May 2, 1849.

**Chassepot**, ANTOINE ALPHONSE (1833-1905), French inventor, was an employee in the Paris arsenal of St Thomas, where he became an official in 1858, and in 1863 brought before the government the model of his rifle, adopted three years afterwards (see BREECH-LOADING, RIFLE). In his later years he kept a hotel in Nice.

**Chasseurs** (Fr., 'hunters') is a name used since 1741 for certain *corps d'élite* of the French army. The *Chasseurs-à-cheval* and the *Chasseurs d'Afrique* are light cavalry. The latter were raised in 1831 for service in Africa, mounted on Arab horses, and wearing a distinct uniform. There used to be twenty regiments of *Chasseurs-à-cheval*, and four of *Chasseurs d'Afrique*. Their uniform consisted of sky-blue tunic with red trousers. The *Chasseurs-à-pied* are light infantry corresponding to the Rifle Corps and Light Infantry Regiments of the British and the *Jäger* ('hunters') of the German and Austrian armies. These units are no longer distinctive except in name, having the same weapons and equipment as the rest; but the *Chasseurs Alpins* of the French army are real light troops, trained for mountain fighting. Italy and Austria have similar units.

**Chastelard**, PIERRE DE BOSCOSEL DE, a hapless French poet, born in Dauphiné about 1540, became a page in the household of the Constable Montmorency, afterwards in that of the Marshal Damville, and accompanied the latter to Scotland in his escort of Queen Mary (1561). Here he fell madly in love with the queen, and Mary was indiscreet enough to amuse herself with his passion, receiving without displeasure the amorous verses which the poet laid before her. Misinterpreting the goodwill of the queen, Chastelard ventured to conceal himself under her bed, was discovered and forgiven, but on a repetition of his offence at Burntisland early in 1563, where the queen was resting on her journey to St Andrews, was seized and executed on the following morning. He is the subject of a tragedy, the first of the trilogy devoted by Swinburne to the history of Mary.

**Chaste Tree**. See VITEA.

**Chasuble** (Lat. *casula*, *casubula*, and *casibula*; also *pænula*, *planeta*; Gr. *phelonion* or *phainotes*), the uppermost garment worn by priests in the Eastern and the Roman Catholic Church when robed for the celebration of the mass; having been at first a secular garment of ceremony common to both sexes. When adopted as an ecclesiastical robe, it was for some centuries used by all grades of the clergy, even as low as that of the acolytes, and its earliest restriction to priests appears in Canon xxviii of the Fourth Council of Toledo, in 633 A.D. It was called also 'the Vestment,' though this term more properly denotes collectively all the robes worn at mass, of which the chasuble is the principal item. Originally it cov-

ered the priest from head to foot, like a little house, whence some writers think it had its name of *casula* (Isid. Hispal., *Orig.* xix. 24).

The earliest direct evidence for it as a sacerdotal robe is in the mosaics of San Vitale at Ravenna (547 A.D.), where Archbishop Maximian is depicted wearing it. Rich materials, cloth of gold or silver, silk, and velvet, elaborately embroidered, were used for it. In the middle ages it was of an elliptical shape, like a *vesica piscis*, with a hole in the middle for the head; it had no sleeves.

When put on it showed two peaks, one hanging down before; another, on which a cross was embroidered, hanging down behind, though in Italy the cross was and is usually in front. The Greek chasuble is ampler and rounder than the Latin form, having more the nature of a mantle, and the episcopal chasuble is provided with a pattern of crosses. Archbishops do not wear the chasuble, but another vestment named *Sakikos*, which is worn by bishops also in Russia. The modern Latin form is commonly a parallelogram with rounded angles, or else resembles a violin. In the Reformed Church of England the chasuble was enjoined as the celebrant's robe at Holy Communion by the Prayer-book of 1549, prohibited by that of 1552, but again legalised in 1559. It remained, however, in practical abeyance (its place in cathedrals and on solemn occasions being supplied by the cope) till recent times, when its use has been partially revived, first in 1851 at St Thomas the Martyr in Oxford. In France the press or wardrobe in which chasubles were kept was called the *chasublier*. See LITURGY.

**Chat** (*Saxicola*), a genus of small birds in the Thrush family (Turridæ). The bill at the base is broader than its height, and the upper portion is not hooked. The genus includes some thirty-six species, especially at home in northern temperate regions, frequenting dry stony places, and nesting in holes. They are lively birds, flitting about rapidly and untiringly in pursuit of insects, on which they chiefly feed. The Wheatear (*S. cerianthe*) is a good example, found in Europe, North Africa, and North America, and along with other chats frequent in Britain. Yellow-breasted Chat is a popular name for a bird common in the United States, and technically known as *Icteria virens*. See WHEATEAR, WHINCHAT, STONECHAT.

**Chata** (*Pterocles alchata*), a desert fowl of the nature of a grouse, occurring in waste places in Southern Europe, North Africa, Arabia, and Syria. It is very good to eat, and many are shot.

**Chatalja**. See CONSTANTINOPLE.

**Château**, CHÂTEL, or CASTEL, from the Lat. *castellum*, 'a fort,' enters as a component part into many names of places in France. See CASTLE. A 'château en Espagne' is a castle in the air.

**Chateaubriand**, FRANÇOIS RENÉ, VICOMTE DE, a distinguished French writer and politician, was born at St Malo, in Brittany, on September 4, 1768. He belonged to a noble Breton family, and was the youngest of ten children. His early years were spent partly by the sea at St Malo and partly in the seclusion of the woodland château of Combourg. He was educated at Dol and Rennes, and served for a short time as an ensign in the



Chasuble.

regiment of Navarre. In 1791 he sailed to North America, and spent eight months there in the travels which are recounted in his *Voyage en Amérique*. On hearing of the arrest of Louis XVI. he returned to France and joined the army of the émigrés. During the Prussians' retreat he was left behind for dead near Namur, but contrived to make his way to that town, and thence, with no little difficulty, to England. For some years he maintained himself in London by teaching and writing translations; in 1797 he published an *Essai sur les Révolutions*, and in 1800 he was enabled to return to France. *Atala*, a love-story of savage life, the scene of which is laid in the American forests and prairies, appeared in 1801, and established Chateaubriand's literary reputation. The *Génie du Christianisme* (1802), a vindication of the Church of Rome, raised him to the foremost position among the French men of letters of the day. He was neither a sound thinker nor a skilful controversialist, and the merit of his famous treatise lies almost entirely in its brilliant passages of description. These, however, are often curiously out of place in a work of the kind. Sainte-Beuve, who spoke of the *Génie* as a *coup de théâtre et d'autel*, declared that many of them would have been more warrantably included in a *Génie du Paganisme*. But the book appeared when there was a widespread reaction against scepticism, and its eloquent pleadings were favourable to the conciliatory policy which Napoleon had adopted in regard to the pope. Its success in consequence was enormous. Its author was in 1803 appointed secretary to the embassy at Rome, where he wrote his *Lettres sur l'Italie*, and in 1804 was sent as ambassador to the little republic of Valais. But on the murder of the Duc d'Enghien, Chateaubriand refused to hold office under Napoleon. He set out to the East in 1806, visited Greece, Palestine, and Egypt, and returned to France in 1807. Two years later he issued *Les Martyrs*, a prose epic, of which the action passes in the days of Diocletian. There is much that is false, much that is extravagant in this singular book, and the borrowed epical machinery works clumsily throughout. But there is genuine passion in the episode of Velleda; and in calling up a vision of the beauty of the ancient world the writer exhibits an almost unsurpassable mastery of ornate prose. In 1814 Chateaubriand published a pamphlet, *De Bonaparte et des Bourbons*, which Louis XVIII. declared to be worth an army to the Legitimist cause. From 1814 to 1824 he gave a thorough-going support to the Restoration monarchy. He was made a peer and a minister of state, and from 1822 to 1824 held the post of ambassador extraordinary at the British court. It was his ambition to become the guiding power in French politics; he believed that it lay in him to reconcile Legitimism and liberty. He was disappointed, however, in his hope of becoming prime-minister, and from 1824 to 1830 he figured as a Liberal politician. On the downfall of Charles X. he refused to swear allegiance to Louis-Philippe, and went back to the Royalist party. His changes of front were not due to mere selfish ambition. A Breton noble, he was by his birth and associations a Royalist; his writings prove that he was deeply imbued with the anti-social sentimentalism of Rousseau (he claimed Byron as his pupil); he had almost no logical faculty, and he was by temperament imperious and rebellious. 'In natural disposition,' he wrote in 1831, 'I am still a Republican.' His politics were thus a tissue of inconsistencies, but to regard him as a mere time-server is to misunderstand his character. During the reign of Louis-Philippe he withdrew from public affairs, and occupied himself in preparing his *Mémoires*

*d'outre Tombe* for posthumous publication. Parts of this eloquent autobiography appeared, however, before his death, which occurred on July 4, 1848. Besides those mentioned above, his writings include the *Itinéraire de Paris à Jérusalem*; *Les Natchez*, a prose epic dealing with savage life in North America; and two works of fiction, *René* and *Le Dernier des Abencérages*.

Chateaubriand is a writer whom it is difficult to criticise justly. He was not a thinker, and he produced no book which has the unity and sustained excellence of an enduring work of art. He dealt in false sentiment and extravagant imagery; he was blind to the virtues of simplicity and restraint. Sainte-Beuve said he transferred the capital of prose from Rome to Byzantium and introduced the style of the lower empire. But when he is at his best his brilliant and glowing diction acts on the reader like an enchantment. His writings revealed new capabilities in the French language. There is no French author of earlier date whose prose can compare with Chateaubriand's in the power of conveying the beauty and mystery of nature. His style, with its magical play of colour, its cunning felicity of descriptive phrase, was a new thing in French literature. It fascinated readers accustomed to the cold and polished prose of the classical school, and Chateaubriand has been justly called the father of the romantic school. Yet not merely Lemaître but Catholic critics like the Abbé Bertrin have mercilessly exposed his vanity, selfishness, and egoism, and his lack of sincerity both in religion and loyalty.

See his *Mémoires* (tr. 1903) and *Correspondance* (1912 et seq.); works by Sainte-Beuve (1877), De Lesourd (1892), Bertrin (1900), Biré (1902-3), Girard (1904-12), Gribble (1910), Cassagne (1911 et seq.), and Lemaître (1912).

**Châteaubriant**, a town in the French department of Lower Loire, on the Chère, 40 miles NNE. of Nantes, with old churches and a castle, iron-founding and bell-casting, and iron-mines close by; pop. 6000.

**Châteaudun**, a pretty town in the French department of Eure-et-Loir, 83 miles SW. of Paris. In 1870 it was captured by the Germans after an obstinate resistance. Dunois is buried in the chapel of the stately castle. Pop. 5700.

**Château Gaillard**. See ANDELYS.

**Château-Gontier**, a town in the French department of Mayenne, on the Mayenne, 180 miles WSW. of Paris by rail. It has linen and woollen manufactures. Pop. 7000.

**Château Margaux**. See MARGAUX.

**Châteauroux**, the capital of the French department of Indre, on the left bank of the river Indre, 88 miles S. of Orleans by rail. It manufactures woollens, iron, leather, and tobacco. General Bertrand was born and died here. Pop. 26,500.

**Château-Thierry**, in the French department of Aisne, on the Marne, 52 miles E. by N. of Paris. It has a cathedral, and is the birthplace of Lafontaine; here Napoleon defeated the Prussians and Russians, 12th February 1814. It was much damaged in the Great War. Pop. 7000.

**Châtelard**. See CHASTELARD.

**Châtelet**, the name of two fortresses, Le Petit and Le Grand, by which Paris was defended while its area was confined to the Cité. Le Grand Châtelet, said to have been built by Julius Cæsar, was certainly besieged by the Normans in 885, became the castle of the Counts of Paris, then the seat of all the royal courts, and finally a great prison. It was pulled down in 1802, but a Place and a theatre still preserve its name.

**Châtelet-Lomont**, GABRIELLE ÉMILIE, MARQUISE DU, a very learned Frenchwoman, notorious

for her intimacy with Voltaire, was born at Paris, 17th December 1706. At an early period she displayed a great aptitude for the acquisition of knowledge. She studied Latin and Italian with her father the Baron de Breteuil, and subsequently betook herself with zeal to mathematics and the physical sciences. Distinguished alike for her beauty and talent, she soon found a host of suitors for her hand. Her choice fell on the Marquis du Châtelet-Lomont, but her marriage did not hinder her from forming, in 1733, a *tendresse* for Voltaire, who came to reside with her at Cirey, a château on the borders of Champagne and Lorraine, belonging to her husband. Here they studied, loved, quarrelled, and loved again, for several years. In 1747, however, she became 'not insensible to the brilliant qualities' of a certain M. Saint-Lambert, a captain of the Lorraine Guards; and the result was, that the philosopher had to make room for the soldier, and content himself for the future with being the 'devoted and indulgent friend' of his former mistress. She died at Lunéville, 10th September 1749, a few days after having given birth to a child. Her first writing was *Institutions de Physique* (1740), a treatise on the philosophy of Leibnitz. She also translated the *Principia* of Newton into French, accompanying it with algebraic elucidations. It did not, however, appear till 1756. See VOLTAIRE, and *Lives of the Marquise by Caphéigne* (1868) and Frank Hamel (Lond. 1910).

**Châtellerault**, a town in the French department of Vienne, on the river Vienne, 40 miles S. of Tours by rail. A handsome stone bridge, with a gateway built by Sully at one end, connects it with a suburb on the other side of the river. It is a smoky, dingy place, one of the chief seats of the cutlery manufacture in France, and since 1820 has had a government small-arms factory. Its river-port makes it the entrepôt for the produce of an extensive district. The title of Duke of Châtellerault was conferred by Henry II. in 1548 on James Hamilton, Earl of Arran and Regent of Scotland; and it now is claimed by both the Duke of Abercorn and the Duke of Hamilton—by the latter under an imperial decree (1864) of Napoleon III. Pop. 17,600.

**Chatham** (Old Eng. *Ceteham*), since 1891 a municipal, and till 1918 a parliamentary, borough, river-port, fortified town, and naval arsenal, in Kent, situated on the right bank of the Medway, at the upper part of its estuary, 30 miles ESE. of London. It forms almost one continuous town with Rochester (q.v.) on the west, but itself has few objects of interest, being much of it ill built and irregular, although great improvements have been effected in recent years. The High Street is  $\frac{1}{4}$  mile long, parallel to the river. Chatham owes its importance to its naval and military establishments, situated at Brompton, a suburb on high ground overlooking the Medway. Luton has been incorporated in the borough. Pop. (1851) 28,424; (1871) 45,792; (1911) 42,250; (1921) 42,665. By the Act of 1918 Rochester parliamentary borough has two divisions, Chatham and Gillingham, each containing part of Chatham borough and part of Gillingham. Traces of Roman villas have been found, with Roman bricks, tiles, coins, and weapons. The dockyard was founded by Elizabeth before the threatened invasion of the Spanish Armada. In 1662 it was removed to its present site. In 1667 the Dutch, under De Ruyter, sailed up the Medway, and, in spite of the fire from the castle, destroyed much shipping and stores.

In a military point of view, the lines of detached forts connected with Chatham constitute a fortification of great strength; and the whole is regarded as a flank defence for London in the event of an

invader seeking to march on the capital from the south coast. The place is also defended by some strong forts on the Medway. In and near Chatham are Fort Pitt; Melville Hospital, for marines and sailors; and barracks, magazines, storehouses, and depôts on a large scale. The 'Chatham Chest,' a fund founded by Drake and Hawkins in 1590 for the relief of sick and wounded seamen, was transferred to Greenwich in 1803, and ultimately incorporated with the hospital funds.

Chatham is one of the principal royal ship-building establishments in Britain and among the first naval stations of the empire. The dockyard, by the addition of St Mary's Island, has a river frontage of over three miles. The older portion includes dry docks and slips, a ropery, workshops, and storehouses, with residences for officials. The modern extension, completed in 1883 after seventeen years' labour in reclaiming some 400 acres of marsh land, comprises three large basins (total water area 69 acres) capable of accommodating the largest ships; in 1905 an additional dock was constructed. The yard is everywhere traversed by tramways for locomotives. Several thousands of artisans and labourers are employed. As a result of dredging operations in the Medway, there is communication for the largest battleships between Chatham and Sheerness at ordinary tides. A statue of Lieutenant Waghorn, the pioneer of the 'overland route' to India, was erected near the railway station in 1888; but Chatham's most cherished memories are of Dickens and Gordon: of the latter there is a statue, mounted on a camel, by Onslow Ford (1890). A new town-hall, English Renaissance in style, was opened 23d January 1900.

**Chatham**, (1) a city of Ontario, on the Thames, 67 miles SW. of London by rail, with manufactures of automobiles, fertilisers, steel, beet-sugar, concrete, woollens, &c., and an active trade in grain, pork, and wood; pop. 13,000.—(2) A port of entry in the north of New Brunswick, on the Miramichi, 6 miles NE. of Newcastle, with a good harbour, shipyards, foundries, a Catholic cathedral, and a college.

**Chatham**, WILLIAM PITT, EARL OF, sometimes styled PITT THE ELDER, one of the greatest English orators and statesmen of the 18th century, was the younger son of a country gentleman, Robert Pitt of Bocconoc, in Cornwall, and was born November 15, 1708. After an education at Eton and Oxford, he travelled on the Continent, and on his return obtained a cornetcy in the Blues. In 1735 he entered parliament for Old Sarum—that synonym for electoral corruption—a borough then belonging to his family. He espoused the side of Frederick, Prince of Wales, then at deadly feud with the king, and offered as the leader of a number of young discontented Whigs known as the 'Patriots' a determined opposition to Walpole, who was at the head of affairs. He was deprived of his commission in consequence—an insult and injury which only increased the vehemence of his denunciations of the court and the government. His influence, both in and out of the House of Commons, increased rapidly; and Walpole being driven from power in 1742, the king, notwithstanding his hatred of Pitt, found it necessary, four years later, to allow of his admission to a subordinate place in the Broad Bottom administration; subsequently he was appointed to the lucrative office of paymaster-general. The Duchess of Marlborough, pleased with his patriotism and powers of oratory, left him £10,000; and later, Sir William Pynsent, struck with similar admiration, left him his whole property, amounting to some £3000 a year, and including what became the family place of the Pitts in Somersetshire. In

1755, when Henry Fox (afterwards Lord Holland) was made secretary of state, finding himself opposed to the foreign policy of the new minister, Pitt resigned office as paymaster. In the following year, when the king, unwillingly acceding to popular demands, had to dismiss Fox, Pitt became nominally secretary of state, but was virtually premier. He immediately began to put into execution his own plan of carrying on the war with France, and inaugurating a brilliantly successful foreign policy. He raised the militia and strengthened the naval power; but the king's old enmity and German predilections led him to oppose Pitt's policy, who thereupon resigned office in April 1757, but was recalled in June, in obedience to the loud demands of the people.

Now firmly established in power, Pitt's war policy was characterised by unusual vigour and sagacity. Success returned to the British arms. French armies were beaten everywhere by Britain and her allies—in India, in Africa, in Canada, on the Rhine—and British fleets drove the few French ships they did not capture or destroy from almost every sea. But the prime mover of all these brilliant victories found himself compelled to resign (1761), when, on the accession of George III., and owing to the influence of Lord Bute, an attempt was made to introduce a vacillating policy into the government; his immediate cause of resignation being the refusal of the majority of the cabinet to declare war with Spain, which Pitt, foreseeing as imminent, wished to commence before the Spaniards were thoroughly prepared. As some recompense for his important services Pitt received a pension of £3000 a year; and his wife, sister of George Grenville, was created Baroness Chatham. Until 1766 Pitt remained out of office, not offering a factious opposition to government, but employing all his eloquence to defeat some of its most obnoxious measures. In that year he received the royal commands to form a ministry. He undertook the task, choosing for himself—to the astonishment of the public, and the sacrifice, to a considerable extent, of his popularity—the almost sinecure office of Privy Seal, with a seat in the House of Lords as Viscount Pitt and Earl of Chatham. Ill-health prevented Chatham from taking any active part in this ministry, of which he was nominally the head, and which was weak and embarrassed throughout, and he resigned in 1768, to hold office no more. He did not, however, cease to take an interest in public affairs. He spoke strongly against the arbitrary and harsh policy of government towards the American colonies, and warmly urged an amicable settlement of the differences. But when, America having entered into treaty with France, it was proposed by the Duke of Richmond to remove the ministers, and make peace on any terms, ill though he was, Chatham came down to the House of Lords, 7th April 1778. In a few faltering words he protested against the implied prostration of Britain before the Bourbons, and declared that war, with whatever issue, would be preferable to the proposed terms of peace. This address secured a majority against the motion, and the war was continued. But it was the orator's last effort; for, exhausted by speaking, on rising again to reply to a query addressed to him by the Duke of Richmond, his physical powers suddenly failed, he fell back into the arms of his friends, and was carried by his second son, William, less than five years later himself prime-minister, from the House. He died May 11, 1778. He was honoured with a public funeral in Westminster Abbey, where a statue was also erected to his memory at the public expense; and in addition, government voted £20,000 to pay this debts, and conferred a pension of £4000 a year

on his descendants. Chatham's personal appearance was dignified and imposing, and combined with a voice of the most magnificent compass, added greatly to the attractions of his oratory, which was of the most powerful kind. It is said that even his whispers were, when he pleased, distinctly heard outside the House in the lobby. His upright and irreproachable character demanded the admiration of his enemies; but his affectedness and haughtiness not unfrequently disgusted his friends, and pride rather than principle seems to have actuated his course at some important conjunctures of his life. He had, however, an intense love of country; the grand object of his ambition being to make his native land safe against all contingencies, and powerful among nations.

See *Lives* by F. Thackeray (1827), Alb. von Ruville (trans. from the German, 1907), Rosebery (1910), and B. Williams (1913); books by Green (1901), A. S. McDowall (1903), Frederic Harrison (1905), D. A. Winstanley (1912), and K. Hotblack (1917)—besides the works of Horace Walpole and Lecky's *England in the Eighteenth Century*.

**Chatham Islands**, two islands (Whairikauri, or Chatham Island, and Pitt Island) and some rocky islets in the Pacific, 480 miles ESE. of Wellington, belonging to New Zealand; pop. 200 whites, and 200 Maoris. They were discovered in 1791 by Lieut. Broughton. A brackish lake occupies one-fifth of Chatham Island, which is of volcanic origin and hilly. Stock-rearing and seal-fishing are the chief industries, the islanders having about 80,000 sheep and some cattle, with which they supply passing whalers. Timber of any size is unknown, so that the native canoe is merely wicker-work bound together by cordage of indigenous flax. The Morioris numbered 1200 in 1831, when 800 Maoris were landed from New Zealand, by whom the former were reduced to 90 in nine years' time.

**Chati**, a small leopard-like cat, smaller than an ocelot, found in South America.

**Châtillon**, a town in the French department of Côte d'Or, on the Seine, 49 miles NNW. of Dijon. A congress of allied sovereigns was held here in 1814, from February 5 to March 19, and opened fruitless negotiations with Napoleon respecting conditions of peace. Pop. 4000.

**Chat Moss**, a bog in Lancashire, the largest in England, 7 miles W. of Manchester, and 10 sq. m. in extent. It is celebrated as having in 1793–1800 been the scene of the first great and successful efforts for the reclaiming of bogs, largely through the instrumentality of Roscoe the historian, and in 1829 of one of George Stephenson's great engineering triumphs in the construction of the Liverpool and Manchester Railway. It is very slightly elevated above the sea, and from 20 to 30 feet in depth. Stephenson laid branches of trees and hedge-cuttings, and in the softest places rude hurdles interwoven with heather, on the natural surface of the ground, containing intertwined roots of heather and long grass; a thin layer of gravel was then spread above all, and on it the sleepers, chairs, and rails were laid in the usual manner. Drains were at the same time cut on both sides of the line, and in the central part of the moss a conduit was formed beneath the line of railway of old tar-barrels placed end to end. Notwithstanding difficulties which every one but himself deemed insuperable, Stephenson constructed the portion of the line through Chat Moss at a smaller expense than any other part of the railway.

**Chatrian**. See ERCKMANN.

**Chatsworth**, the magnificent seat of the Duke of Devonshire, one of the most splendid private mansions in England, is situated in Derbyshire, on the Derwent, 25 miles N. by W. of Derby. The

domain was purchased by Sir William Cavendish, who in 1553 began the old mansion, which, after his death in 1557, was completed by his widow, 'Bess of Hardwick,' afterwards Countess of Shrewsbury. Here Mary, Queen of Scots, was five times imprisoned during 1573-81. The present edifice includes the old Palladian pile built in 1687-1706 by the first Duke of Devonshire, and the north wing added in 1820. The façade is 720 feet long, or with the terraces, 1200 feet. The building is nearly a square, with an inner quadrangle. Chatsworth is famed for its library, and for its pictures and sculptures by Holbein, Titian, Teniers, Murillo, Reynolds, Landseer, Canova, Thorwaldsen, Chantrey, &c. The gardens and park, 10 miles in circuit, offer an exquisite variety of hill and dale. They were laid out by London and Paxton, and are celebrated for their trees, shrubs, rockwork, deer, and water-works—only surpassed by those at Versailles. The conservatory, unrivalled in Europe, covered nearly an acre, measured 300 by 145 feet, was 65 feet high, and had 70,000 square feet of glass, with a carriage-road through it. It was demolished in 1920. Hobbes lived much at Chatsworth. See CAVENDISH.

**Chattahoo'chee**, a headstream of the Appalachicola (q.v.).

**Chattanooga**, capital of Hamilton county, Tennessee, a shipping centre on the Tennessee River, 151 miles S.E. of Nashville, with good railway connections. The town has cotton and other manufactories, ironworks, tanneries, and sawmills. There was much fighting near here early in the Civil War. Pop. (1870) 6093; (1920) 57,895.

**Chattel** (Old Fr. *chatel*, from Low Lat. *capitale*, meaning the capital or principal sum in a loan; hence goods in general, especially cattle, as distinguished from land), in the law of England, is a term used to designate any kind of property which, with reference either to the nature of the subject or the character of the interest possessed in it, is *not freehold*. Ownership in personal or movable property is generally absolute. Any estate or interest in lands and tenements not amounting to freehold is a chattel. But as, between property thus 'savouring of realty' and mere personal movables—money, plate, cattle, and the like—there was a manifest distinction, chattels were, consequently, distinguished into *chattels-real* and *chattels-personal*. These classes of property differ considerably as to the method of holding and transferring them and their devolution on death. See REAL.

**Chatterer**, a significant popular name, often applied to the birds of a small family (Ampelidæ) of finch-like Perching birds (Insessores). The short broad beak with only a hint of a hook, the soft plumage, and tolerably long wings are characteristics of the family. Only about nine species, of small size, are known, and confined to the warmer parts of the nearctic and palaearctic regions. The Bohemian Waxwing (*Ampelis garrulus*) and the Cedar Bird of America are examples. See WAXWING. The name is also applied to the South American family Cotingidæ. See BELL-BIRD, COCK OF THE ROCK, COTINGA, UMBRELLA-BIRD.

**Chatterton**, THOMAS, was born at Bristol, 20th November 1752. His father, a sub-chanter in the cathedral, and master of a charity school, was a roystering fellow, yet a lover of books and coins, a dabbler in magic; he had died in the August before the poet was born. The mother, a poor schoolmistress and needlewoman, brought up her boy and his sister beneath the shadow of St Mary Redcliffe, that glorious church where their forefathers had been sextons since the days of Elizabeth. He seemed a dull, dreamy child till his seventh year; then he 'fell in love' with an old

illuminated music folio, and, quickly learning to read from a black-letter Bible, began to devour every book that fell in his way. He was a scholar of Colston's bluecoat hospital from 1760 till 1765, and then he was bound apprentice to Lambert, an attorney. In December 1762 he wrote his first poem, *On the Last Epiphany*; in the summer of 1764, the first of his pseudo-antiques, *Elinour and Juga*, which imposed on the junior usher of his school, and which he professed to have got from Canynge's Coffin in the muniment room of St Mary's. Next, early in 1767, for one Burgum, a pewterer, he concocted a pedigree of the De Bergham family (this brought him five shillings); and in 1768 he hoaxed the whole city with a description, 'from an old manuscript' of the opening of Bristol Bridge in 1248.

His life at Lambert's was a sordid one; he slept with the footboy, and took his meals in the kitchen. Yet, his duties over—and he discharged them well—he had ample leisure for his darling studies, poetry, history, heraldry, music, antiquities. An attempt to draw Dodsley had failed, when, in March 1769, he sent Horace Walpole a 'transcript' of *The Rhye of Peyncteyning yn Englande, wroten by T. Rowleie, 1469, for Mastre Canynge*. Walpole, quite taken in, wrote at once to his unknown correspondent, expressing a thousand thanks for the manuscript, deploring his ignorance of the 'Saxon language,' and half offering to usher the Rowley poems to the world. Back came a fresh batch of manuscript, and with it a sketch of Chatterton's own history. The poems, however, being shown to Mason and Gray, were pronounced by them to be forgeries; and Walpole's next letter was a letter of advice, to stick to his calling, that so, 'when he should have made a fortune, he might unbend himself with the studies consonant to his inclinations.' A curt request for the return of the MSS. lay six weeks unanswered during Walpole's absence in Paris. A second, still curter; and, 'snapping up poems and letters,' Walpole 'returned both to him, and thought no more of him or them'—until, two years after, Goldsmith told him of Chatterton's death.

Was it jest or grim earnest, a boyish freak or a suicide's farewell, that 'Last Will and Testament of Thomas Chatterton . . . executed in the presence of Omniscience this 14th of April 1770?' Anyhow, falling into his master's hands, it procured the hasty cancelling of his indentures; and ten days later the boy quitted Bristol for London. There he arrived with his poems, and perhaps five guineas in his pocket, and lodged first with an aunt, Mrs Ballance, in Shoreditch; next, from the middle of July, at Brook Street, Holborn. Abstemious, sleepless, he fell to work as with a hundred hands, pouring forth satires, squibs, stories, political essays, burlettas, epistles in Junius' style (for 'Wilkes and liberty'), and the matchless *Balade of Charitie*. For a while his prospects seemed golden. The publishers spoke him fair; he obtained an interview with the Lord Mayor Beckford; in the first two months he earned eleven guineas (at the rate of from a farthing to twopence a line); and he sent home glowing letters, with a box of presents for his mother and sister. Then Beckford died; the 'patriotic' publishers took fright; the dead season set in; he had overstocked the market with unpaid wares; a last desperate application failed for the post of surgeon to a Bristol slaver. Penniless, starving, yet too proud to accept the meal his landlady offered him, on 24th August 1770 he locked himself into his garret, tore up his papers, and was found the next morning dead—poisoned with arsenic. They buried him in the paupers' pit of the Shoe Lane Workhouse, a site usurped fifty-six years later by Farringdon Market.

For eighty years the Rowley controversy was waged with no less bitterness than ignorance, the Rowleyans including Jacob Bryant (1781), Dean Milles (1782), and Dr S. R. Maitland (1857); the anti-Rowlevans, Tyrwhitt (1777-82) and Warton (1778-82). The subject was once and for ever laid to rest by Professor Skeat in his edition of *Chatterton's Poetical Works* (2 vols. 1871). Vol. i. contains Chatterton's acknowledged poems, 78 in number; vol. ii. the 43 Rowley poems, with an essay thereon by the editor. Almost unconsciously the learned professor establishes Chatterton's wondrous originality. Theft from an unknown poet?—there is not 'the slightest indication that Chatterton had ever seen a MS. of early date.' Indebtedness to Chaucer?—he had 'read very little of this excellent author. . . . If he had really taken pains to read and study Chaucer, or Lydgate, or any old author earlier than the age of Spenser, the Rowley Poems would have been very different. They would then have borne some resemblance to the language of the 15th century, whereas they are rather less like the literature of that period than of any other. . . . The metres are mostly wrong, the rimes are sometimes faulty; the words [taken mostly from Kersey's Dictionary, and 93 per cent. of them misused] are wrongly coined, or have the wrong number of syllables; and the phrases often involve anachronisms, or, occasionally, plagiarisms.' These last from such recent poets as Dryden and Gray—from the former of whom he boldly stole the line, 'And tears began to flow;' from the latter adapted the conception, 'closed his eyes in endless (everlasting) night.'

'An owl mangling a poor dead nightingale,' said Coleridge of Dean Milles; the words apply to many more critics of Chatterton. There are those among them whose patronising praise and commonplace censure enable us to feel how Chatterton was worsted in life's battle, why he blew up the ship sooner than strike his colours. Others there are—Coleridge, Wordsworth, Shelley, Rossetti—whose precious tributes attest the boy-poet's divinity. No man can tell what Chatterton might have done; what he did do is patent to every one. Had Shakespeare died, or Milton, in his eighteenth year, or even Keats, the world had never heard of their existence. But he, a lad, with chances infinitely less than theirs, had written his name by then so high in Fame's temple, that purblind pilgrims must accept his achievement on hearsay. If he had *lived* to be famous, the fraud of the 'poet-priest Rowley' would not, belike, have been more hardly blamed than that of 'Jedediah Cleishbotham.' As it is, the conscientious critics have found it less difficult to dilate on Chatterton's pride and scepticism, his vices and deceit, nay, on the meteorology of 1770, than to master the difficult Rowleyan dialect, and to gauge the genius of this nursling of medievalism, this harbinger of the Renaissance of Wonder, to use Watts-Dunton's definition of the neo-Romantic movement. For him it was reserved to point out Chatterton's metrical inventiveness, and his 'undeniable influence, both as to spirit and as to form, upon the revival in the 19th century of the romantic temper—that temper, without which English poetry can scarcely perhaps hold a place at all when challenged in a court of universal criticism. . . . As a youthful poet showing that power of artistic self-effacement which is generally found to be incompatible with the eager energies of poetic youth—as a producer, that is to say, of work purely artistic and in its highest reaches unadulterated by lyric egotism—the author of the Rowley Poems (if we leave out of consideration the acknowledged poems), however inferior to Keats in point of sheer beauty, stands alongside him in our literature, and stands with him alone.'

See Watts-Dunton in Ward's *English Poets* (1880), the edition by Roberts (1906), the *Rowley Poems* by Steele (1899) and Hare (1911) in Chatterton's spelling; a study by Helene Richter (German, 1900); Sir Herbert Croft's *Love and Madness* (1780); and Lives of Chatterton by Dix (to be used with caution, 1837), Sir D. Wilson (the best, 1869), and Prof. Masson (1856; new ed. 1900).

**Chaucer**, GEOFFREY, was born apparently in 1340—the date 1328 is incompatible with facts—the son of John Chaucer by his second wife Agnes, of unknown surname, a niece of one Hamo de Copton. (His first wife, Joan de Esthale, was certainly living as late as 1331.) This John Chaucer was son of Robert Chaucer, of Ipswich and London, so that the poet's family can be traced to the eastern counties. John Chaucer was a vintner and a tavern-keeper, and may perhaps be identified with the John Chaucer who was deputy to the king's butler in the port of Southampton in 1348, and 'seems afterwards to have held the same situation in the port of London.' John's house was in Thames Street by Walbrook, at or near the foot of Dowgate Hill; and there we may well suppose the future poet was born.

Of his boyhood we know nothing. There were good schools in London then as now—e.g. Paul's Cathedral School and Anthony's, and Chaucer probably was sent to one of them. At a later period the variety and the minuteness of his knowledge are remarkable, and we know that he was an assiduous student. Likely enough his studious habits were more or less formed and the basis of his knowledge laid in his early days. It is possible he may have gone to Oxford or to Cambridge, but there is no evidence of value on this point. In his works he shows some acquaintance with both universities; but this may have been picked up incidentally. What is certain is that in 1357 and 1358 he was a page in the service of Elizabeth, Countess of Ulster, wife of Lionel, Duke of Clarence. From that service he would seem to have been presently transferred to the king's household. In 1359 he first 'bore arms.' He served in the campaign in France in that year—a campaign famous for the bitter sufferings which the English army had to endure. Chaucer was taken prisoner at Réthel in Champagne, but was presently ransomed, the king contributing £16 towards the required amount.

And now we lose sight of Chaucer for some eight years. His father died in 1366, and his mother soon after married one Bartholomew Attechapel; but of Geoffrey no mention has yet been found till 1367, when the king grants him a pension for life, 'or until we shall think it right to make some other order to suit his condition.' He is described as 'dilectus valettus noster' ('our beloved yeoman'), and in an Issue Roll as 'unus valettorum cameræ regis' ('one of the yeomen of the king's chamber'). It seems fairly certain that by this time Chaucer was married. In 1366 one Philippa Chaucer appears amongst the ladies of the queen's bed-chamber, and there is no good reason for doubting that this was the poet's wife. Her maiden name was in all probability Roet. It is commonly supposed that she was the daughter of Sir Payne Roet of Hainault and king-at-arms of Guienne, and so the sister of Katherine who married Sir Hugh Swinford, and afterwards became the mistress and eventually the wife of John of Gaunt. After the queen's death in 1369 she passed into the household in which her sister was such an important figure, and very likely remained there till her death in 1387. She gave birth, it would seem about 1362 or 1363, to Thomas, a noticeable personage in the House of Commons in the following century; probably to Elizabeth (*circa* 1365), for whose novitiate at the Abbey of Barking John of Gaunt paid some £50 in 1381, and to Lewis, born in the same year in

which his sister was admitted at Barking, for whom his father wrote some ten years later a treatise on the Astrolabe. But the whole matter of Chaucer's married life is involved in much obscurity. It is in evidence that when he was certainly married he speaks of himself several times as one unblest with love's favour; nor can these expressions be explained away as being dramatic and not autobiographical. The picture he draws of himself in the *House of Fame*, a poem undoubtedly written after his marriage, is assuredly that of a forlorn bachelor. On the whole, we believe him to have married about 1360, and that for some reason or other not at present discovered, if ever to be, his married life was disturbed and unhappy.

In the year 1369 Chaucer comes certainly before us as a poet, with his *Death of Blanche the Duchess*. This is not probably his first writing; but it is highly important, because the date of it is exactly fixed by the subject. It laments the death of the Lady Blanche, the first wife of John of Gaunt, which took place in September 1369. It is in many ways a crude composition, and a sufficient proof that Chaucer's art was, like that of many of the greatest masters, not precocious but of slow growth. But even so it illustrates his great gift of style, and gives satisfactory promise of his future excellence.

The following years of Chaucer's life exhibit him to us both as a much-employed man of business and as a rapidly developing man of letters. In 1370 he went abroad on the king's service; in 1372-73 on a royal mission to Italy—to Genoa, Pisa, Florence; in 1376, abroad, it is not known where; in 1377, to Flanders and to France; in 1378, to Italy again. Thus he seems to have been highly valued as a commissioner and a diplomatist. Meanwhile in 1374 he was appointed Comptroller of the Customs and Subsidy of Wools, Skins, and Tanned Hides in the port of London; in 1382, Comptroller of the Petty Customs; and in 1385 he was allowed to nominate a permanent deputy—a most important concession, as by the terms of his appointment he was, like his predecessors, to write the rolls of his office with his own hand and to be continually present. Nor were other marks of royal and of ducal favour wanting. In 1374, on St George's day, the king granted him a pitcher of wine daily, to be received in the port of London from the hands of the king's butler. In the same year John of Gaunt conferred on him a pension of £10 for life for the good service rendered by him and his wife Philippa to the duke, to his consort (the duke's second wife, Constance, daughter of Peter the Cruel, married in 1371), and to his mother the queen. In 1375 he received from the crown the custody of the lands and person of Edmond Staplegate of Kent, which brought him in £104 (well over £1000 of our money), and the custody of some property at Soles, also in Kent. In 1386 he was elected a knight of the shire for Kent. These were Chaucer's most prosperous years in an income-making sense.

To turn to his literary work during these years, the following writings certainly belong to the period between 1369 and 1387—i.e. between the composition of *The Book of the Duchess*, and that of the Prologue to *The Canterbury Tales*—and were probably produced in the order in which they are here named: *The Assembly of Fowls*, *The House of Fame*, *Troilus and Cressida*, and *The Legend of Good Women*; and besides these in unascertained order the Tale of Griselda (afterwards assigned to one of the Canterbury pilgrims—the Clerk), the Tale of Constance (afterwards assigned to the Man of Law), the Legend of the Martyred Christian Boy (afterwards assigned to the Prioress), the Legend of Saint Cecilia (afterwards assigned to the Second Nun), and the Story of Palamon and Arcite in its first shape (afterwards rewritten and assigned to the

Knight). None of these pieces represents the poet's genius in all its fullness or its maturity; they exhibit its gradual expansion and growth. As we see Chaucer in these he is not yet completely master of himself, or wholly satisfied with the instruments at his command—e.g. with the metrical forms then current around him. By far the most important influence acting upon him during this middle period of his literary life was the influence of Italy; and in this respect his going to Genoa in 1372, as already mentioned, had an importance other than commercial or political. That was a journey that made an epoch in his artistic development. It introduced him to poetry in its noblest medieval shape, and in one of the noblest shapes it has ever assumed in any age. Chaucer seems to have felt deeply the greatness of Dante. He appreciated worthily the works of Petrarch and Boccaccio; but to the credit of his judgment, it was Dante that most profoundly impressed him. *The Assembly of Fowls* and *The House of Fame* largely reflect this impression, the latter so closely that Lydgate, as Professor Skeat points out, speaks of it as 'Daunt in English.' Much of his subject-matter he derived from his great Italian contemporaries, especially from Boccaccio. Thus the Reeve's Tale, the Franklin's, and the Shipman's are all to be found in the *Decameron*; *Troilus and Cressida* is to a considerable extent a translation of Boccaccio's *Filostrato*; and the story of Palamon and Arcite is based upon that poet's *Teseide*. The tale of Griselda is taken from a Latin letter of Petrarch's, to whom Chaucer acknowledges his obligation in the Clerk's Prologue. Oddly enough, he never mentions Boccaccio. In one passage in *Troilus and Cressida* he would seem to denote him by the name of Lollius; but certainly in another, when he speaks of 'mine author called Lollius,' he denotes Petrarch, for he proceeds to give a version of one of Petrarch's sonnets. Dante he mentions by name several times. With both Petrarch and Boccaccio it is possible that he was personally acquainted. Boccaccio was living at or near Florence when Chaucer was there in 1372, and Petrarch near Padua, only some 120 miles away. Certainly what is said in the Clerk's Prologue suggests an actual meeting with Petrarch.

However this may be, the influence of the Italian poets on Chaucer is beyond question. Nor is it to be measured by what he borrowed in the way of plot or incident or expression. It was far profounder than such debts might suggest. It recreated him as an artist, giving him a new and loftier conception of artistic form and beauty. This regeneration is soon visible in the improvement of his style—in its growing dignity and shapeliness. It is strikingly indicated by his metrical progress. The old four-accented couplet seems to him 'light and lewd'; he needs something weightier and statelier. He does not satisfy this need by importing the favourite Italian metres. The sonnet form does not appear in any extant work of his, though conceivably he may have attempted it. The *terza rima* he does seem to have essayed, as Professor Skeat was the first to notice; but he did not take to it, or it to him. What he did was to imitate not the letter but the spirit of the Italian masters. And in the heroic heptastich, and presently in the heroic couplet, he found metrical forms that satisfied the highest ideal. The crowning work of the middle period of his life is certainly *Troilus and Cressida*—a work in which the abundant wealth of his genius is lavishly displayed. Probably about the year 1384, when his official duties were so considerably lightened, Chaucer, now a complete master of the poetic craft, began to seek for some great subject. The first selection he made proved unsatisfactory;

it was the *Legend of Good Women*. The Prologue to this famous fragment is an admirable piece of writing; but the theme was soon felt to be wearisomely monotonous, and was abandoned. His second choice was happier, as it provided full scope for his various powers—for his humour and his dramatic faculty, as well as for his pathos and more purely poetical gift. This was the *Canterbury Pilgrimage*.

But before that final choice was made, having been suggested probably by an actual journey to St Thomas's shrine, some strange reverses of fortune had befallen Chaucer. About the close of the year 1386 he was deprived of both his places in the civil service; and from this time to very nearly the end of his life, with slight intermissions, things went ill with him. The cause of his dismissal is obscure; possibly he was involved in the intrigues that disturbed and disordered the court in the reign of King Richard II.; possibly also there was some genuine dissatisfaction with the way in which his official work had been or was being performed. In 1389 he received a new appointment—he was appointed Clerk of the King's Works at the palace of Westminster, Tower of London, castle of Berkhamstead, the king's manors of Kennington, Eltham, Clarendon, Sheen, Byfleet, Langley, and Feckenham, and elsewhere, in this case, too, being allowed to nominate a deputy; but his previous fate seems to have pursued him. Two years afterwards we find him superseded by one John Gedney. It was during this term of office that he went through the odd experience of being robbed twice in one day. What glimpses we have of him in the succeeding years show him in perpetual impecuniosity and distress. It seems fairly clear that thrift was not one of his virtues. No sort of provision seems to have been made against a 'rainy day;' and now came many rainy days. For some two years he had to subsist as best he might on John of Gaunt's pension of £10, his salary as one of the foresters of North Petherton Park, Somersetshire, and whatever wages, if any, were paid him as a king's esquire. In 1394 King Richard granted him a pension of £20 for life; but the advances of payment he applies for in the following year, and again and again later on, and other signs, such as the issue on his behalf of letters of protection from arrest for debt, sufficiently indicate his unprosperous condition. An improvement came with the accession to the throne of the son of his old friend and patron John of Gaunt. In October 1399, King Henry IV. granted him a pension of 40 marks (£26, 13s. 4d.). This would raise his income to at least £500 a year of our money. And we may believe his few remaining months were spent in comfort. The following Christmas he took a lease for 53 years, at an annual rent of £2, 13s. 4d., of a house situated in the garden of the Lady Chapel, Westminster, the site now of what is commonly known as Henry VII.'s Chapel. But the end was near. Our last trace of him is the payment of a pension instalment in June 1400, made not to him personally, but to one Henry Somers in his behalf. Before the close of the century, of which he was in England the supreme literary glory, he was laid in that part of the abbey which through his burial there came afterwards to be called the Poet's Corner. His tombstone says he died October 25, 1400; and though the present tomb dates only from the 16th century, it probably perpetuates some older inscription.

In spite of all his reverses and troubles, it was during this last period of his life that Chaucer's genius shone brightest.

A merry heart goes all the day;  
Your sad tires in a mile-a.

Having formed a design that permitted the full

expression of his abundant and many-sided genius, he vigorously pursued it amidst the darkness that overclouded him. The design was indeed too huge for completion; and no doubt for all his vigour and buoyancy his troubles interfered with his progress. Moreover he was approaching or had reached what amidst the unhealthy ways and conditions of mediæval life was accounted old age. Hence his work remains but a fragment; but it is a fragment of large and splendid dimensions, consisting of parts that are admirably finished wholes, each one of which illustrates some special feature of the poet's versatile mind and art, and justifies and insures his fame. His greatest achievement is the Prologue to the *Canterbury Tales*, which for its variety, humour, grace, reality, and comprehensiveness is, as a piece of descriptive writing, unique in English literature—indeed in all literature. It portrays the society of the later middle ages in unfading colours, and historically as well as artistically is of inestimable excellence and value. Chaucer is in order of merit amongst the first of all our poets. It might indeed be disputed whether he does not deserve the place next to Shakespeare. In the middle ages in England he stands supreme.

See Skeat's edition of Chaucer's works (Oxford, 6 vols. 1894-95, vol. vii. the spurious works), and his one-volume edition (1895); Pollard's *Canterbury Tales* (1894); the 'Globe' Chaucer (ed. Pollard and others, 1899); Lounsbury's *Studies on Chaucer* (1892); Tyrwhitt's *Introductory Discourse to the Canterbury Tales* (1775-76); Nicolas's *Life of Chaucer* in the Aldine Edition, the magnificent Kelmscott Edition (ed. Ellis, folio, 1896); Ten Brink, *Chaucer-Studien* (1870); Child, *On Chaucer's Language* (in Ellis's *Early English Pronunciation*); Skeat, *The Chaucer Canon* (1900); Legouis, *Chaucer* (trans. 1913). For Chaucer's language—the East Midland variety of Middle English—see Morris and Skeat; editions of the Prologue and three of the tales, issued by W. & R. Chambers; Sweet's *Middle English Primers*, and Ten Brink's *Chaucer's Sprache und Verskunst* (1884; ed. Eckhardt, 1920). Invaluable to the Chaucer student are Dr Furnivall's Six-text Print of the *Canterbury Tales*, and the other issues of the Chaucer Society, including a Concordance. It must be noted that many works have been ascribed to Chaucer, and were long printed in popular editions, that are certainly not his—e.g. *The Court of Love*, *Chaucer's Dream*, *The Complaint of the Black Knight*, *The Cuckoo and Nightingale*, *The Flower and the Leaf*, and much of the extant *Romaunt of the Rose*. Neither Furnivall nor Skeat had access to the important Cardigan Chaucer MS. (c. 1450), still unedited, which contains many new readings.

For criticism of the poetry, see Ward's *Chaucer* in the 'English Men of Letters' series; Morley's *English Writers* (vol. iv. in new ed.); Warton's *History of English Poetry*; a fine essay by J. R. Lowell in *My Study Windows*; Kittredge's *Chaucer and his Poetry* (1915); A. A. Jack's *Commentary on the Poetry of Chaucer and Spenser* (1920); C. F. E. Spurgeon's *Five Hundred Years of Chaucer Criticism* (3 vols. 1925); A. Brusendorff's *The Chaucer Tradition* (Copenhagen and London, 1925).

**Chaudes-Aigues**, a town in the French department of Cantal, 90 miles S. of Clermont, with four mineral springs, which vary in temperature from 135° to 177° F. They have the property of discharging grease from sheep's wool, and are also useful in rheumatism and cutaneous diseases.

**Chaudfontaine**, a Belgian village charmingly situated in the valley of the Vesdre, 5 miles SSE. of Liège by rail, with mineral springs (92° F.).

**Chaudière**, a river and lake of Canada. The river joins the St Lawrence from the south 7 miles above Quebec, and, 2½ miles from its mouth, forms the falls of Chaudière. The lake—merely one of the many expansions of the Ottawa—has on its right the city of that name, the capital of the Dominion.

**Chaumette**, PIERRE GASPARD, one of the French Revolutionists, was born a shoemaker's son

at Nevers in 1763. He was some years a seaman, but the opening of the Revolution found him a clerk at Paris. He attached himself to Camille Desmoulins, and soon gained such popularity by his extravagant sansculottism that he was appointed procurator of the commune of Paris. In his zeal he rejected his own Christian name, Pierre, as having been sullied by saintly associations, and styled himself 'Anaxagoras.' The institution of the tribunal of the Revolution, the decree for a revolutionary army, and the law against suspected aristocrats, were largely due to his efforts. One of his proposals was that all Parisians should wear sabots, another that the Tuileries and Luxembourg gardens should be planted with potatoes. His antics in connection with the 'worship of reason' excited the disgust of Robespierre, who devised measures for bringing the whole company of actors under Hébert to the scaffold. He was executed April 13, 1794.

**Chaumont**, a town in the French department of Haute-Marne, on an elevation (1023 feet above sea-level) between the rivers Marne and Suize, 140 miles SE. of Paris, manufactures gloves, cutlery, &c. In 1814 the allied powers here bound themselves by treaty against Napoleon. Pop. 16,000.

**Chauny**, a town in the French department of Aisne, 77 miles NNE. of Paris by rail, partly on the navigable river Oise, was wrecked in the Great War. It is an old, rather uninteresting place, with manufactures of glass, beetroot sugar, gloves, &c. Pop. 10,000.

**Chausses**, in the armour of the middle ages, from the 12th to the 16th century, were defence-pieces for the legs. Some were made of padded and quilted cloth, with metal studs; some of chain-mail; and some of riveted plates. It was not unusual to fasten them by lacing either below the knee or behind the leg. The word is used also in the general sense of hose, and when armour is meant in the Norman romances the phrase is *chausses de fer*.

**Chautauqua**, a celebrated summer-resort on Chautauqua Lake, in a county of the same name, picturesquely situated near the south-west extremity of the state of New York, is a mere village, but is famous as the seat of the 'Chautauqua Assembly,' founded in 1874 by John H. Vincent, D.D., and Lewis Miller, to provide systematic instruction for Sunday-school teachers, together with popular lecture courses in literature, science, and art. In 1878 the Chautauqua Literary and Scientific Circle was organised. The distinctive mission of this 'circle' is stated to be 'to direct the reading habits of grown people, both those who have received the best that the educational institutions can give, and desire to pursue an "after school" course, and those who for any reason failed to receive a college education in early life, but who now desire to secure to themselves the college student's general outlook upon the world and life, and to develop the habit of close connected persistent thinking.' The system comprehends a four years' course of home reading and study, to be pursued under the advisory supervision of the officers of the institution, on the completion of which diplomas are awarded. Post-graduate and special courses are also provided for those who desire to prosecute particular branches of study beyond the limits laid down in the regular course. It is stated that about 260,000 persons, scattered through all parts of the world, belong to the Assembly, or the Chautauqua Institution, as it is now named; most of them are members of local circles formed in accordance with the general plan of the scheme for the more efficient prosecution of the studies. A faculty of able professors gives

instruction by correspondence, and after rigid examinations the regular collegiate degrees are conferred under charter from the state of New York.

Lake Chautauqua is a beautiful sheet of water about 18 miles long, with an average breadth of 2 miles, lying about 700 feet above Lake Erie, from which it is distant 10 miles. The Chautauqua Institution Grounds, situated upon the northern shore of the lake, contain attractive summer cottages, a fine hotel, a museum of archaeology, an amphitheatre with a seating capacity of over 5000, several halls for meetings, and numerous other appliances for combining recreation with instruction. Large numbers of students and visitors congregate here during the summer session. 'Chautauquas,' more or less on the plan of the original, with buildings, lectures, &c., have been established in various parts of the United States.

**Chauvinisme**, a term that has come to mean an extravagant and absurd patriotism and pride in one's own country, with a corresponding enmity towards and contempt for foreign nations. It is the French equivalent for the *Jingoism* of the London music-halls after Lord Beaconsfield's return from the Congress of Berlin in 1878. The origin of the word is due to Chauvin, the name of a figure in the comedy *La Cocarde tricolore* (1831), by the brothers Théodore and Hippolyte Cognard, the action in which includes the conquest of Algeria. Chauvin is a young recruit who speaks much, displays great courage, and sings several couplets with the refrain: 'J'suis Français, j'suis Chauvin, j'tape sur le Bédouin.' The authors of the comedy, however, borrowed the name from that of Nicolas Chauvin, an old soldier of Napoleon, well known in his time in Paris for his devoted enthusiasm for the emperor. *Calvin* is a Latinised form of the same family name.

**Chaux de Fonds**, a town of Switzerland, in the canton of Neuchâtel, 18 miles by rail NW. of the city of that name. It is situated in a bleak valley, at an elevation of 3254 feet above the sea, and is scattered over a large area, almost every cottage being surrounded by a garden. It has for two centuries been one of the chief seats of the manufacture of watches in the canton. The mechanists work chiefly at home, each devoting himself to a particular portion of machinery. Pop. (1834) 6500; (1890) 27,094; (1920) 37,708.

**Chavannes**. See PUVIS DE CHAVANNES.

**Chay Root**, CHOYA, or SAYAN (*Oldenlandia umbellata*), a perennial herb of the Rubiaceæ (Cinchonoideæ), grown on the Coromandel coast and in Java for the sake of its long, orange-coloured roots, the bark of which affords a beautiful red dye. It is the Indian madder.

**Chazars** were a people of the Finnic stock known in the 7th century on the shores of the Caspian; in the 9th century their kingdom occupied the south-east of Russia from the Caspian and the Volga to the Dnieper. Their capital was long at Astrakhan, called by them Balandshar. They were singularly tolerant of all religions—Jewish, Christian, and Moslem; and a large part of the nation formally adopted the Jewish faith from Jews who fled from the persecutions of the Emperor Leo. Cyril converted many to Christianity in the 9th century. The power of the Chazars was ultimately broken in the 12th century by the Byzantine emperors and the Russians.

**Chazy Epoch**, the name given by American geologists to that division of Silurian (or Ordovician) time during which the Chazy limestone of New York, Canada, &c. was formed.

**Cheadle**, (1) a market-town in the moorland district of Staffordshire, 14 miles NNE. of Stafford.

Lying in a pleasant vale, engirt by wooded hills, it has a parish church, rebuilt in 1837-38, and a Roman Catholic church, erected in 1846 from designs by Pugin, at a cost of £60,000.—(2) **CHEADLE AND GATLEY**, a Cheshire urban district near the Mersey, 2½ miles WSW. of Stockport; pop. 11,000.

**Cheating.** In the technical language of the English law, cheating means the offence of fraudulently obtaining the property of another by any deceitful or illegal practice short of felony, but in such a way that the public interest may possibly be affected. In order to constitute cheating, the fraud must be of such a kind that it could not be guarded against by common prudence. Cheating, in this sense, is an offence at common law, and indictable, which is not the case with imposition in a private transaction. The law of Scotland has no such distinction. The following are instances of cheating: selling by a false weight or measure (which is also a statutory offence under the Weights and Measures Act, 1878); selling unwholesome bread as if it were wholesome. Cheating seems, therefore, to be distinguished from obtaining property or credit on false pretences by the absence of any definite false statement. Cheating is also technically used in connection with frauds at play with cards or dice, but is popularly applied to almost every form of fraud. In Scots law, cheating is generally prosecuted under the name of falsehood, fraud, and wilful imposition, and has by one authority been called practical cheating, as distinguished from those cases in which a spoken or written false pretence occurs. See **FRAUD**.

**Cheb,** the Czech name of Eger (q.v.).

**Cheboygan,** a city of northern Michigan, on Lake Huron, was partly burned in 1922; pop. 6000.

**Chechens,** or **TOCHETCHENS**, a people of the Caucasus (q.v.), whose autonomous territory (so constituted in 1920) has its capital at Grozny (q.v.)

**Checkerberry.** See **WINTERGREEN**.

**Checquy.** See **HERALDRY**.

**Cheddar,** a village in Somersetshire, south of the Mendip Hills, 21 miles SSW. of Bristol, at the entrance of a deep and beautiful rocky gorge a mile long, whose stupendous limestone cliffs contain caverns—one 300 feet long—with fine stalactites and stalagmites. In Gough's Cave was found in 1903 a man's skeleton, associated with implements of flint and reindeer horn, which have been assigned to the Magdalenian culture. For the famous Cheddar cheese, see **CHEESE**.

**Chedu'ba,** a fertile island of Arakan, in the Bay of Bengal; area, 240 sq. m.

**Cheer,** defined by the New English Dictionary as 'a shout of encouragement, welcome, approbation, or congratulation,' is the same word as appears in 'good cheer,' and is derived from the late Latin *cava*, 'face,' 'countenance.' The standard modern English cheer is indubitably *hurrah* or *hurray*, which is, however, a more modern word than *huzza*, and is possibly a modification of it influenced by the (older) Swedish, Danish, and Low German *hurra*, identical with the Dutch *hoera* and the Russian *ura*. From these comes the French *hou-ra*; according to the New English Dictionary the French *hou-ra* is taken from the English. The word seems to be connected with the Middle High German *hurr*, *hurrd*, interjection, and *hurren*, to whir, to rush. The oldest English example adduced in the New English Dictionary dates from 1686; and *whurra*, *hurra*, and *hooray* are also English spellings. *Hurrah* was the battle-cry of the Prussians in the War of Liberation (1812-13), and comes effectively into the refrain of battle-songs of that period. The German *hoch*, the French *vive*, the Italian *evviva*

are different in usage, corresponding to 'Long live (the king, or other person whom at the moment the crowd delighted to honour)!' In the House of Commons the cheer of 'Hear, hear!' may be followed by counter-cheers.

The most singular development of cheering is associated with American college sports; many colleges as a rule having each its own cheer or yell, or even several for several occasions. The yell is delivered by a whole company in marked staccato time; Harvard and Yale using *rah* (short for *hurrah*) shouted nine times in swift succession and strict time, with the name of the institution added at the end. But many of the college yells are complicated and eccentric. The American claque or college yell produced a startling impression on the cosmopolitan crowds at the Olympic games at Stockholm in 1912, and was by no means generally approved; if it stimulated the American contestants to their remarkable series of victories, it was said to have disturbed many of those not accustomed to it to the extent of getting on their nerves. Other institutions than colleges in the United States have their characteristic yells; and Canada and New Zealand have followed suit.

**Cheese** consists of the casein of milk reduced by coagulation to a more or less solid form, and contains at the same time varying amounts of fat, depending on the variety of the article in its final state. Cheese may be roughly divided into two great classes—hard and soft. The various English, Scotch, American, and Canadian cheeses belong to the first class, and will keep for several months. Soft cheeses originated on the Continent, and require, with a few notable exceptions, to be consumed almost immediately after they are manufactured. The main object of cheese-making is to utilise more of the solid contents of milk than is possible in butter-making, and thus secure the food-constituents of milk in a form convenient for storing. The solids of milk which are retained in cheese are the casein, fat, and part of the ash; those which are lost being the sugar, albumin, and the remainder of the ash, which are drawn off in the whey. Casein may be coagulated by Rennet (q.v.) or acid, the former being generally used, as the curd so produced is softer and less brittle. During coagulation the fat becomes entangled in the casein, and the more fat there is in milk the greater the difficulty in producing a cheese of good quality. Although the sugar is largely removed in the whey, a certain amount remains in the curd, and is necessary as a medium for the lactic acid bacteria which influence the flavour during ripening. Lime salts, usually in the form of calcium phosphate, are present in milk, and without them coagulation will not take place. For this reason soil which is deficient in lime does not produce pasturage which is suitable for dairy cattle where cheese-making is the object in view.

The differences in flavour, texture, &c. of the various types of cheese are brought about by variations in manipulation, coupled with alteration of temperature and amount of acidity. The best examples of cheeses which possess distinct characteristics are usually prepared in the country in which they originated, but by following the system of such district a good imitation can generally be produced elsewhere. Certain methods in manufacturing a cheese are favourable to certain bacterial and fungous changes, although the exact scientific value of these differences in manipulation is not fully understood.

A description of the manufacture of Cheddar cheese, taken as a typical example of a hard cheese, is given below; the method adopted when making other classes of hard cheese is based on the Cheddar system. All temperatures in the process of cheese-

making must of necessity change considerably with varying conditions, and those noted are therefore only approximate; they are given in degrees Fahrenheit. In the Cheddar system the evening's milk is strained into a jacketed vat, where it remains till morning, a temperature of between 65° and 70° being maintained during that time. By adding steam or hot or cold water to the hollow jacket of the vat, the temperature of the contents may be raised or lowered at will. The milk produced on the following morning is strained and mixed with that already in the vat by thorough stirring. The temperature of the milk is then raised to 84° or 85° and the Rennet (q.v.) added. The object of renneting is to allow a ferment present therein to cause coagulation in the milk by changing the soluble caseinogen into insoluble casein, which forms a clot. The amount of standard rennet used is four to five ounces per one hundred gallons of milk, the rennet being diluted with water and distributed as evenly as possible through the milk. The renneted milk should be stirred for three to four minutes, beginning with deep stirring and gradually confining the operation to the upper part of the liquid. Stirring must cease as soon as signs of coagulation appear, and this should take place in about ten minutes, being noticed by the appearance of small white specks on the stirrer. The vat is now covered with a cloth to keep in the heat, and left for about forty minutes, when the curd should be sufficiently firm for the process of cutting to take place. If the curd is ready for cutting, it should break with a clean fracture when a glass rod is drawn upwards through it. The curd is cut with thin-bladed knives into a number of small cubes to permit of the expulsion of the Whey (q.v.), which is the liquid residue of the whole milk. The contraction of the curd after cutting materially assists the expulsion of the whey. The curd is now scalded by raising its temperature to 100° or 104°, and at the same time stirring or breaking is carried out. The breaking is usually effected by means of an implement resembling a small wire rake, called a 'breaker'. In some systems, notably that prevailing in Somerset, the curd is twice scalded at temperatures of about 96° and 102° respectively. The broken curd is next allowed to settle in the whey until a sufficiently advanced stage of ripeness is reached, the whey being then drawn off. The correct condition of ripeness is reached when a hot iron applied to the curd will draw away a thread a quarter of an inch in length. The curd can now be placed on the drainer or cooler at one end of the vat, after being cut into blocks about 6 inches square, and covered over with cloths to prevent quick fall in temperature. These blocks of curd are turned every half-hour till sufficiently dry to allow salting and grinding to be proceeded with. When dry, curd should have developed an acid smell and possess a velvety touch. The curd is broken by being passed between two parallel spiked rollers which form the curd-mill. A slatted board is next employed as a cooler, on which the curd is placed, and salt is then added at the rate of one ounce per three pounds of curd. In mixing in salt by hand care must be taken not to render the curd too soft, or loss of fat will result in the later process of pressing. In order to mould the cheese into the desired shape the curd is packed into metal or wooden cylinders, commonly called cheese-hoops, which are first lined with a cloth of open texture. The larger portions of curd are placed nearest the sides of the cylinder, filling up the centre with smaller pieces; and the curd temperature should be 62° to 68°. When the hoops are full the ends of the cloth are folded over and a circular piece of metal or wood placed on top.

The hoop is then placed in the screw-press, by means of which pressure is applied from above. The object of pressing is to expel any surplus whey and to consolidate the curd, and the press is tightened gradually. After the curd has remained in the press for one night it should be sufficiently consolidated to allow the cloth to be removed and a bandage substituted, when the cheese is returned to the press and the pressure increased. The object of bandaging is to prevent the cheese being crushed out of shape. The cheese is left in the press for about three days, and should then be ready for the curing or ripening room. In the case of a forty-pound cheese a final pressure of a ton or over is applied, and for smaller cheeses proportionally smaller weights. It is advisable to affix the date to every cheese as it is placed in the curing-room. The temperature of the curing-room should be from 60° to 65°, and the cheeses are turned twice daily for the first fortnight, and once per day during the remainder of the first month; turning every other day is continued till the end of the second month, when the cheese should be ready for marketing. If a specially mellow cheese is required, the ripening period may be extended to six, twelve, or eighteen months; but after two months the temperature of the ripening-room is decreased, but never allowed to fall below 55°.

The practice of giving cheeses a red colour by the addition of artificial colouring matter is now common, and this is almost invariably done by the use of Annatto (q.v.). Annatto is added to the milk before renneting at the rate of one and a half ounces per one hundred gallons. The amount of cheese produced from a gallon of milk varies considerably at different seasons of the year, but the average may be taken as one pound.

Cheshire cheese closely resembles Cheddar in its method of manufacture, but the system is less perfect, depending more upon rule of thumb. Its texture is less dense than that of Cheddar, being more flaky in appearance, this being brought about by allowing the curd to become more acid, and by expelling the whey less thoroughly before packing into the hoops. As much of the Cheshire cheese is consumed by the working population of the manufacturing towns in the north of England, a cheap, early ripening cheese of rather a biting flavour is most commonly manufactured; but medium and late ripeners are also produced, the latter being more closely allied to Cheddar.

The demand for quickly ripened hard cheeses is increasing in the case of all varieties. Other British hard cheeses are Derbyshire, Wiltshire, Leicester, Gloucester, Wensleydale, and Dunlop, the last being peculiar to Scotland, and the manufacture of these only differs in small details from that of Cheddar.

The average weights of cheeses of the different British varieties are as follows: Cheddar 70 lb., Cheshire 80 lb., Derbyshire 28 lb., Wiltshire 30 lb., Leicester 40 lb., Wensleydale 15 lb., Dunlop 56 lb. There are two names associated with the Gloucester cheese—viz. single and double, and it is often erroneously supposed that the former is made from whole milk, and that the latter is made after the addition of cream. The composition of these two cheeses is, as a matter of fact, practically identical, the real difference being in the size of the finished cheese. The single Gloucester weighs 14 lb., and the double 28 to 30 lb.

One of the most famous cheeses made in England, and one which commands a high price, is Stilton. Different in many respects from any of the hard or soft cheeses, it is known by its drab-coloured, wrinkled skin and the presence of veins of a greenish mould (*Penicillium glaucum*, see *PENICILLIUM*) running through it. It is made either from

whole milk, as in the case of Cheddar, or from morning's milk to which the cream only of the previous evening's milk has been added, and if made on the latter method the resultant cheese is richer in fat. Sufficient rennet is added to obtain a firm curd for cutting in about forty-five minutes. The curd is ladled into cloths and hung up over the vat to allow drainage to take place, the ends of the cloth being gradually drawn tight to exert pressure on the curd. After breaking and salting, the curd is put into tinned hoops, which in the Stilton system are perforated to allow of skewers being thrust upwards into the curd to facilitate drainage, as usually no pressure is applied. When the curd has remained in the hoops for a few days it will have shrunk sufficiently to be easily removed, and is withdrawn and the outside rubbed with the flat of a knife to close any cracks which may have appeared. It is usual now to bandage and return to the hoop, and in a few days the cheese will be solid enough to require no support. The cheese is now carried to the curing-room, where the mould is developed and the wrinkling of the skin produced. The presence of *Penicillium glaucum* in Stilton cheeses gives to them their distinctive flavour. Stilton, like other cheeses produced from creamed milk, is liable to attacks by Cheesemites (q.v.), owing to the fact that this type of cheese possesses a dry surface. The presence of these mites in a cheese produces a brownish colouring.

The manufacture of Gervais may be taken as an example of the process followed in soft-cheese making. Fresh whole milk, to which half its volume of cream is added, is placed in a crock and the mixture thoroughly stirred for about ten minutes. Rennet, at the rate of eight drops to three quarts, is added at a temperature of 62° to 65°, and the vessel covered and left overnight. Ladle the soft curd into huckaback cloths, and hang up to drain. The cloths must be opened from time to time and scraped to prevent the curd adhering thereto, or free drainage cannot take place. When the curd is sufficiently dry it is broken up small and salted, using a teaspoonful of fine salt to the curd produced from three quarts of milk. The curd is then placed in small cylindrical tin moulds, which are lined with absorbent paper, and left for two or three days. The moulds are usually of such a size that twelve are filled by the curd produced from three quarts of milk and cream. The cheese on removal from the moulds is usually eaten fresh, but the flavour imparted by keeping and developing a slight amount of green mould is sometimes considered an advantage.

The following are a few of the best-known soft cheeses: York, Slipcote, and New Forest, from England; Gervais, Brie, Camembert, Coulommiers, and Pont l'Évêque, from France; Limburg, from Belgium; Parmesan and Gorgonzola, from Italy. As a rule the chief difference in composition between hard and soft cheese is that in the latter the percentage of water is much higher and of casein much lower. The compositions of Cheddar and Gervais are given for comparison, the figures being an average of a number of analyses. Cheddar—water, 34.55 per cent.; casein, 26.94 per cent.; fat, 31.94 per cent.; sugar, 2.95 per cent.; ash, 3.62 per cent. Gervais—water, 53.40 per cent.; casein, 11.25 per cent.; fat, 29.83 per cent.; sugar, 2.62 per cent.; ash, 2.92 per cent.

Cheeses made from the milk of other mammals than cows are produced in small quantities in various countries for local consumption. In Germany, Italy, France, Hungary, and other European countries the milk of ewes and goats is used for making cheese; in Lapland reindeer's milk is treated in the same way; whilst among the Arabs a cheese is prepared from camel's milk.

Of the ewe-milk cheeses one only—namely, Roquefort—has become famous, and is exported to a considerable extent. The milk from which this cheese is made is supplied by sheep of the breed known as the Larzac. The evening's milk is heated almost to boiling-point, cooled, and kept overnight. In the morning the milk is skimmed and the morning's milk added. The mixed milk is coagulated with rennet at a temperature of 93° F., and the curd afterwards broken and the whey expelled. The curd is then packed into glazed clay moulds in alternate layers with finely crumbled bread which has been allowed to become mouldy. The object of this mouldy bread is to introduce the mould *Penicillium glaucum*, which in time permeates the entire cheese. The cheeses are slightly pressed in the moulds, and after removal therefrom are allowed to dry for ten or twelve days wrapped in cloths, which are frequently renewed as the cheeses are turned. The next operation is salting, followed by scraping in about a week. The cheeses are then left to ripen on straw, usually in rock-caves where the air is cool and dry. The ripening period generally extends to slightly over a month, frequent scraping being meanwhile necessary to remove a white mould which accumulates on the rind.

Interest has of late been aroused in the sour-milk treatment considered likely to promote longevity. Metchnikoff had noticed that in Bulgaria a large number of peasants lived to a great age. A peculiarity of their diet was found to be the consumption of large quantities of a peculiar soured milk. This milk on bacterial examination showed the presence of a distinct bacillus, to which the name *Bacillus bulgaricus* was given. The presence of this bacterium in the large intestine was considered to be hostile to the germs giving rise to the toxic bodies 'indol' and 'scatol,' bodies which, absorbed into the blood, give rise to arterial sclerosis and senile decay. One method of introducing the *Bacillus bulgaricus* into the system is by means of cheese, an example being the St Ivel prepared at Yeovil—a soft-cream cheese, the curd being in an easily digestible form, and, in addition to the above-noted bacillus, containing soluble phosphates.

Margarine cheese (see BUTTER) is defined by the Food and Drugs Act of 1899 as 'any substance, compounded or otherwise, which contains fat not derived from milk,' and the sale is forbidden save when in cases specially branded 'Margarine Cheese.' All factories for its manufacture must be registered, and be open to inspection by the Board of Agriculture.

American and Canadian cheeses are manufactured in large quantities in factories (see DAIRY), the system followed being practically identical with the Cheddar process; and the product competes in the open market with the best cheese of any country. Before the introduction of the factory American cheese was not of uniform character, and often possessed a pungent flavour, with poor keeping qualities. Dairy-farming with a view to cheese-production in America is most common in New York, Pennsylvania, Wisconsin, Ohio, Iowa, and in Canada in Ontario. The first cheese-factory was established in 1881 by Jesse Williams in New York state, and the co-operative system of cheese-making spread rapidly through the United States and Canada. The manufacture in America of so-called filled cheese—i.e. that produced from skim milk with the addition of animal fats other than milk fat—is regulated under the Filled Cheese Law of 1896, which places a tax upon all cheese of this class, and also requires all manufacturers and dealers to be licensed. The words 'Filled Cheese' must be clearly stamped on all cases exposed for sale.

The best milk for cheese-making is that in which

the fat globules are small in size, the milk of the Ayrshire cow being the most suitable in this respect. In England the Dairy Shorthorn is the cow most favoured for cheese-making. The milk produced by Jersey and Guernsey cattle is better suited to butter-making, owing to the high percentage of fat and the large size of the globules. In America the so-called Grade Shorthorn predominates, and there are crosses between the native cattle and Holstein, Ayrshire, and Devon breeds.

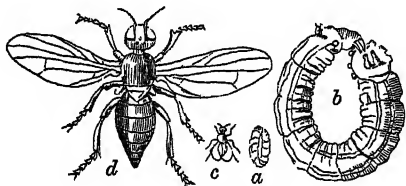
As noted above, the whey from cheese-making contains the larger part of the sugar of the milk. The preparation of lactose or milk-sugar from whey is now carried on to a considerable extent, particularly in Switzerland. Milk-sugar is easily digested, and is used in the preparation of infant and invalid foods. See BUTTER and CATTLE.

A vegetable cheese is made from the soy or soya bean, which is rich in vegetable casein, and is now imported into Europe and America in large quantities (see BEAN, SOY). A vegetable milk is made by crushing and macerating in about ten times their weight of cold water soy beans that have already been well soaked. The thick, milky liquid thus obtained is filtered, and may be used fresh for drinking (as it largely is in Cochín-China and Assam) or for making cheese. In the latter case the vegetable milk is treated with a mineral salt or an acid, which coagulates the milk into a curd (like rennet in cow's milk); or the milk may be boiled and treated (as in China) with calcined selenite. The curd is drained and washed, and may be used fresh, or may be preserved by smoking and salting. The milk and cheese are cheap, wholesome, and nutritious, but not palatable to most Europeans or Americans; though milk, cheese, oil, sauce, flour, and other products from soy have been manufactured near Paris.

**Cheese-cake**, a cake of light pastry originally containing cheese, now filled with a compound of curds, sugar, and butter, or whipped egg and sugar.

**Cheese-cloth**, a cloth of open texture, made from flax or tow yarn, used for wrapping cheese; a finer quality is employed in dressmaking, and a similar material is used in the upholstery trade and as a basis for embroidery.

**Cheese-hopper**, the larva of *Piophilæ caset*, a small dipterous (two-winged) fly, of the large family Muscidae, to which the house-fly, blow-fly, &c. belong. The perfect insect is about a line and a half in length, mostly of a shining black colour; antennæ, forehead, and some parts of the legs reddish. It is a pest of dairies and store-closets, laying its eggs in cracks or crevices of cheese, the destined food of its numerous, active, and voracious larvæ. To preserve cheeses from this pest, it is of advantage to brush or rub them frequently, and to



Cheese-hopper :

a, larva, natural size; b, larva, magnified, preparing to spring; c, perfect insect, natural size; d, magnified.

remove all cracked or injured cheeses from large stores, besides keeping them dry and in a well-aired place. The same rules are applicable in regard to the other insect larvæ by which cheeses are some-

times infested. Of these the most notable are the larvæ of the Bacon Beetle (see DERMESTES), and of another species of dipterous fly, *Musca corvina*.

**Cheese-mite** (*Tyroglyphus siro*), familiar on old dry cheese. It is a true Mite, and belongs to the division without special breathing organs. The body is rounded behind, conical in front, with a well-marked groove between the second and third pairs of legs, and with relatively long smooth hairs. The male differs slightly from the female, for instance in the possession of two posterior suckorial pits. The larvæ have only three pairs of legs, and pass through an immature eight-legged 'nymph' stage before becoming like the adults. The cheese-mite is not confined to cheese, but attacks dried fruits and the like. See ACARINA (with cut), ARACHNIDA; also Michael, *Journ. Roy. Microscop. Soc.* 1884, 1885.

**Cheetah**, or HUNTING LEOPARD (*Felis jubata* or *Cynaelurus jubatus*), an animal of the feline family, distinguished by its longer and narrower



Cheetah.

feet and less completely retractile claws, which are also more blunt and less curved. It also differs from other Felidæ in certain dental characters—e.g. of the upper sectorial tooth. With these peculiarities are associated a greater length of limb than is usual in feline animals, and the habit of taking its prey by running rather than by leaping. The cheetah is in size about equal to a leopard, but the body and limbs are longer. The colour is yellowish brown, with black and brown spots. It is very widely distributed, being found in Senegal, South Africa, Persia, India, Sumatra, &c. Its geographic range extends from the Cape of Good Hope as far north as the Caspian Sea and the steppes of the Kirghiz Tatars. The African form is sometimes distinguished as *C. guttatus*. The animal, though trained to the chase in man's service, must be caught wild and taught; tame-bred ones are useless (see J. L. Kipling, *Beast and Man in India*, 1891). Deer and antelopes are the game principally hunted, and packs of cheetah are kept for this purpose by Indian princes. The head of the cheetah is kept covered with a leather hood till within 200 yards of the game. When the hood is taken off, the cheetah stealthily creeps towards the herd, taking advantage of every bush and inequality for concealment, till, on their showing alarm, he is amongst them at a few bounds, and striking down his victim with a blow of his paw, instantly tears open its throat, and begins to suck the blood. It is then somewhat difficult to withdraw him from his prey, which is generally done by offering him meat. If unsuccessful, the cheetah does not attempt to follow the herd by running—nor does this animal seem to possess the power of maintaining speed through a lengthened chase, but slowly, and as if ashamed, creeps back to the hunters. In a domesticated state it is

extremely fond of attention, and seems to repay kindness with affection.

**Cheever**, GEORGE BARRELL (1807-90), born in Maine, was educated at Bowdoin College and Andover Theological Seminary, and from 1832 to 1870 was pastor of Congregational and Presbyterian churches in Salem and New York. His *Lectures on the Pilgrim's Progress* (1844) and *Wanderings of a Pilgrim in the Shadow of Mont Blanc* (1845-46) had a wide circulation.

**Che-foo**, or CHI-FU (properly the name of the European colony of the Chinese town of *Yen-Tai*), a treaty port on the north side of the peninsula of Shan-tung, at the entrance to the Gulf of Pechili, remains open throughout the winter. The foreign quarter is in some sense a colony of Shanghai, and, having the wholesomest climate of all the treaty ports, it is much resorted to by convalescents. The Chinese town, built on the sandy shore, with exceedingly dirty streets, has about 100,000 inhabitants. The district, which is noted for fruit-growing, produces also cereals and raw silk. Pongee and lace are made. The principal imports are textiles, sugar, paper, iron, edible seaweed, and matches. The chief exports are silk, straw braid, bean-cake, and vermicelli. The *Che-foo Convention* (1876) settled several disputed points between China and Great Britain, and extended certain commercial advantages to the latter country.

**Cheh-kiang**. See CHE-KIANG.

**Cheiranthus**. See WALLFLOWER.

**Cheirolepis**, a genus of fossil ganoid fishes, characteristic of the Devonian strata. The generic name means 'scaly-hand.'

**Cheiomancy**. See PALMISTRY.

**Cheiomys**. See AYE-AYE.

**Cheironectes**. See OPOSSUMS, YAPOCK.

**Cheiroptera**. See BATS.

**Cheirotherium**, a name given to Labyrinthodonts (q.v.), from hand-like impressions in the Triassic rocks.

**Cheke**, SIR JOHN, one of the revivers of Greek learning in England, was born in 1514 at Cambridge, and in 1529 obtained a fellowship of St John's College, where he embraced the Reformed doctrines. He laboured earnestly to advance the study of the Greek language and literature; and when a regius professorship of Greek was founded at Cambridge in 1540, Cheke was appointed its first holder. A new mode of pronouncing Greek which he introduced was assailed by Bishop Gardiner, the chancellor of the university, and forbidden under severe penalties. Cheke was obliged to submit; but notwithstanding, his system established itself in England. In 1544 Cheke became tutor to the prince, afterwards Edward VI., whose elevation to the throne secured him rank, wealth, and honour—a seat in parliament (1547), the provostship of King's College (1548), and knighthood (1552). He was stripped of everything at Mary's accession, and went abroad, but in 1556 was treacherously seized in Belgium, and brought to the Tower. Fear of the stake induced him to abjure Protestantism, and fresh lands were given to him in the place of those he had forfeited, but his recantation preyed on his mind, and he died in the course of the following year, 13th September 1557. Of more than thirty Latin and English books by him, one is a translation of St Matthew's Gospel (edited by Goodwin, 1843), exemplifying a plan for reforming the language by eradicating all words save those of English origin. See his *Life* by Strype (best ed. Oxford, 1821).

**Chekhov**, ANTON, Russian tale-writer and dramatist, was born, the son of a small shopkeeper

and grandson of a serf, at Taganrog, 17th January 1860. He helped in his father's shop, studied at Taganrog high school and Moscow University, graduating in medicine in 1884. From the beginning he combined medicine, in study and practice, with literature. He wrote much as a student for comic periodicals. From 1887 onwards he issued many series of short tales, a number of farces, and in 1889 his first four-act play, *Ivanov*. Disease of lungs and heart did not prevent him from visiting Sakhalin in 1890 to inquire into the condition of prisoners. In 1892 he was fighting a cholera epidemic. At another time we find him working against famine. Consumption then drove him to the Crimea. Plays belonging to this period are *The Sea-gull* (1896), *The Three Sisters* (1901), *Uncle Vanya* (1902), and his masterpiece, *The Cherry Orchard* (1904). A few months after the production of the last he died at Badenweiler in the Black Forest. Chekhov has been called 'the hero of our time,' 'wholly a saint,' a criminal with 'evil fire' in his eyes, one who had no philosophy, who set himself to blight all human hopes, Russia's supreme optimist. His tales and plays are neither for those who would cling to their lies and illusions, nor for those who go to literature for formulae and propaganda. The doctor, it is true, is visible everywhere. Not one of the longer plays but has a doctor among its characters. But Chekhov the artist prefers diagnosis to prescribing. His characters are commonly of the middle-class intelligentsia, futile people. His plays are tragi-comedies of helplessness and inaction. His tales can scarcely be said to have plots. But seldom has there been a more receptive or subtle mind; perhaps never a greater artist in the short story. Those who have eyes for the delicate beauty and humour which this honest and pure-minded artist has distilled out of sometimes repulsive subjects need not fear to be oppressed by his grayness. His plays have been translated by Fell and West (1915-16), many volumes of his tales (1916 *et seq.*) and his *Letters* (1920) by Mrs Garnett. See also his *Life and Letters*, translated and edited by S. S. Kotliansky and P. Tomlinson (1925).

**Che-kiang**, an eastern maritime province of China (q.v.), is hilly, except around the Bay of Hang-chow. Tea, silk, cotton, rice, and beans are produced. Capital, Hang-chow.

**Cheliceræ**, biting appendages in Spiders (q.v.), scorpions, and other Arachnida.

**Chelifera**. See BOOK-SCORPION.

**Chellean**. See ANTHROPOLOGY, STONE AGE.

**Chelmsford** (perhaps the Roman *Cesaromagus*; Old English *Celmeresforde*), the county town of Essex, and, since 1888, a municipal borough, at the confluence of the Chelmer and the Cann, 29 miles NE. of London. It has a corn exchange (1857), shire hall (1792), grammar-school, founded by Edward VI. in 1551, and cathedral (till 1913 a parish church), which, all but the tower and spire, was rebuilt between 1803 and 1878. There is a trade in agricultural produce. Pop. 21,000.

**Chelmsford**, FREDERIC THESIGER, BARON, born in 1794, was a shipman in the navy, but exchanged the sea for law, and was called to the bar in 1818. He was knighted and made Solicitor-general in 1844, Attorney-general in 1845 and 1852, and Lord Chancellor in 1858 and 1866. He died 5th October 1878.—His son, FREDERIC AUGUSTUS THESIGER, second BARON, was born in 1827, entered the Rifle Brigade in 1844, became major in the Grenadier Guards in 1855, and served through the Crimea, the Indian Mutiny, and the Abyssinian campaign of 1868. He was adjutant-general in Bengal (1869-74), and commanded the forces in the Kaffir war of 1878 and in the unfortunate Zulu war

of 1879, having resigned the governorship of Cape Colony. Appointed lieutenant-general in 1882, he was lieutenant of the Tower of London in 1884-89, retired in 1893, and died in April 1905.—The second baron was succeeded by his son **FREDERIC JOHN NAPIER THESIGER**, born 12th August 1868, viscount in 1921. He was governor of Queensland (1905-9) and of New South Wales (1909-13), and as viceroy of India (1916-21) issued, with Mr Montagu, a report on proposed reforms which were embodied in the Government of India Act (1919). In 1924 he became First Lord of the Admiralty in Mr Ramsay MacDonald's ministry.

**Chelonia.** See **TORTOISES AND TURTLES**.

**Chelsea**, a metropolitan borough, on the north bank of the Thames. In the 16th century the village of Chelsea was the residence of Sir Thomas More, Queen Catharine Parr, the Princess Elizabeth, and Anne of Cleves. Afterwards Atterbury, Sir Robert Walpole, Swift, Steele, Smollett, and Sir Hans Sloane, and, in later years, Leigh Hunt, Carlyle, Rossetti, George Eliot, Turner, and Whistler, lived here. In the 18th century Ranelagh was much resorted to, and Cremorne (closed 1877) was at one time a popular attraction. The Royal Military Asylum for soldiers' children is now in Dover. Chelsea barracks are outside the borough boundary. But Chelsea possesses several colleges and hospitals, as well as the Chelsea Royal Hospital. It has an embankment (1873) extending to Battersea Bridge on the west. The famous 18th-century porcelain is noticed under **POTTERY**. Crosby Hall was removed to Chelsea from Bishopsgate in 1908. The borough has returned one member to parliament since 1885. Pop. 63,700.

**CHELSEA HOSPITAL** is an asylum for old and disabled soldiers of the British army. The gradual decay of the feudal system rendered it necessary to make some new provision for sick and maimed soldiers, consequently various statutes were passed during the reigns of Elizabeth, James I., and Charles I., throwing their maintenance on their respective parishes, under directions from the county justices. This system was abrogated during the Commonwealth as a matter of policy, and the expense met out of moneys arising from sequestrations of the estates of the vanquished royalists. After the Restoration a new act was passed (1662) again throwing their maintenance on the parishes, but this was so burdensome that it was never re-enacted. Sir Stephen Fox, the first paymaster-general of the forces, who had long been an exile in France, and was no doubt well acquainted with the erection in 1671 of the *Hôpital des Invalides* at Paris, first suggested the building of Chelsea Hospital. The foundation stone was laid by Charles II. in 1682, and the building, designed by Wren, was opened in 1692.

The funds for its lands and buildings, and for many years the maintenance of its inmates, were derived chiefly by deductions from the pay of the troops themselves—viz. 1s. in the £1, as well as one day's pay in each year. Since 1783 it has, however, been almost entirely supported by annual parliamentary grants. All Pensions (q.v.) granted to soldiers are awarded by the Commissioners of Chelsea Hospital, who are appointed by the crown. Originally it was contemplated that all pensioners would become inmates of Chelsea Hospital, but this was soon found impossible, and thus those who could not gain admittance were granted allowances termed out-pensions. The in-pensioners are selected from such out-pensioners as desire to become inmates, according to merit, age, and sufferings from wounds or other disabilities, and are provided with board, lodging, clothing (including the well-known red coat and cocked hat), nursing, and medical attend-

ance, together with a small weekly allowance in money according to rank. Those within can at any time become out-pensioners again. Chelsea Hospital is locally known as 'Chelsea College'—the Hospital having been erected nearly on the site of James I.'s short-lived 'College for Religious Controversy' (1610).

**Chelsea**, a north-eastern suburb of Boston (q.v.), Massachusetts, from which it is separated by the estuary of Mystic River; pop. 43,000.

**Cheltenham**, a fashionable watering-place of Gloucestershire, on the Chelt, a little affluent of the Severn, 44 miles NNE. of Bristol, 47 SSW. of Birmingham, and 121 WNW. of London (by road only 95). It lies in a picturesque and fertile valley, on the east and south-east half encircled by the Cotswolds. A saline spring was discovered here in 1716, and from a mere village the place gradually increased till 1788, when the benefit derived by George III. from its waters suddenly made it a resort of fashion. The four spas—Royal Old Well, Montpellier, Pittville, and Cambray—are all saline but the last, which is chalybeate; they are deemed efficacious for liver complaints and dyspepsia. With its squares, crescents, and terraces, its gardens and promenades, its clubs and pump-rooms, its August 'cricket week,' its healthy climate, the cheapness of living, and the happy absence of manufactures, the town offers many attractions both to visitors and residents, the former largely foxhunters in winter, the latter retired Anglo-Indians. It is, besides, the seat of a college for boys, founded in 1840, incorporated by act of parliament in 1894, and occupying a splendid Tudor pile of 1843; a grammar-school (1586; reconstituted 1833); a large ladies' college (1854); a Church of England training college for schoolmasters (1847); and private schools beyond number. Notable buildings are the 14th-century parish church; the Roman Catholic Church (1857), with a spire 205 feet high; the Corn Exchange (1863); and the handsome Free Library. Cheltenham has memories of Handel, Tennyson, Frederick Robertson, Sydney Dobell, and Dean Close, under whom (1824-56) it became a stronghold of Evangelicalism. It was incorporated as a municipal borough in 1876, and has returned one member to parliament since 1832. Pop. (1921) 48,444. The urban district of Charlton Kings, to the south-east, is now within the parliamentary boundary. See Miss Beale's *History of the Ladies' College* (1900), and her *Life* by Miss Raikes (1908).

**Chelyabinsk** (*Tcheliabinsk*), a town of Russia, in the province of Orenburg, on the eastern slope of the Urals, and on the Siberian Railway, about 500 miles ENE. of Samara. It is a trade centre for corn and cattle. Pop. 70,000.

**Chelyuskin**, **CAPE** (also 'North-east Cape' or 'Cape Severo'), the most northerly point of Asia, a low promontory in 77° 42' N., on the western arm of the eastern half of the Taimyr peninsula. It is named after a Russian officer who led an expedition thus far in 1742, and here succumbed; it was not revisited till 1878, by Nordenskjöld, who spent two August days here on his voyage in the *Vega*.

**Chemical Affinity** is the name given to the tendency to combine with one another which is exhibited by many substances; or to the force by which the substances constituting a compound are held together. The tendency of any given element to unite with a number of other elements varies greatly. Chlorine, for instance, unites with great readiness with most metals and with many non-metallic elements, much heat being produced during the union; but it has little or no affinity for, or tendency to combine with, oxygen, so that compounds of chlorine with oxygen can only be obtained by roundabout methods, and are very

liable to sudden and explosive decomposition into chlorine and oxygen. Where the affinity of elements for each other is great, the compounds produced by their union are decomposed with difficulty, and where the affinity is feeble, decomposition is easily effected. See also CHEMISTRY.

**Chemistry.** Although chemistry has only taken its place as an exact science based upon accurate experimental investigation within a comparatively recent period, yet its origin dates back to the earliest times of philosophical study. It will be convenient to give in the first place a short sketch of the history of chemistry, and then to state some of the principles of the science, illustrating these from the simplest facts. When possible, such illustrations will be chosen as are likely to be not altogether unfamiliar to non-scientific readers.

*Historical Sketch.*—The word *chemistry* has come to us from the Greek through the Arabic, as shown in our article ALCHEMY. With regard to the chemistry of the ancients, we know that the ancient Egyptians, Phœnicians, Greeks, and Romans were acquainted with a very considerable number of useful substances, and that their processes for preparing some of these did not differ in any essential particular from those now in use. It does not appear, however, that they have left any chemical records behind them, or that they knew anything of the science of chemistry. Several metals were known to, and employed by, these ancient peoples, who were acquainted with processes for reducing them from their ores. Amongst these metals were gold, silver, mercury, copper, tin, lead, and iron; whilst they also knew and worked with brass, although they were not aware that it was an alloy of copper and zinc. Various alloys were employed for bronzes for statues, and these usually contained copper, lead, and tin. The processes for manufacturing soap, starch, glass, leather, various mineral and vegetable pigments, stoneware, and other useful substances, were all known and carried on in very early times; and wine and beer appear likewise to have been prepared and used as beverages long before the process of distillation, which was unknown to the ancients, had been introduced. Vinegar, sulphur, and carbonate of soda were also known.

We find the application in medicine of many chemical products at a comparatively early period, and the Arabians appear to have been the first who tried to prepare new medicines by chemical methods. Geber, who lived in the 8th century A.D., is the most noted of the Arabian chemists, and he has left some writings which show us what was the state of chemistry at that early date. Geber knew, for instance, how to make and distil vinegar and nitric acid, and even sulphuric acid was made and used as a solvent by him. He knew, amongst other substances, white arsenic, borax, common salt, alum, sal-ammoniac (ammonium chloride), cop-peras (ferrous sulphate), nitre (potassium nitrate), and corrosive sublimate (mercuric chloride), and was acquainted with a number of their properties. He used almost all the kinds of apparatus that were commonly in use down till the 18th century, and understood the processes of distillation, filtration, sublimation, and crystallisation. In one of his works he describes the construction of furnaces for chemical purposes.

From the 8th till the 17th century but little real progress was made in chemistry as a science. The new knowledge that was gained during this period was mainly due to the assiduity of the alchemists, who, in their vain search for the philosopher's stone, necessarily made useful discoveries from time to time. Many of the alchemists so called were mere tricksters who deceived their

dupes by more or less clumsy experiments, which appeared to demonstrate the production of gold from baser metal. Others, however, were really earnest and untiring in their labours, and held the fullest belief in the prospects of the ultimate success of some fortunate worker. The new substances obtained by the alchemists were frequently used in medicine, and it is to these infatuated workers, therefore, that we owe our first knowledge of many potent medicines. The writings of many of the alchemists are preserved, but numbers of them are entirely worthless from a scientific point of view, as the descriptions of processes are mixed up with so much of mystery and extravagance that they present a wholly unintelligible jargon. For more detail, however, regarding this remarkable period in the history of chemistry, see the article ALCHEMY.

As Geber has been called the patriarch of chemistry, so Robert Boyle (1627-91) has been called the father of modern chemistry, since it was Boyle who first tried to free chemistry from the trammels of alchemy and to place it upon a true scientific basis. Boyle in his *Sceptical Chemist* tried to discredit the salt, sulphur, and mercury of the alchemists (as well as the Aristotelian earth, air, fire, and water) as elements or ultimate constituents of substances, and he gave a scientific definition of an element. Boyle was an experimental investigator of considerable skill, and to him we owe the introduction of the air-pump and the thermometer into this country. His experiments upon the physical properties of gases led to the formulation of the law concerning the relation of the volume of a gas to the pressure, which is commonly known as Boyle's Law.

Theory in modern chemistry begins with Becher (1635-82) and Stahl (1660-1734). The latter adopted, with some modifications, a theory propounded by the former concerning elements and compounds, and formulated the phlogiston theory of combustion. The views of Becher and Stahl regarding elements were not so enlightened as those of Boyle, and must be considered as retrograde. Stahl's phlogiston theory (1697) was at once adopted almost universally by chemists, and for fifty years it was held to give the full explanation of the phenomena of combustion. According to this theory phlogiston was a constituent of all combustible substances. When a substance burned, the phlogiston made its escape, and the product of combustion was regarded as the other substance with which the phlogiston had been previously united. When a metal such as lead was heated in the air, it lost its phlogiston, and the oxide formed was looked upon as the other constituent of lead besides phlogiston. The process of reduction of lead from its oxide by means of charcoal was the transfer of phlogiston from the charcoal to the lead. It did not present itself to the adherents of the theory as an absurdity that a metal, in losing its phlogiston on oxidation, gained weight, although some of them at least were aware of the fact. The idea of gain of matter being a necessary accompaniment of gain of weight is so familiar to us that we can scarcely realise that it was not always so regarded. To this may fairly be attributed the persistence with which the phlogiston theory held its ground for so long a period.

The Dutch chemist Boerhaave (1668-1738), who did not accept Stahl's theory, published in 1732 his system of chemistry, which was a compilation of practically all that was known up till that date, collected with great labour from a large variety of alchemical and other writings.

The interval between the introduction of the phlogiston theory and its overthrow by Lavoisier in 1772-85 was one of great advance in chemical

knowledge, and a number of very eminent chemists preceded and were contemporaries of Lavoisier.

In Germany, Marggraf (1709-82) studied the properties of the almost unknown alumina and magnesia, and made considerable advances in the qualitative analysis of substances in solution.

Amongst British chemists of note may be mentioned Hales (1677-1761), who was amongst the first to experiment on gases; Black (1728-99), who in 1756 published his research on *Magnesia Alba*, showing the nature of fixed air or carbonic acid gas, and of the difference between caustic and mild (or carbonated) alkalis; Priestley (1733-1804), who, in addition to his discovery of oxygen in 1774, investigated nitric oxide, nitrous oxide, sulphurous acid, carbonic oxide, hydrochloric acid, and ammonia gases, being specially attracted to the study of gaseous substances and their properties; and Cavendish (1731-1810), who investigated the nature and properties of hydrogen, analysed atmospheric air, and discovered the compound nature and composition of water and of nitric acid.

Lavoisier (1743-94) was one of the ablest chemists of his time, and his labours include a vast variety of subjects. His attack upon, and eventual demolition of the phlogiston theory, and his experiments in connection with his new theory of combustion, occupied him for a considerable number of years. He taught that combustion was the union of the combustible substance with atmospheric oxygen; he was the first to introduce system into chemistry and chemical research; he determined the constituents of a large number of substances, including sulphuric, phosphoric, and carbonic acids, numerous metallic oxides, and many animal and vegetable substances; and he, along with Berthollet, Fourcroy, and Morveau (1737-1816), introduced a new and consistent system of chemical nomenclature. Two contemporary Swedish chemists, Bergman (1735-84) and Scheele (1742-86), must be mentioned before leaving the phlogiston age. Bergman investigated, amongst other things, carbonic acid gas, studied the phenomena of affinity, and made advances in the processes and reagents used in qualitative analysis. Scheele was one of the most laborious chemists of his time. He discovered citric, malic, tartaric, oxalic, lactic, hydrocyanic, arsenic and other acids, and chlorine, besides investigating the nature of a large number of other bodies and independently discovering oxygen.

It was towards the end of the 18th century that the value of quantitative analysis of substances began to be generally recognised. The question as to whether the quantitative composition of a given substance was always the same gave rise to a discussion which lasted for several years, and was at length decided in favour of constant composition.

The researches of Richter (1762-1807) on the quantities of various acids neutralised by a given quantity of a base, and of various bases neutralised by a given quantity of an acid, led him to the general conclusion that the quantities of two acids,  $\alpha$  and  $\alpha'$ , which form neutral salts,  $\alpha b$ , and  $\alpha' b'$ , with the quantities of two bases,  $b$  and  $b'$ , are just the quantities required to form two other neutral salts,  $\alpha b'$  and  $\alpha' b$ . This fundamental discovery was erroneously attributed to Wenzel by Berzelius in 1819, and the error has been carefully perpetuated in a considerable number of text-books since that time (Kopp, *Entwicklung der Chemie in der neueren Zeit*, p. 251).

Berthollet (1748-1822), who was one of the most active opponents of the theory of the constant composition of chemical substances, contributed valuable researches into the laws of chemical affinity, and applied chlorine to processes of bleaching. The processes of chemical analysis were improved, and large numbers of analyses, especially of minerals,

were carried out by Klaproth (1743-1817), Vauquelin (1763-1829), Fourcroy (1755-1809), and others; and many quantitative observations of all kinds were made about the end of the 18th century, all preparing the way for Dalton's statement of the Atomic Theory (q.v.) in 1803-4.

Chemistry has made great progress since the beginning of the 19th century, and it is not possible to do much more than mention the names of some of the most prominent workers. A stimulus was given to research by the publication of Dalton's atomic theory; and the labours of Gay-Lussac (1778-1850), who experimented with gases, of Dulong (1785-1838) and Petit (1791-1820), who pointed out the relation between specific heats and atomic weights of elements, and of others, supported and amplified Dalton's views.

Wollaston (1767-1829) discovered palladium in 1803, and rhodium in 1804. The first alkaloid (morphine) was obtained pure by Serturner in 1816, and this led to the discovery of a number of others in a short time.

The decomposition by electricity of the bases potash and soda by Davy (1778-1829) in 1807, and the separation from these of the metals potassium and sodium, threw an entirely new light on the nature of these substances. The metals were more fully investigated by Gay-Lussac and Thénard (1777-1857). Davy is noted also as the inventor of the miners' safety-lamp, and for experiments on the respiration of nitrous oxide and other gases.

Amongst the foremost chemists of the earlier part of the 19th century was the Swede Berzelius (1779-1848), whose careful and exact analyses of mineral substances contributed a good deal to the confirmation of the law of constant proportions and to the fixing of the atomic weights (see ATOMIC THEORY) of the elements. Berzelius was very conservative with regard to new theories, which he declined to accept without putting them to the strictest experimental tests. He formulated the electro-chemical theory of the constitution of salts, introduced great improvements into the methods of quantitative analysis, increased the value of the blowpipe as an aid in mineral analysis, discovered many new substances, and further examined and elucidated points concerning many already known, both inorganic and organic.

The artificial production of urea in 1828 by Wohler (1800-82) marks the beginning of a new era in the branch of organic chemistry, and enormous strides have been made in this department since that time by Dumas (1800-84), Liebig (1803-73), Laurent (1807-53), Gerhardt (1816-56), Wurtz (1817-84), Kolbe (1818-84), Baeyer (1835-1917), Cannizzaro (1826-1910), Frankland (1825-99), Hofmann (1818-92), Kekulé (1829-96), Williamson (1824-1904), E. Fischer (1852-1919), and many others. Advances in general inorganic chemistry and analysis were made by Leopold Gmelin (1788-1853), H. Rose (1795-1864), Sainte-Claire Deville (1818-81), Bunsen (1811-99), and Mendeleëff (1834-1907); whilst in connection with advances in chemical physics may be mentioned Faraday (1791-1867), Mitscherlich (1794-1863), Graham (1805-69), Regnault (1810-78), Andrews (1813-85), Berthelot (1827-1907), Moissan (1852-1907), Ostwald, and Van't Hoff (1852-1911). These lists do not include all of even the most prominent names that might be mentioned in connection with each department.

The special features of the more recent developments in chemistry are the great advances which have been made in organic chemistry since the middle of last century, the remarkable prominence to which physico-chemical theories and methods of investigation have attained (see article PHYSICAL CHEMISTRY), and the startling discoveries which have resulted from the study of radio-activity. The

clearing up of the chemistry of the sugars and the synthesis of some important members of the sugar group, also the elucidation of the nature of uric acid and allied substances, and of the Proteins (q.v.), are amongst the later triumphs of organic chemistry; while physico-chemical investigation has led to entirely new views regarding solution, electrolysis, the periodic classification of the elements, &c.

Of the greatest possible interest from a theoretical point of view is the fact that after 1870 three new elements were discovered—gallium, scandium, and germanium—whose existence had been predicted, and their properties partly described beforehand by Mendeleeff. (See the periodic law as discussed in the article ATOMIC THEORY.) The discovery of Argon (q.v.) in 1895 led to the recognition of its congeners neon, krypton, and xenon; helium is associated with or is an emanation from Radium (q.v.), discovered, during researches on radio-activity, by Mme. Curie in 1903.

*Elementary Principles of Chemistry.*—The science of chemistry deals with a certain class of changes which matter undergoes when subjected to particular conditions. Similar treatment may produce very different effects upon different substances, as, for instance, the effect of strong heat upon a piece of quartz, a piece of limestone, and a piece of sugar. The quartz does not suffer any *permanent* change, that is, it has the same properties after it is cold again as it had before the action of heat. The limestone, although not necessarily much altered in appearance, has its properties entirely changed, and what remains is a new kind of matter—quicklime. The sugar melts, darkens, and chars, and becomes quite manifestly changed into more than one new kind of matter, for gaseous products, having the smell characteristic of 'burnt sugar,' go off, whilst a black coaly mass remains.

The first of the above changes is merely a *physical* change, from cold to hot; the other two are *chemical* changes, which result in the production of new kinds of matter having properties entirely different from those of the kinds of matter from which they were obtained. Chemistry deals with changes from one kind of matter to another.

When the properties of matter are studied, it is found that for chemical purposes all kinds of matter may be divided into two great classes, which are called respectively *elements* and *compounds*. The name *element* is applied to any kind of matter that has not been proved to be composed of more than one simpler kind of matter. This conception of an elementary substance we owe to Boyle, and it may be noted that some of those substances which were at one time rightly classed as elements (according to Boyle's definition) are now known to be compounds of two or more elements.

The compound nature of a specimen of matter may be proved in one or other (or both) of two ways. One of these methods is called *Synthesis* (q.v.), and consists in building up the compound from the component simpler kinds; the other is called *Analysis* (q.v.) or decomposition, and consists in separating more than one simpler kind from the compound kind.

The distinction between chemical compounds and mere mechanical mixtures is a fundamental one, and must be fully understood. The substance gunpowder, for instance, is an intimate mixture of finely powdered sulphur, charcoal, and saltpetre (potassium nitrate), certain precautions being observed during the mixing in order to avoid explosion. These substances are not combined together chemically in gunpowder, but are only mixed, a fact as to which we can easily satisfy ourselves in various ways. We may examine the

gunpowder under the microscope and identify the separate particles of the ingredients; or, by the use of appropriate solvents, we may dissolve out first the saltpetre and then the sulphur, and thus recover all three ingredients separately. The explosion of gunpowder when heated to a sufficiently high temperature is due to the occurrence of a series of changes of the kind we call chemical, for these changes result in the production of new kinds of matter, gaseous and solid, which possess properties in no way resembling those of sulphur, charcoal, or saltpetre, and from which these substances cannot now be dissolved out.

A mixture possesses to a greater or less extent the properties of its respective ingredients; a compound, on the other hand, has not as a rule any properties resembling those of its constituents. A piece of magnesium wire heated in the air to a sufficiently high temperature takes fire and burns. This is a chemical change in which the metal magnesium combines with the oxygen of the air to form a white, brittle, solid compound called *magnesia* or *magnesium oxide*. This *magnesia* does not in the least resemble either magnesium or oxygen in its properties, and the most powerful microscope fails to reveal particles of either of these substances to our vision.

The Atomic Theory (q.v.) is based upon the assumption that matter of every kind is made up of extremely minute indivisible particles called *atoms*. The atoms which exist in a substance may be all of the same kind, as in elements, or of different kinds, as in compounds. Chemists believe that the element hydrogen consists of *molecules* or aggregates of atoms—each molecule consisting of two atoms; further, that the compound substance water consists of molecules, each composed of two atoms of hydrogen and an atom of oxygen united to each other by that force which is called *Chemical Affinity* (q.v.); and that similarly every other compound substance is composed of molecules, each molecule consisting of two or more different kinds of atoms united by chemical affinity. The weight of a new compound formed by the union of two or more substances is in every case equal to the sum of the weights of its constituents. In chemical actions it is only the *kind* of matter which is changed, whilst, as in every physical change, the *quantity* of matter concerned remains constant and unalterable.

It has already been seen that one of the characteristics of the chemical combination of two substances is that the properties of both disappear and are not observable in the compound. Another and a most important characteristic is the evolution of heat, which is a very frequent although not an invariable accompaniment of chemical action. The best examples of this may be seen in the ordinary phenomena of Combustion (q.v.). All combustion, whether it be of magnesium wire, coal, phosphorus, paraffin oil, or a candle, is nothing more than a chemical action accompanied by the evolution of heat and light, oxygen gas of the atmosphere being almost invariably one of the substances taking part in such action.

The conditions under which substances act chemically upon each other are very various for different substances. In the first place, certain substances cannot be got to act upon each other at all. Such substances may have little affinity for each other, as chlorine and oxygen, or no affinity, as fluorine and oxygen. Other substances, again, only act upon each other with difficulty. The main conditions upon which action of one substance upon another depends are the state of physical aggregation and the temperature. Certain chemical actions take place at ordinary temperatures, as, for instance, the combination of chlorine with metallic antimony

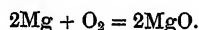
or copper, or the spontaneous ignition of one of the compounds of phosphorus and hydrogen when brought into contact with oxygen. Other actions only take place when the temperature of the substances which are to take part in them has been sufficiently raised. Thus magnesium requires to be strongly heated in air before it takes fire; once the action is started, however, the heat given out by the combustion of one part of the magnesium is sufficient to raise another part to the temperature necessary for combustion to go on, and so the change is propagated. Coal-gas only burns in air when it is raised to a bright-red heat. A jet of coal-gas escaping into the air may be easily ignited by applying a brightly red-hot poker, but when the poker cools to dull redness it will no longer ignite the jet. A bar of metallic iron does not undergo any chemical change on exposure to dry air at ordinary temperature, but if iron in the state of very fine powder (a form in which it can easily be obtained by appropriate methods) be thrown into the air, combination at once takes place with the evolution of heat and light. When a piece of iron (say a moderately fine iron wire) is heated to redness in air, combination with the oxygen of the air takes place with the formation of a scale composed of a black oxide of iron, but the quantity of heat given out during the combination is not sufficient to propagate the combustion from particle to particle of the iron after removal of the source of heat. If, however, iron wire be raised to a red heat in an atmosphere of oxygen, it takes fire and burns with great brilliancy. The difference noticed here is due to the presence in the one case, and the absence in the other, of the diluting nitrogen which forms nearly four-fifths of the air by volume.

There are certain chemical actions which in taking place are accompanied, not with evolution, but with absorption of heat. In such cases heat has to be supplied throughout the action, and not merely to start it. This is frequently noticed in the combination of substances which have feeble affinity for each other, and the compounds produced are less stable, or more readily break up into their constituents, than those which are produced with the evolution of heat. In general terms it may be stated that the quantity of heat given out in the formation of a compound is a measure of the stability of the compound. When a given weight of magnesium unites with oxygen to form magnesia, a quite definite and measurable quantity of heat is given out. In order to separate the magnesium from the oxygen again, exactly the same quantity of heat, or its energy equivalent in some other form, must be supplied. In the case of those substances in the formation of which heat is absorbed, we find that heat is given out during their decomposition, and its quantity is exactly that which was absorbed during their formation.

**Chemical Notation.**—For the purpose of shortly expressing the composition of chemical substances, and for representing chemical changes, chemists employ a system of notation which is in extremely common use. In the table of Atomic Weights (see ATOMIC THEORY) it will be noticed that after the name of each element is placed its *symbol*, which usually consists of the first, or of the first and another letter of the Latin name of the element. Each symbol distinctly indicates the element which it is intended to represent, but it must always be borne in mind that the symbol for an element is not merely a contracted form of its name, but that it stands for a definite quantity of that element, this quantity being the atomic weight expressed in terms of the unit of weight employed. The unit of weight almost universally employed to-day by chemists is the gramme (see METRE), and that unit will be adopted for illustrations throughout this article.

With the gramme as unit, and employing round numbers, H stands for 1 gramme of hydrogen, Cl for 35.4 grammes of chlorine, O for 16 grammes of oxygen, Mg for 24 grammes of magnesium, and so on. In order to represent the composition of a compound, the symbols of the various elements which occur in the compound are written side by side, and this collection of symbols is called a *formula*. Thus,  $MgO$  represents 40 ( $= 24 + 16$ ) grammes of magnesium oxide, and  $HCl$  is 36.4 ( $= 1 + 35.4$ ) grammes of hydrogen chloride. When a compound contains more than one atom of the same element the symbol for that element is not repeated, but the number of atoms is indicated by a subscribed numeral. Thus the formula for water is written  $H_2O$ , which indicates that the molecule of water contains two atoms of hydrogen and one of oxygen; and the formula for sulphuric acid is written  $H_2SO_4$ , which indicates that the molecule of sulphuric acid contains two atoms of hydrogen, one of sulphur, and four of oxygen (besides the quantitative signification of these formulæ already mentioned). A number subscribed to a portion of a formula inclosed in brackets multiplies the portion so inclosed. Thus the formula  $Ba(NO_3)_2$  represents one atom of barium united to twice the quantity of the group  $NO_3$ , which is represented as united to one atom of potassium in the formula  $KNO_3$ . A number prefixed to a formula multiplies the whole of the formula that follows. Thus  $2H_2O$  represents twice the quantity of water represented by  $H_2O$ .

Chemical symbols and formulæ are used to represent shortly chemical changes. A simple illustration of the method of using them may be given to represent the case of the burning of magnesium. The symbols for the magnesium and the oxygen entering into combination (connected by the sign +) are written on one side of what is called a chemical equation, whilst the product is written on the other side, thus:



The formula for free (or uncombined) oxygen is written  $O_2$ , because a molecule of oxygen is believed to consist of two atoms (see ATOMIC THEORY). In order to represent the element magnesium, the simplest possible formula ( $Mg$ ) is employed because there is no evidence for writing a more complicated one.  $2Mg$  simply represents twice as much magnesium as  $Mg$  does.

The above equation when fully interpreted gives a great deal of information about the change which it is intended to represent. It shows that magnesium and oxygen unite with each other (under conditions which are not expressed) to form an oxide of magnesium, and that these elements are united in the compound in the proportions by weight of 24 of magnesium to 16 of oxygen; and, further, it enables us, by applying a simple and easily remembered rule, to calculate the *volume* of oxygen taking part in the action as well as its weight. This rule for ascertaining the volume may be conveniently stated here. From certain theoretical considerations, as well as for convenience in calculations concerning the volumes of gases, chemists write the formulæ of gaseous substances in such a way that the quantity of a gas represented by its formula, in terms of any unit of weight, shall occupy, under similar conditions of temperature and pressure, the same volume as two units weight of hydrogen. Thus, the unit being the gramme,  $H_2$  represents 2 grammes of hydrogen, and 2 grammes of hydrogen at *standard* temperature ( $0^\circ C.$ ) and pressure (760 millimetres of mercury) occupy a volume of 22.4 litres (see METRIC SYSTEM). Similarly, the quantities in grammes of oxygen, carbonic

anhydride, and nitrous oxide, represented by their respective formulæ,  $O_2$  ( $16 \times 2 = 32$  grammes),  $CO_2$  ( $12 + 32 = 44$  grammes), and  $N_2O$  ( $28 + 16 = 44$  grammes), each occupy, when measured at  $0^\circ C$ . and 760 mm. pressure, 22.4 litres. This rule holds for other gases, and also, with a certain qualification, for the vapours of volatile liquids. In the case of the latter, of course, conditions of temperature and pressure must be chosen such that the substance is in the state of vapour; and the quantity in grammes which, as a vapour, occupies the same volume as 2 grammes of hydrogen under the same conditions, is the quantity which the formula is chosen to represent. Thus, the formula  $H_2O$  informs us that 18 ( $= 2 + 16$ ) grammes of water occupy, in the form of steam, the same volume as 2 grammes of hydrogen when both are measured at the same temperature and pressure. It must, of course, be understood that the formula for a substance is chosen so as to represent the observed facts. The formula of a volatile liquid is deduced from the determination of the *vapour density* of the liquid; this determination is made by ascertaining the weight of that quantity of the liquid which, when converted into the state of vapour, occupies the same volume as a given weight of hydrogen, both being measured at the same temperature and pressure.

Returning to the equation already given, it will be seen that from it we learn that 48 ( $= 2 \times 24$ ) grammes of magnesium unite to form magnesium oxide with a quantity of oxygen (32 grammes) which at  $0^\circ C$ . and 760 mm. occupies 22.4 litres. What volume this quantity of oxygen would occupy under other conditions of temperature and pressure can be calculated from formulæ deduced from the laws of Charles (relation of the volume of a gas to the temperature) and Boyle (relation of the volume of a gas to the pressure). See further in article GASES.

As there are certain conditions under which chemical combination takes place, so there are definite laws which regulate combination. The first of these has been called the *law of constant proportions*, and it states that any chemical compound always contains the same constituents and in the same proportions. Thus magnesium oxide,  $MgO$ , always consists of magnesium and oxygen in the proportions by weight of 24 to 16—one atom of magnesium weighing 24, being combined with one atom of oxygen weighing 16. No compound of magnesium and oxygen containing these elements in any other proportion has ever been obtained. If in preparing magnesium oxide quantities of magnesium and oxygen were employed differing from this proportion, then some either of the magnesium or of the oxygen would remain over after the action, according as the former or the latter had been employed in excess of the right quantity.

Intimately connected with the foregoing law is the *law of multiple proportions*. Whilst certain elements combine with each other in only one proportion by weight, others combine in two, and sometimes more than two different proportions. The law of multiple proportions states that when elements combine in two or more proportions these various proportions can be expressed by simple multiples of the atomic weights of the elements concerned. Thus carbon and oxygen unite with each other to form two different compounds: 12 parts by weight of carbon unite with 16 parts by weight of oxygen to form carbonic oxide,  $CO$ ; 12 parts by weight of carbon unite with 32 parts by weight of oxygen to form carbonic anhydride,  $CO_2$ . Here the relation is of the simplest kind, for the one compound contains exactly twice as much oxygen for the same quantity of carbon as the other. Again, iron and oxygen unite with each

other to form three different compounds: 56 parts by weight of iron unite with 16 parts by weight of oxygen to form ferrous oxide,  $FeO$ ; 112 parts by weight of iron unite with 48 parts by weight of oxygen to form ferric oxide,  $Fe_2O_3$ ; 168 parts by weight of iron unite with 64 parts by weight of oxygen to form ferroso-ferric oxide,  $Fe_3O_4$ . This case is not quite so simple as that of the oxides of carbon, for here it is necessary to employ multiples of the atomic weights of both elements concerned in order to see the simplicity of the quantitative relations existing amongst these oxides of iron. The law of multiple proportions is, however, fully illustrated by both series of oxides.

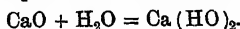
It may be useful to call attention here to the simple explanation furnished by the Atomic Theory (q.v.) for the occurrence of compounds illustrating this law of multiple proportions. There is no compound intermediate in composition between carbonic oxide and carbonic anhydride. The atomic theory explains this very simply. Under one set of conditions we can obtain a compound of one atom of carbon with one atom of oxygen, whilst under other conditions we obtain a compound of one atom of carbon with two atoms of oxygen, or exactly twice as much. This is why we find such marked intervals in composition between two or more compounds of the same elements. The molecule of one compound cannot differ from that of the other by less than an atom, and the addition of an atom to a molecule necessarily forms a new molecule differing in weight from the old one by the weight of the added atom.

The last law of combination has been called the *law of volumes*. It states that when gases combine to form new compounds, the volumes taking part in the action bear a very simple relation to each other and to the volume of the product if gaseous when all the volumes are measured at the same temperature and pressure. Thus, one volume of hydrogen combines with one volume of chlorine to form two volumes of hydrochloric acid gas; two volumes of hydrogen combine with one volume of oxygen to form two volumes of water vapour; two volumes of carbonic oxide combine with one volume of oxygen to form two volumes of carbonic anhydride, and so forth. The very simple relations of the volumes concerned in these examples are sufficiently manifest, and much greater complexity is not frequently met with.

Chemists divide the elements into two great classes, the typical members of which are very different in their physical and chemical characters. These are *metals* and *non-metals*, and as representative of each class may be mentioned copper and sulphur. The more prominent physical characteristics of metals are the metallic lustre, malleability, ductility, and the property of conducting heat and electricity, all of which are possessed to a more or less marked degree; whilst non-metallic elements as a rule possess these properties to a very limited extent, if at all. Differences in chemical behaviour are also very striking in typical representatives of each group. It must be borne in mind, however, that all the members of each group are not typical, but that there is a gradual transition from one group to the other, and certain of the transition elements possess some of the properties of both groups, as in the cases, for instance, of arsenic and antimony.

With the exception of bromine and fluorine, and the inert gases of the helium-argon group (see ARGON), all the elements enter into combination directly or indirectly with oxygen to form oxides. The oxides produced from metallic elements are quite different in chemical character from those produced from non-metallic elements. We shall

look first at the oxides of the metals. Every metal forms one or more oxides, and at least one oxide of every metal is a *basic* oxide—i.e. an oxide related to a salt-forming hydroxide or Base (q.v.). Some of the basic oxides readily unite with water, and thereby give rise to the corresponding hydroxides. Thus, for example, quicklime or calcium oxide,  $\text{CaO}$ , the basic oxide of calcium, unites with water, with great evolution of heat, to form slaked lime or calcium hydroxide,  $\text{Ca}(\text{HO})_2$ , which is a typical representative of the class of substances already mentioned as bases. The formation of calcium hydroxide is represented by the equation :



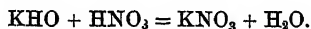
The oxides produced from non-metallic elements are very frequently *acidic* oxides—i.e. oxides which unite with water to form the class of bodies called *Acids* (q.v.). The acidic oxides themselves are often called *acid anhydrides*, whilst the compounds produced by the action of water upon them are called acids, or *hydrogen salts*. When phosphorus burns in air, phosphoric anhydride,  $\text{P}_2\text{O}_5$ , is obtained. This is a white solid substance which unites with water with the evolution of much heat to form metaphosphoric acid, or hydrogen metaphosphate, a representative acid :



There are a few acids known which do not contain oxygen, and are not obtainable by the combination of an oxide with water. Examples are hydrochloric acid,  $\text{HCl}$ , hydrobromic acid,  $\text{HBr}$ , and hydrocyanic acid,  $\text{HCN}$ . These are also called hydrogen chloride, bromide, and cyanide respectively.

The two classes of substances, bases and acids, are nearly related to the very large class of *salts*. A salt is a compound which can be obtained, amongst other ways, by the action of an acid upon a base, water being almost invariably eliminated at the same time; and just as we saw that the properties of two elements are totally different from those of the compound formed by their combination, so we find that in the formation of a salt the properties of both acid and base to a great extent or altogether become neutralised and disappear.

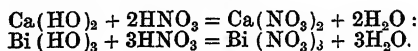
If to a solution in water of potassium hydroxide,  $\text{KHO}$  (which is a powerful base), we add a sufficient quantity of nitric acid,  $\text{HNO}_3$ , that is until the liquid on thoroughly mixing does not possess either the acid or the alkaline reaction, we obtain a solution in water of potassium nitrate (saltpetre), and nothing else—the water eliminated in the action simply mixing with that which is already present :



Acids have already been mentioned as hydrogen salts. The above equation shows how hydrogen nitrate is exactly comparable with potassium nitrate—an atom of potassium taking the place of an atom of hydrogen—and a characteristic of all hydrogen salts, or acids, is that they contain hydrogen, which is capable of removal and of having its place thus taken by an equivalent quantity of another metal. In the example above mentioned every 1 part by weight of hydrogen has its place taken by 39 parts by weight of potassium. These quantities of hydrogen and of potassium are equivalent, both being capable of uniting with the group  $\text{NO}_3$ . This group is an example of what is called a *compound radical*—i.e. a group of elements which is capable of going as a whole through a series of changes. Acids which contain in their molecule one atom of hydrogen replaceable by another metal are called *monobasic* acids. Nitric acid is thus a monobasic acid, whilst sul-

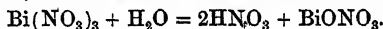
phuric acid,  $\text{H}_2\text{SO}_4$ , is  *dibasic*, orthophosphoric acid,  $\text{H}_3\text{PO}_4$ , is *tribasic*, and so on.

Bases, likewise, are sometimes spoken of as *monacid*, *diacid*, *triacid*, and so on, according as one molecule of the base requires one, two, three, &c. molecules of a monobasic acid (as nitric acid) to form what is called a *normal salt*, that is, a salt in which all the replaceable hydrogen has been replaced by another metal. Thus potassium hydroxide,  $\text{KHO}$ , is a monacid base; calcium hydroxide, or slaked lime,  $\text{Ca}(\text{HO})_2$ , is diacid; bismuth hydroxide,  $\text{Bi}(\text{HO})_3$ , is triacid, and so on. Equations may make this clearer (see the equation above for a monacid base) :



Salts are formed in many cases by the replacement of only a *part* of the replaceable hydrogen of a hydrogen salt by another metal. Such are called *acid salts*, and  $\text{KHSO}_4$  is an example. This salt,  $\text{KHSO}_4$ , may be looked upon as intermediate between the acid,  $\text{H}_2\text{SO}_4$ , and the normal salt,  $\text{K}_2\text{SO}_4$ .

Many salts are known which may be looked upon as bases which have their basic character only partially neutralised by an acid. Such salts are called *basic salts*, and as examples may be mentioned  $\text{BiONO}_3$  and  $\text{Pb}(\text{OH})\text{NO}_3$ . The former is intermediate between the normal nitrate,  $\text{Bi}(\text{NO}_3)_3$ , and the oxide,  $\text{Bi}_2\text{O}_3$ , the latter between the normal nitrate,  $\text{Pb}(\text{NO}_3)_2$ , and the hydroxide,  $\text{Pb}(\text{OH})_2$ . Such basic salts are often produced by the action of water upon the normal salts, as, for instance, in the case of the basic bismuth nitrate :



Salts are looked upon as being composed of metal and *salt radical*, the latter name being given to all of the salt that is not metal. Thus  $\text{SO}_4$  is the salt radical of the sulphates,  $\text{NO}_3$  the salt radical of the nitrates, &c. This way of looking at salts arises from the phenomena observed when salts are decomposed by Electrolysis (q.v.), metal and salt radical being the primary products of decomposition.

*Chemical Nomenclature.*—Chemists endeavour to make the nomenclature of compound substances as systematic as possible, and a certain amount of system has even been introduced into the nomenclature of the elements themselves. The oxides of the metals are named after the metal which they contain, as magnesium oxide,  $\text{MgO}$ ; aluminium oxide,  $\text{Al}_2\text{O}_3$ ; and the series of salts derivable from these oxides are similarly named after the metal. Thus  $\text{MgCl}_2$  is magnesium chloride, and  $\text{Al}_2(\text{SO}_4)_3$  is aluminium sulphate. When a metal forms more than one basic oxide, adjectival terminations are employed to distinguish these; thus the two basic oxides of iron are named ferrous and ferric oxides ( $\text{FeO}$  and  $\text{Fe}_2\text{O}_3$ ) respectively, and correspondingly there are ferrous and ferric salts.  $\text{FeSO}_4$  is ferrous sulphate;  $\text{FeCl}_3$  is ferric chloride. Acid salts and in general salts which contain more than one metal are named after the metals which they contain, the compound radical  $\text{NH}_4$  (ammonium; see AMMONIA) being regarded as a metal for purposes of nomenclature. Thus,  $\text{KHSO}_4$  is potassium hydrogen sulphate, whilst  $\text{HNaNH}_4\text{PO}_4$  is hydrogen sodium ammonium orthophosphate.

The nomenclature of non-basic metallic oxides has been rendered systematic by the use of names descriptive of the number of atoms of metal and of oxygen contained in the oxide, as, for instance, trimanganic tetroxide for  $\text{Mn}_3\text{O}_4$ . A considerable number of non-basic oxides, as  $\text{BaO}_2$ ,  $\text{PbO}_2$ ,  $\text{MnO}_2$ , &c., are somewhat less systematically called *per-oxides*.

The acid anhydrides, which, as has already been stated, are oxygen compounds or oxides of the non-metallic elements, are named after the elements of which they are oxides. As there are frequently two or more such acid anhydrides derived from one element, different terminations and, where necessary, other devices of nomenclature are employed to distinguish amongst these. Thus there are two acid anhydrides derived from sulphur—sulphurous anhydride,  $\text{SO}_2$ , and sulphuric anhydride,  $\text{SO}_3$ . The latter unites with water to form sulphuric acid,  $\text{H}_2\text{SO}_4$ , and the solution of sulphurous anhydride in water contains some sulphurous acid,  $\text{H}_2\text{SO}_3$ , although this acid has never been obtained except in the form of an aqueous solution. From sulphuric acid there is derived the series of salts called *sulphates*, from sulphurous acid the series called *sulphites*. It sometimes happens that an acid and series of salts are known of which the corresponding anhydride is unknown, just as the existence of certain acids is doubtful although the corresponding anhydride is known. In other cases series of salts are known, although both the corresponding anhydride and acid are unknown. Certain of these peculiarities, as well as some further forms of nomenclature, are illustrated by the table given below of the compounds corresponding to known or unknown oxides of chlorine :

Oxide	Acid.	Salt	Name of salt.
$\text{Cl}_2\text{O}$	$\text{HClO}$	$\text{KClO}$	Potassium Hypochlorite.
—	$\text{HClO}_2$	$\text{KClO}_2$	" Chlorite.
[ $\text{ClO}_2$ , not an acid anhydride].			
—	$\text{HClO}_3$	$\text{KClO}_3$	" Chlorate.
—	$\text{HClO}_4$	$\text{KClO}_4$	" Perchlorate.

Of the four acids formulated above, only the last is known as a definite separate substance. The other three, with formulæ enclosed in square brackets, exist in aqueous solution, but cannot be obtained from this undecomposed. The hypothetical chlorous, chloric, and perchloric anhydrides might be formulated  $\text{Cl}_2\text{O}_3$ ,  $\text{Cl}_2\text{O}_5$ , and  $\text{Cl}_2\text{O}_7$ , respectively.

A very large number of salts and other chemical compounds are commonly known by popular names, the latter being frequently of extremely ancient origin. The popular name as a rule conveys no information as to the composition of the substance. For instance, copperas (ferrous sulphate,  $\text{FeSO}_4$ ) is not recognised by its name as an iron compound, nor calomel (mercurous chloride,  $\text{HgCl}_2$ ) as a mercury compound, nor litharge (lead oxide,  $\text{PbO}$ ) as a lead compound. It is the aim to convey, by the systematic name of a substance, the greatest possible amount of information as to its composition. It is not possible to attain to a perfect system of nomenclature, as new discoveries render changes necessary from time to time.

**Graphic Formulæ.**—In addition to representing the composition of a substance by means of formulæ, chemists endeavour to express certain ideas as to the *constitution*, or arrangement of the atoms in the molecule of substances by means of *graphic* formulæ. It must not be supposed (as has sometimes erroneously been done) that graphic formulæ are intended to represent the shape of molecules. They are employed to give simple expression to the views held regarding the mutual relationships to one another of the atoms of which the substances are built up, and as a ready means of visualising these relationships. Special methods of graphic representation have been devised, moreover, to distinguish from each other the two conceivable arrangements in space of the atoms or atomic groups present in pairs of compounds classed as *stereo-isomeric* (see ISOMERISM). In a graphic formula we have the symbols for the different elements grouped in a particular

way, so as (1) to indicate the *valency* (see the article ATOMIC THEORY) of each element, and (2) to express ideas based upon observed facts as to the most likely arrangement of the atoms in a molecule, when various arrangements are conceivable.

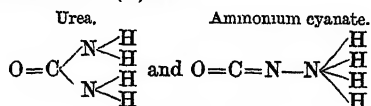
The following may be given as simple illustrations of (1) :

$\text{H}-\text{Cl}$ , hydrochloric acid;  $\text{H}-\text{S}-\text{H}$ , sulphuretted hydrogen;  $\text{Mg}=\text{O}$ , magnesium oxide;  $\text{N} \begin{smallmatrix} \text{H} \\ \diagup \\ \text{H} \end{smallmatrix}$ , am-

monia;  $\text{H}-\text{C} \begin{smallmatrix} \text{H} \\ | \\ \text{H} \end{smallmatrix}-\text{H}$ , marsh-gas;  $\text{H}-\text{C} \begin{smallmatrix} \text{Cl} \\ | \\ \text{Cl} \end{smallmatrix}-\text{Cl}$ , chloro-

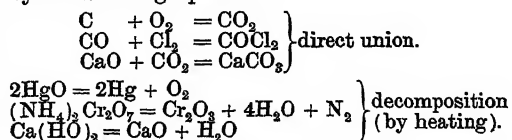
form;  $\text{O}=\text{C} \begin{smallmatrix} \text{Cl} \\ | \\ \text{Cl} \end{smallmatrix}$ , phosgene;  $\text{O}=\text{C}=\text{O}$ , carbonic anhydride;  $\text{S}=\text{C}=\text{S}$ , carbon bisulphide, &c. The letters representing univalent atoms are written with one stroke proceeding from them, those representing bivalent, trivalent, and quadrivalent atoms being written with two, three, and four such strokes respectively.

Illustrations of (2) are :



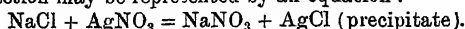
These two substances illustrate two other points of importance. One of these is the occurrence of the nitrogen atom sometimes *trivalent*, as in ammonia,  $\text{NH}_3$ , sometimes *quivalent*, as in the ammonium salts—e.g. ammonium chloride,  $\text{NH}_4\text{Cl}$ . In ammonium cyanate one atom of nitrogen is represented as trivalent and the other as quivalent. The two substances, moreover, illustrate *Isomerism* (q.v.), or the existence of two or more compounds containing exactly the same elements and in the same proportions, and yet differing from one another in chemical and physical properties.

**Chemical Changes.**—There are several kinds of chemical changes which are of very frequent occurrence, and may conveniently be classified. The simple union of one element with another has already been mentioned, and closely related to this kind of change is the union of a compound with an element or with another compound. Along with these changes may be classed those in which a compound breaks up into two or more elements or simpler compounds, or into one or more of each. All these variations are illustrated by the following equations :



One of the most important kinds of chemical change is that called *double decomposition*. This occurs perhaps most frequently when solutions of salts are mixed with each other, and it is characterised by a mutual exchange of metal and salt radical. If an aqueous solution of sodium chloride be mixed with one of potassium bromide, although no visible change takes place, we have reason to believe that double decomposition goes on to a certain extent, with formation of some sodium bromide and some potassium chloride, whilst some of each of the original salts also remains, a state of equilibrium being eventually established amongst the four salts. If, however, one of the new products formed by double decomposition be insoluble

or practically insoluble in water, as soon as any of it is formed it will appear as a *precipitate*, and be thus removed from solution, so that no condition of equilibrium can be established until formation of a precipitate no longer occurs—i.e. until the double decomposition is practically complete. Thus, if solutions of sodium chloride and silver nitrate be mixed in the proper proportions, the extremely insoluble silver chloride will be precipitated, and only sodium nitrate will remain in solution. The action may be represented by an equation :



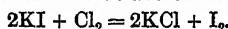
The action of sulphuretted hydrogen on many metallic solutions illustrates double decompositions in which the action is virtually complete, as,



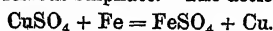
where the mercuric sulphide formed is insoluble in water, and is consequently obtained as a precipitate.

The occurrence of double decomposition is attributed, in modern chemistry, to interactions that take place amongst the ions (see ELECTRICITY, section on Electrolysis ; IONS), into which it is assumed that salts, such as sodium chloride, become to a greater or less extent resolved in solution. According to the ionisation hypothesis, aqueous solutions of sodium chloride contain sodium ions, each carrying a positive electrical charge, and chlorine ions, each carrying a negative electrical charge, a certain proportion of the salt molecules—but not the whole of them—having undergone ionisation. Other salts similarly undergo partial ionisation in solution, the degree of ionisation varying, however, with different salts, and with different concentrations of the solutions in the case of the same salt. Double decomposition is brought about by the rearrangement of ions into new forms of combination, when solutions of such partially ionised salts are mixed.

Another very important kind of chemical change is the *displacement* of one element in a compound by another. Chlorine, for instance, displaces the iodine in potassium iodide and takes its place :



The greater affinity of potassium for chlorine than for iodine is the explanation given of this displacement. Displacement of one metal by another is a familiar phenomenon, although the chemistry of what is taking place may not be familiar to all who have seen it. When a piece of bright iron or steel, as a key or the blade of a knife, is dipped into an acidulated solution of cupric sulphate (blue vitriol), a reddish deposit of metallic copper is formed almost immediately upon the surface of the metal. This copper is derived from the cupric sulphate solution; but what is not manifest from observation alone, is that at the same time an equivalent quantity of iron is dissolved away and goes into solution as ferrous sulphate. The action is,

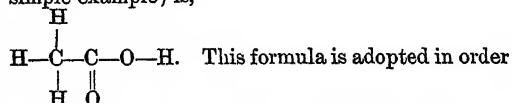


The whole of the copper would eventually be separated from the solution in the metallic state if enough iron were present, and for every 63 parts of copper precipitated 56 parts of iron would go into solution.

*Inorganic and Organic Chemistry.*—The whole subject of chemistry has been divided into two great divisions, named respectively *inorganic* and *organic*. Made originally to separate from each other the chemistry of purely mineral substances, and that of substances of animal or vegetable origin, which were at the time supposed to be capable of formation only as products of vital processes, this subdivision is retained still mainly as a matter of convenience. The division of organic chemistry is sometimes spoken of now as the chemistry of the compounds of carbon; but

this is not a very strict definition, as many carbon compounds occur in nature as purely mineral substances, and having really no connection with organic chemistry, such as numerous mineral carbonates. As has been already stated, it is mainly for convenience that the consideration of the majority of the compounds of carbon is taken as a separate branch, not because of any difference in the chemical principles involved, but really on account of the very great number of these compounds, and of the great complexity of many of them.

It is in the domain of organic chemistry that the study of the constitution of substances has been most diligently prosecuted, and with the greatest amount of apparent success. The graphic formula which chemists assign to acetic acid (to take a simple example) is,



to express a number of ideas concerning the supposed mode of arrangement of the atoms in acetic acid, deduced from the study of its formation, its decompositions, and the action upon it of various substances. The known facts find suitable expression in the formula, and there is no observation yet made as to the chemical relations of acetic acid which is at variance with the constitution indicated by it. It would not be possible here to quote evidence in favour of a particular constitution for any substance, but it may be stated generally that chemists endeavour to fix the constitution of the simplest compounds on the firmest possible basis, and, in passing from the simple to the more complex, to make secure every step.

The quadrivalent character of the carbon atom, and the great facility with which carbon atoms enter into combination with other carbon atoms and with the atoms of other elements, give their impress to the whole of organic chemistry. The graphic formulæ of organic substances amply illustrate the former, whilst the syntheses of a long array of simple and complex organic compounds as amply illustrate the latter.

The application of the ideas and methods of physics to chemical problems has been fruitful in all branches of the subject. *Thermochemistry* enables us to predict the probable course of a reaction or the heating power of a fuel; *electrochemistry* may deal with the theory of solutions or the smelting of aluminium; *photochemistry* may be concerned with vibrations of atoms or colours of dyes, *colloid chemistry* with surface tension or with soap. These and kindred subjects are dealt with in the article PHYSICAL CHEMISTRY (q.v.).

In connection with this article should be read the articles ATOMIC THEORY, which is to a certain extent supplementary to this, ANIMAL CHEMISTRY, and PHYSIOLOGY (VEGETABLE). See also separate articles on the several elements, those on the various acids, those on the great chemists, and the following as amongst the most important of the many chemical articles throughout this work :

Acids.	Atmosphere.	Isomerism.	Salts.
Alchemy.	Base.	Isomorphism.	Soap.
Alcohol.	Distillation.	Lime.	Soda.
Alkalies.	Elements.	Manure.	Spectrum.
Alkaloids.	Ethers.	Metals.	Starch.
Allotropy.	Fats.	Oils.	Sugar.
Analysis.	Fermentation.	Oxides.	Synthesis.
Aromatic Series.	Glycerine.	Radical.	Water.

See Roscoe and Schorlemmer, *Treatise on Chemistry* (1878-89, and later editions of inorganic portion); Watts, *Dictionary of Chemistry* (4 vols. 1890-94); Thomson, *History of Chemistry* (1830-31); French works by Hoefer,

Chevreur, Berthelot, Moissan; Ladenburg, *Handwörterbuch der Chemie*, also *History of Chemistry since Lavoisier* (1905); Kopp, *Geschichte der Chemie*, Von Meyer, *A History of Chemistry* (trans. by McGowan, 1898); Mendeleeff, *The Principles of Chemistry* (1905); Ostwald, *Fundamental Principles of Chemistry* (1909), and *General Outline of Chemistry* (new version from 4th ed. by Taylor, 1912); Perkin and Kipping, *Organic Chemistry* (new ed. 1922); Thorpe, *Dictionary of Applied Chemistry*, Walker, *Introduction to Physical Chemistry* (9th ed. 1922); Mellor, *A Comprehensive Treatise on Inorganic and Theoretical Chemistry*.

**Chemists and Druggists.** Up to the passing of the Pharmacy Act of 1868, any one was free to describe himself as chemist and druggist and to prosecute that calling to the best of his ability, untouched by any special legislation. Like apothecaries, chemists and druggists were at first hardly distinguishable from merchants and grocers, and, until the Pharmaceutical Society was founded, were without permanent organisation. And owing to the absence in Scotland of the apothecaries, as distinguishable from druggists, the history of the latter class in that country does not, at least up to the passing of the Pharmacy Act of 1882, correspond accurately with that of their English brethren. The policy these latter pursued for a long period of their history may be described as purely defensive, and any organisation they formed was in response to some attack from one of the other orders. As early as 1802 such a defensive association was formed, and from 1812 to 1815 engaged in very active opposition to the bill promoted by the 'Associated Apothecaries.' One of the objects of that bill was to bring the chemists and druggists under the control and surveillance of a body consisting chiefly of apothecaries, on which the chemist and druggist was not represented at all. The upshot was that the promoters of the bill introduced a clause into the Act of 1815, which it was understood at the time would completely exempt the chemist and druggist from the operation of the bill. In spite, however, of this understanding, which seems to have been respected for twenty-six years, the bill was in 1841 made use of to punish a chemist and druggist for prescribing medicine, although that was a function which, rightly or wrongly, he had exercised previous to 1815. In 1841 a bill again threatened to subject the chemist and druggist to the control of the apothecaries, but was at length defeated. It now became evident, not only that a permanent society to protect the interests of the craft was necessary, but that the only wise policy was to educate and organise themselves in such a way as would deprive the physicians and apothecaries of any excuse for further interference. This led to the formation of the Pharmaceutical Society of Great Britain, which was founded in 1841 and incorporated by Royal Charter in 1843. As declared in the charter, the main objects of the society were those of 'advancing chemistry and pharmacy and promoting a uniform system of education of those who should practise the same; and also for the protection of those who carry on the business of chemists and druggists;' and to enable it to carry these out successfully the society appointed professors and examiners, and afterwards proceeded to promote a bill in parliament for the recognition and protection of the titles they proposed to confer on those who passed the examinations. This was naturally a work of time, and in the meanwhile an important act in relation to the sale of poisons—viz. the Sale of Arsenic Act (1851)—was passed, and drew the attention of government to the absence of a definite class of persons qualified by training and education to have the custody and sale of poisonous substances entrusted to them; so that this to some extent led up to the passing of

the first Pharmacy Act of 1852. The main result of this act was to create a class of 'Pharmaceutical Chemists,' alone empowered to use and exhibit that or any equivalent title, and consisting, 1st, of those already members of the society; and 2dly, of such persons as should pass the examinations, as conducted by its two Boards in England and Scotland. The bill, as passed, involved no compulsion on any persons to go through these examinations, nor did it confer any privilege or monopoly on the pharmaceutical chemist except the exclusive right to that title. The dispensing of medicines and sale of poisons was still left open to any one who chose to engage in it. Nor was it till the Act of 1868 that the term chemist and druggist came to signify a specially qualified person or one possessing exclusive rights. By that act all persons not in business on their own account prior to 1st August 1868, had (except some who for a time were allowed to pass a 'modified examination') to pass the Preliminary and Minor Examinations, and after that were entitled to have their names placed on the 'Register of Chemists and Druggists for the United Kingdom;' and no person who was not on that register could legally use the title, or (with certain exceptions in favour of physicians, apothecaries, veterinary surgeons, &c.) sell or dispense certain poisons specified in schedules to the act. Any person wishing to use the style 'Pharmaceutical Chemist,' had to pass a further examination called the 'Major,' and thus arose the two grades in what we may now call, in view of its educational qualification, the profession of pharmacy.

**Chemnitz**, a town of Saxony, is situated at the base of the Erzgebirge, and at the confluence of the river Chemnitz with three other streams, 51 miles SSE. of Leipzig by rail, and 43 WSW. of Dresden. It is the principal manufacturing town of the kingdom—the 'Saxon Manchester' its townsfolk call it—its industry consisting in weaving cottons, woollens, and silks, and in printing calicoes, chiefly for German consumption. It supplies the world with cheap hosiery, and makes mixed fabrics of wool, cotton, and jute for the markets of Europe and America. It has several extensive machine-factories, producing locomotives and other steam-engines, with machinery for flax and wool spinning, weaving, and mining industry. Created a free imperial city as early as 1125, Chemnitz suffered much during the Thirty Years' War. Pop. (1801) 10,835; (1861) 45,532; (1890) 138,954; (1919) 303,775.

**Chemnitz**, MARTIN, the most eminent Lutheran theologian in the second half of the 16th century, was born at Treuenbrietzen, in Brandenburg, 9th November 1522. He had a hard struggle with poverty in his early years, and had repeatedly to interrupt his university studies at Frankfurt-on-the-Oder and Wittenberg in order to obtain by school-teaching the means of pursuing them; but at length his proficiency in astrology led to his being appointed librarian of the ducal library at Königsberg in 1550, and from that time he devoted himself entirely to theology. In consequence of his opposition to the teaching of Osiander he was obliged to leave Königsberg and proceed to Wittenberg (1553), where he delivered lectures on the *Loci communes* of Melancthon, which were published after his death as *Loci theologici* (1591). He was appointed a preacher at Brunswick in 1554, and 'superintendent' in 1567, and died there 8th April, 1586. The chief works of Chemnitz were his *Examen Concilii Tridentini* (4 vols. 1565-73; new ed. Berlin, 1862), which was the first thorough-going criticism of Tridentine doctrine from a Protestant point of view; and his share in preparing and securing the acceptance of the 'Formula of

Concord'—the next in importance to that of Jacob Andrea. His *Corpus Doctrinae Pruthenicum*, written in conjunction with Mörlin (1567), became a standard work of orthodox Lutheranism. In his *De diabulo Naturis in Christo* (1571) Chemnitz developed the doctrine of the 'ubiquity' of Christ in a form mediating between Luther and Melancthon. In every other point of his theology he was a steadfast follower of Luther. His Life has been written by Pressel (1862), Lentz (1866), and Hachfeld (1867).

**Chemnitzia**, a large genus of gasteropod molluscs, named in honour of a German conchologist of the 18th century. They have a slender, elongated, many-whorled shell, the whorls striated, a simple semi-oval aperture, and a horny operculum. There are many recent species scattered all over the world. Numerous fossil species have been described from the Lower Silurian upwards, but it is probable that different animals with similar shells are included under this one title.

**Chemosh**, the national god of Moab, called in 1 and 2 Kings 'the abomination of the Moabites.' The derivation of the name is uncertain, the most probable being that of Gesenius, from *kāmash* (= *kābhash*), 'to trample under foot,' with which the Syrian *kemūsh*, 'nightmare,' is connected. Chemosh was essentially one with the Moloch or Milcom ('king') of the Ammonites, and both were simply forms of the Canaanite Baal (q.v.). On the 'Moabite Stone' King Mesha attributes the Israelite successes over Moab to the wrath of Chemosh, and Moab's deliverance to his assistance. His worship was marked by cruel rites and lascivious orgies. Mesha's first-born son was doubtless sacrificed as a burnt-offering to him (2 Kings, iii. 27). Solomon in his later years consecrated 'high places' (*Bāmōth*) to Chemosh in Jerusalem.

**Chemulpo**, a town on the west coast of Korea, 25 miles by road WSW. of Seoul. It is one of the three treaty ports opened in 1883 to foreign commerce. It has new harbour-works (1911-18), and an important trade, exporting rice, beans, and hides, and importing petroleum, cotton goods, and metals. It is connected by rail (1900) and telephone with Seoul, and has telegraphic communication with China and Japan. There is an English Mission with an hospital. The earliest naval operations of the Russo-Japanese war (1904) took place at Chemulpo. Pop. about 30,000, including over 11,000 Japanese.

**Chemung Period**, name given by American geologists to one of the principal divisions of Devonian time.

**Chenab**, one of the five rivers which give name to the Punjab, rises in the Kashmir range of the Himalayas, winds through the gorges of Jammu, and enters British territory in Sialkot district. It absorbs the Tavi, forms the boundary between Sialkot and Gujerat districts, and enters Jhang desert, where it runs through a broad cultivated valley. It unites with the Jhelum at Timmu, afterwards receives the Ravi, and, as the Trimab, joins the Sutlej, 50 miles above Mithankot. Its length is 755 miles. Along with the Jhelum and the Ravi it is used in a great system of desert-irrigation works.

**Chenery**, THOMAS, journalist and orientalist, was born in Barbadoes in 1826, and educated at Eton and Cambridge. He was called to the bar, but was soon after sent out as *Times* correspondent to Constantinople, where he remained during the Crimean war. Afterwards he was constantly employed on the *Times* staff until 1877, when he became its editor, a post which he laboriously filled till within ten days of his death. But this was only one side

of his life. As a singularly thorough Hebrew and Arabic scholar he had few equals among his contemporaries, and his translation of the Arabic classic, the *Assemblies of Al Hariri* (1867) gave him a chair of Arabic at Oxford in 1868. One of the company of Old Testament revisers, he published an edition of the *Machberoth Ithiel* (1872), a Hebrew version of the 'Assemblies.' He died 11th February 1884. See the article *TIMES*.

**Chengalpat**. See CHINGALPAT.

**Cheng-tu**, or CHENG-TU-FU, one of the largest cities of China, capital of the province of Sze-chwan, is situated in the irrigated valley of the Min, a tributary of the Yang-tze-kiang, 175 miles NW. of Chung-king. It has a large trade, chiefly with Tibet. Riots in 1911 (against railway concessions) were with difficulty suppressed. Pop. 800,000.

**Chénier**, MARIE-ANDRÉ, French poet, was born at Constantinople in 1762, third son of the French consul-general there, his mother being an accomplished Greek lady. Sent to France as a child, in his thirteenth year he was placed at the Collège de Navarre, and from the first Greek literature was his special subject of study. At twenty he entered the army, but in six months returned to Paris, and gave himself up to a strenuous course of study. To this period belong two of his most famous idylls, *Le Mendiante* and *L'Aveugle*. His health giving way, he travelled in Switzerland, Italy, and the Archipelago. In 1786 he returned to Paris, and began several of his most ambitious poems, most of which, however, remained fragments. The most noteworthy are *Suzanne*, *L'Invention*, and *Hermès*, the last being in plan and spirit an imitation of the great poem of Lucretius; for Chénier shared the beliefs of the 18th-century philosophers of France. In 1787 he went to England as secretary to the French ambassador, but seems to have found his residence there as ungenial as Heine did. Returning to Paris in 1790, he found himself in the ferment of the Revolution. Up to a certain point he gave the movement his ardent support; but alarmed by its excesses he mortally offended Robespierre by certain denunciatory pamphlets. He was thrown into the prison of Saint-Lazare, and after six months was executed on the 25th July 1794, just three days before the close of the Reign of Terror.

Chénier holds in France a somewhat similar position to Keats in England, to whom he shows a certain affinity of genius. Other pieces of Chénier that deserve special mention are *La Jeune Captive*, *Le Jeune Malade*, and *Versailles*. Sainte-Beuve thus sums up his claims: 'Chénier was one of the great masters of French poetry during the 18th century, and our greatest classic in verse since Boileau and Racine.' See his *Œuvres Complètes* (ed. Dimoff, 1908 et seq.); *Œuvres inédites* (ed. Lefranc, 1914); Sainte-Beuve, *Critiques et Portraits*; Haraszi, *La Poésie d'André Chénier* (1891); Faguet, *André Chénier* (1903); and Bailey's *Claims of French Poetry* (1907).—His younger brother, MARIE-JOSEPH DE CHÉNIER (1764-1811), an ardent republican, sat in the Legislative Assembly, and wrote satires and declamatory plays.

**Chenille** (Fr., 'caterpillar'), a thick, velvety-looking cord of silk or wool (and so resembling a woolly caterpillar), used in ornamental sewing and manufactured trimmings.

**Chenonceaux**, a famous French château, standing partly on an island in the Cher, partly on a bridge spanning the river, near a station 20 miles E. by S. of Tours by rail. It was commenced in 1524 by the Chancellor Thomas Bohier, continued by Diana of Poitiers, and completed by Catharine de' Medici, who richly embellished the building, and surrounded it with a beautiful park.

It passed into the hands of the Condés, and afterwards of Madame Dupin, widow of a *fermier général*, who here was visited by Montesquieu, Bolingbroke, Voltaire, Rousseau, Buffon, and others. The castle is in excellent preservation; it possesses a fine chapel, a theatre, and memorials of its former occupants in furniture, personal relics, ciphers, and a collection of portraits.

**Chenopodiaceæ**, an order of apetalous dicotyledons usually regarded as reduced types of Caryophyllaceæ, and closely related to Anniaceæ, with which some include them as Olacaceæ. They are herbaceous or half-shrubby plants, with simple, alternate, exstipulate leaves, and inconspicuous flowers, hermaphrodite or unisexual, usually wind-fertilised. There are about 500 species, mostly weed-like, and growing in waste places, sometimes in salt marshes or on sea-shores. They are widely diffused over the world, particularly northern Europe and Asia. Beet and spinach are among the best-known and most useful plants of the order, but many others are occasionally used as pot-herbs, as some species of *Chenopodium* (q.v.), Orache (q.v.), &c. The Australian saltbush (*Atriplex* and other genera) grows wild over large areas of the inland plains, and provides indispensable fodder for stock in time of drought. *A. nummularia*, the commonest, is a tall shrub with sage-green leaves, varying in shape from round to diamond-ovate; the male flowers occur in pinnulate leafless spikes, the female are as a rule solitary and axillary. See GLASSWORT, SALTWORT.

**Chenopodium**, a genus of Chenopodiaceæ, of which some of the common species are well known by the name of Goosefoot, as weeds growing in gardens, on heaps of rubbish, and in waste places. The species are mostly annuals, with entire or toothed leaves, often with a sort of mealy hoariness, and are widely distributed, or becoming naturalised in all climates. The leaves of many species are used as a substitute for spinach, particularly those of the Good Harry, Wild Spinach, All-good, or English Mercury (*C. bonus-Henricus*), a common wayside perennial, which is still sometimes cultivated; the young shoots are also used as asparagus. *C. album* (Pigweed), an annual common in waste places, has been largely used in Russia in time of famine. *C. Vulvaria* (Stinking Goosefoot), an annual with an odour compared to that of stale salt fish, growing in waste places, especially near the sea, was formerly in popular repute as an antispasmodic and emmenagogue. *C. purpurascens* (*Atriplex*) is a handsome annual introduced from China. *C. Botrys*, a native of the south of Europe, with pinnatifid leaves resembling those of the oak, and hence called Jerusalem Oak, is in use as an expectorant and anthelmintic. It is agreeably fragrant. *C. ambrosioides* has a strong aromatic odour, is used in Mexico instead of tea, and is occasionally cultivated in France, an infusion of it being deemed useful in nervous disorders. The closely allied *C. anthelminticum*, the Wormseed of the United States, has a strong and somewhat aromatic odour, and a high reputation as a vermifuge, due to the presence of an essential oil. More important than any of the species, as affording a principal article of food in the countries of which it is a native, is Quinoa (q.v.).

**Cheops** (a Grecised form of *Khufu*) was a king of Memphis in Egypt, belonging to the fourth dynasty, famous as the builder of the largest of the existing pyramids. The date usually assigned to him is about 3000 B.C. His successor was his brother Chephren (*Khafra*), who built the next largest pyramid. See EGYPT, PYRAMIDS.

**Chepstow**, a river-port of Monmouthshire, a sub-port to Gloucester, on the right bank of the

Wye, 2½ miles from its influx to the Severn estuary, and 17 ENE. of Newport. It lies between bold cliffs, on a slope rising from the river, in the midst of exquisite scenery. Its noble ruined castle, later chiefly than the 12th century, stood two sieges during the Civil War, and was held successively by Fitz-Osbornes, Clares, Bigods, Herberts, Somersets, and Lysaghts. The railway crosses the Wye by Brunel's tubular suspension bridge (1852), 600 feet long, and 50 above high-water, the principal span being 300 feet long. Here occurs the highest tide in the British Islands; though accounts of it have been frequently exaggerated. The range is 50 feet, and in extreme tides 53 feet, the rise above the mean level of the sea being 23½ feet; and the extreme heights are seldom reached. National shipyards, started in 1917, were sold to a company in 1920. Pop. 5000.

**Cheque** is a money order on a banker, payable on demand. It is really a Bill of Exchange (q.v.), and is subject to the provisions of the Act of 1882, which contains special clauses relating to cheques. If it is not presented within a reasonable time, the drawer is discharged should the banker fail, but the holder can claim against the banker's estate. The banker bears the risk of the forgery of the drawer's signature, but is not responsible for a forged indorsement. A cheque is held as payment of a debt until dishonoured on presentation; it is not payable after the drawer's death or bankruptcy.

A *crossed cheque* is an ordinary cheque with two transverse lines drawn across it, which have the effect of making it payable only through a banker. When a particular banker's name is written between the lines, the cheque is said to be *pecially* crossed, and is only payable to the banker whose name it bears. Wanting a particular name, or with the words '& Co.,' it is said to be *generally* crossed, and is payable through any banker. An ordinary cheque may be crossed either generally or specially by the holder. The crossing is a material part of the cheque, and may not be obliterated or altered, except as provided by the Bills of Exchange Act, 1882.

In the United States a cheque is not a bill of exchange, though it has many of its properties. It is not a legal tender, nor is it a payment of debt till honoured at the bank. It has no days of grace, and is due only after presentation. The bank is responsible for paying a forged cheque, and is liable for wrongfully dishonouring it.

**Chequers**, a house and estate in a hollow of the Chiltern Hills, near Wendover, given to the nation in 1917-21 by Sir Arthur Lee (Lord Lee of Fareham) as an official residence for the prime-minister. The house is of Tudor date, and was restored in 1909. Part of the estate, Coombe Hill, the highest point of the Chilterns (852 feet), had been given to the nation in 1913.

**Cher**, a French river, flowing 200 miles northward and north-westward till it falls into the Loire below Tours. It is navigable from Vierzon.

**Cher**, to which the river gives its name, is the central department of France. The surface consists of plain and well-wooded hills (1600 feet), and produces corn, fruits, wine, hemp, flax, &c. The climate is mild and pleasant, except in the swampy district in the north, which has, however, been largely drained. Agriculture, sheep and cattle rearing, and bee-keeping give employment to many. The rivers abound in fish, and wolves are still sometimes seen. Education is backward. Area, 2770 sq. m.; pop. (1872) 335,392; (1891) 359,276; (1911) 337,810; (1921) 304,800. Bourges is the chief town.

**Cherasco**, a walled town in the province of Cuneo, north Italy, 37 miles SSE. of Turin by

rail; pop. 5000. In the middle ages Cherasco was one of the chief fortresses of north Italy, but its works were destroyed by the French in 1801. A peace was concluded here between Louis XIII. of France and the Duke of Savoy in 1631, and another between the Sardinian commissioners and Napoleon in 1796.

**Cherbourg**, a fortified seaport town and arsenal of France, in the department of Manche, at the head of a deep bay on the northern extremity of the peninsula of Cotentin, 70 miles S. of the Isle of Wight, and 230 WNW. of Paris. Begun by Vauban in 1687, the harbour-works and fortifications were pushed on by the great Napoleon, and were supposed to have been completed in 1858 by Napoleon III. at a total outlay of 200 million francs; but less than thirty years after, the French government resolved to spend 49 millions more on the construction of fresh works between 1883 and 1894. Port extensions to cost over 15 million francs were decreed in 1922 to be of public utility. The stupendous *digue* or breakwater, enclosing a space of nearly 4000 acres, is described in the article **BREAKWATER**. In connection with its fortifications, this breakwater assumes an importance that attaches to no other work of the kind in existence. At the apex of the angle formed by the meeting of the two branches of the *digue* there is a centie fort or battery, measuring 509 feet on the inner line of the parapet, which forms a flat semi-ellipse. The circular forts at the extremities of the breakwater are remarkably well placed for purposes of defence. Behind the centre battery there is an elliptical tower, measuring 225 feet on the major and 123 feet on the minor axis. The entrances to the harbour are round the ends of the *digue*; and the passages are further defended by the fortifications of the Ile Pelée, and by the batteries of La Roche Chavaignac and Fort Querqueville. A series of coast redoubts, and the large fortifications of Les Flamands, du Homet, Digoville, and Nacqueville, are situated behind this outer zone of defence. The town itself is commanded by La Roule on the heights behind. The commercial harbour of Cherbourg consists of an outer harbour, 786 feet in length by 654 feet wide, and of an inner basin, 1338 feet long by 416 feet wide. The great inner naval floating-harbour was inaugurated by the Emperor Napoleon in 1858, in presence of Queen Victoria. Entirely cut out of the solid rock, it is 20 acres in area, and is surrounded by building-slips and capacious graving-docks. The commercial port displays great activity, and is surpassed in trade only by Marseilles and Le Havre among French ports. The principal exports are stone, eggs, butter, and cattle. The town itself is insignificant, the streets being narrow and dirty; the only buildings of note are Trinity Church, founded by the English about 1450, the hôtel-de-ville (with a good collection of pictures), and the theatre. There are some fishing and shipbuilding, iron and copper founding, manufactures of ropes, hosiery, chemicals, lace, and leather, sugar and salt refineries, sawing and flour mills; but the industrial energies of the great bulk of the population are absorbed in the arsenal and dockyards. Cherbourg is a very ancient place; originally *Cæsaris Burgum*, in the 11th century it was known under the name of *Carusbur*. In 1758 Cherbourg was taken by the English, who destroyed the naval and military works, and levied a contribution on the town. Pop. (1872) 34,785; (1891) 38,540; (1921) 38,281.

**Cherbuliez**, the name of an influential family at Geneva, which has produced many eminent scholars and men of letters. Its founder was Abraham Cherbuliez, a prosperous bookseller, who

left three sons—(1) **ANDRÉ** (1795–1874), professor first of Latin, next of Ancient Literature at the Geneva Academy, author of *De Libro Job* (1829), and an *Essai sur la Satire Latine* (1829).—(2) **ANTOINE ÉLISÉE** (1797–1869), an eminent publicist; professor of Law and Political Economy at Geneva; afterwards at Paris the redoubtable antagonist, in the pages of the journals, of Proudhon and the socialists; died professor at Zurich; author of *De la Démocratie en Suisse* (1843), *Études sur les Causes de la Misère* (1853), and *Précis de la Science Économique* (1862).—(3) **JOEL** (1806–70), who succeeded to his father's business, and became well known as editor of the *Revue Critique* (1833 et seq.), and an occasional contributor to the *Revue des Deux Mondes*. His book, *Le Lendemain du dernier Jour d'un Condamné* (1829), was a clever burlesque and more upon Victor Hugo's well-known *tour-de-force* on the question of capital punishment, while his *Geneve, ses Institutions, ses Mœurs, &c.* (1867), was a solid contribution to the history of the city. Of the sisters, two made some reputation: the eldest, **MADAME TOURTE-CHERBULIEZ** (1793–1863), wrote tales and novels, among them *Annette Gervais*, and *Le Journal d'Amélie*; and the youngest, **ADRIENNE** (1804–80), translated into French the tales of Zschokke and H. von Kleist. (For the achievements of this remarkable family, see Rambert's *Écrivains nationaux Suisses*.)

**VICTOR CHERBULIEZ**, son of André, was born at Geneva in 1829, and studied there, at Paris, Bonn, and Berlin, first mathematics, then philology and philosophy; after which he lived in Geneva as a teacher, until his call to Paris in 1864 to join the *Revue des Deux Mondes*. Naturalised in 1880, he became an Academician in 1881. Cherbuliez began his literary career with books which were compounds between fiction and criticism. In the first of these, *À propos d'un Cheval, Causeries Athéniques* (1860; 2d ed. under the title, *Un Cheval de Phidias*, 1864), beauty in art, and especially in the sculptures of Phidias, is discussed in a series of conversations by the attendants of a French marquise who is visiting Athens; *Le Prince Vitale* (1864) treats in a similar way the subject of Tasso's madness; *Le Grand Œuvre* (1867) contains, with many incongruous enough discussions of social and political questions, an account of the unfortunate attempt of an English baronet to grow a wife for himself. From these the author turned to work which really proved his powers. In 1863 he published *Le Comte Kostia*, a strong and striking novel, which at once found its author an audience. It was followed by a series of novels which, always clever and original, if sometimes mannered and over-inventive, soon lifted Cherbuliez into the front rank of contemporary French writers of fiction. His style is brilliant and epigrammatic, his dialogue natural and lively; while he is readable from beginning to end, and his situations are not only full of interest for the moment, but are remembered long. Many of his earlier stories take the form of a narrative by the chief character, but those difficulties in developing a plot in such a method which have been too great for many novelists are surmounted with consummate art. His best novels, besides those named already, are *Le Roman d'une honnête Femme* (1866), *L'Aventure de Ladislav Bolski* (1869), *La Revanche de Joseph Noirel* (1872), *Meta Holdenis* (1873), *Miss Rover* (1875), *Le Francé de Mlle. de Saint-Maur* (1876), *Samuel Brohl et C<sup>ie</sup>* (1877), *L'Idée de Jean Téterol* (1878), *Noirs et Rouges* (1881), *La Ferme du Choquard* (1883), and *La Vocation du Comte Ghislain* (1888). He published also in book form political studies on Germany and Spain, essays on literature and art, and other series of papers which appeared in the *Revue des*

*Deux Mondes*, under the pseudonym G. Valbert. He died 1st July 1899. See Saintsbury, *French Novelists* (1891), and Faguet's *éloge* (1899).

**Cheremisses.** See MARI.

**Cheribon**, a seaport of Java, on the north coast, 125 miles ESE. of Batavia. It has a considerable trade in coffee, indigo, and teak-wood, and is the residence of a Dutch governor. Pop. 25,000.

**Cherimoya**, or CHIRIMOYA (*Anona cherimolia*), the most esteemed fruit of Brazil and Peru, now common, and even naturalised in some parts of the East Indies, and other tropical countries of the Old World. It is sometimes described as the finest of all fruits, sometimes as inferior only to the mangosteen. Flowers and fruit emit a pleasant fragrance, but when the tree is covered with blossom the odour is almost overpowering. The fruit varies from the size of an orange to 16 lb. or upwards in weight. See CUSTARD-APPLE.

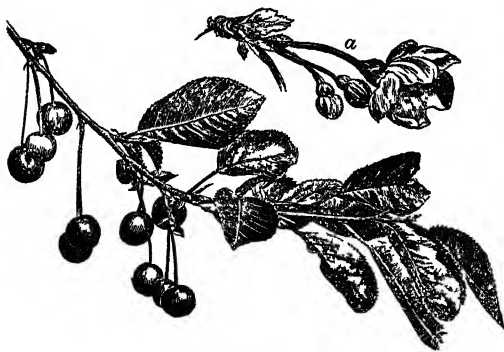
**Cherkask.** See TCHERKASK.

**Chernigov.** See TCHERNIGOFF.

**Cherokees**, one of the most civilised of the American Indian tribes, of the Appalachian stock. They once owned a wide tract of country on either side of the southern Appalachian Mountains. In 1838 the great majority of the tribe were deported from Georgia to west of the Mississippi, and now they occupy the north-east angle of Oklahoma (q.v.). The Cherokee Outlet was bought by government and thrown open to settlement in 1893. The Cherokees, who numbered 41,700 in 1909, have a syllabic alphabet of eighty-five characters, invented in 1826 by George Guess or Sequoyah, a half-breed.

**Cheroots.** See TOBACCO.

**Cherry** (*Cerasus*), a sub-genus of *Prunus* (see PLUM), of which the species and their cultivated varieties yield the familiar stone-fruit of the same name. The chief distinction between the cherries and the apricots and plums forming the other two sub-genera of the genus *Prunus* is that they have numerous flowers ranged in racemes or simple corymbs, and smooth spherical drupes without any



Common Cherry :  
a, blossom.

bloom. The COMMON WILD CHERRY or GEAN (*Prunus avium*) and the WILD BLACK or BIRD CHERRY (*P. Padus*) are common trees in our woodlands and hedgerows; and it is from them that the GARDEN CHERRY (*P. Cerasus*) has been obtained by cultivation. They are fair-sized hardwood trees, but of little importance sylviculturally, although the wood is hard, close-grained, tough, and suitable for a variety of purposes, such as cabinet-making, turnery, musical instruments, &c. Both species are frequently planted for ornament, not only on account of the beauty of their flowers in spring, but also for their foliage in autumn.

Both have white flowers in clusters or nearly sessile umbels, and both are generally regarded as natives of middle and southern Europe, if not also of Britain, where they are both at any rate naturalised. According to the usual reading of Pliny, *P. Cerasus* was, however, introduced by Lucullus from Cerasus in Pontus to grace his triumph after his victory over Mithridates; Belon, however, plausibly identified this as his own cherry-laurel (see LAUREL). In the wild state both are often called gean (Fr. *guigne*); more accurately, however, this is *P. avium*. Double varieties of both species are also grown in our shrubberies. The cultivated varieties of the cherry are very numerous, and differ considerably in size, colour, and flavour; opinions hence differ seriously as to their parentage. The fruit is largely eaten fresh, and as an ingredient in preserves, &c.; the woodcutters and charcoal-burners in some parts of France make it a principal ingredient in soups. Besides its use for dessert and for preserves, and the like, the cherry is extensively used for making liqueurs (see KIRSCHWASSER and LIQUEUR). Cherry Brandy is a liqueur made by steeping Morello cherries in brandy; whereas *Kirschwasser* is a spirit distilled from cherries. In some parts of Germany the roads are fringed by avenues of cherry-trees; and the cherry ripens in Norway and East Bothnia as far north as 63° lat. The other species of cherry are numerous. Some species are low or even prostrate shrubs, as *P. chamaecerasus*, the Ground Cherry of the south of Europe and of Siberia; and *P. pumila*, the Sand Cherry of North America. The name cherry is also shared by the closely allied Bird-cherry (q.v.) and Choke Cherry (q.v.), including the American Wild Cherry, famous for its medicinal bark; the Mahaleb (*P. Mahaleb*) of the south of Europe, famous for the fragrance of its flowers, and grown in pots to make symmetrical pipe-stems; the Capollim (*C. or P. capollim*) of Mexico and Peru, famed for the fragrance of its fruit; and the laurel-cherry (see LAUREL). The name cherry is also vaguely and popularly applied in different countries to plants of any kind which happen to recall the true cherry, especially by the size, colour, or taste of their fruit; among these, see BARBADOS CHERRY, WINTER CHERRY, &c. Thus the 'Native Cherry' of Australia is the fleshy fruit-stalk of *Exocarpos cupressiformis* (*Santalaceae*), while the Hottentot Cherry is *Ilex* (*Cassine*) *Maurocena*. The 'Beech Cherry' or 'Brush Cherry' of Australia is *Trochocarpa laurina* (*Epacridaceae*), and so on.

**Cherry-laurel.** See LAUREL.

**Cherso** (Serb. *Cres*), an island of Illyria, in the Gulf of Quarnero, 13 miles SSW. of Fiume, Austrian till the Great War, Italian by the treaty of Rapallo (1920). A bridge unites it with the adjoining isle of Lussin. Area, 127 sq. m.; population, 10,000. On its rugged hills sheep are fed; there are large forests, and on the coast wine, olives, and fruits are produced. Cherso, the chief town, on the west side, has a spacious harbour. Pop. 5000.

**Cherson.** See KHERSON.

**Chersonesus**, the ancient name of several peninsulas and promontories in Europe, the most important of which are the Crimea (q.v.). *C. Taurica*; the peninsula of Gallipoli (q.v.), *C. Thracica*; and Jutland (q.v.), *C. Cimbrica*. The name is sometimes applied to the Malay Peninsula.

**Chert**, or HORNSTONE, a variety of chalcedony, always massive, not unlike flint, but more brittle, breaking with a splintery fracture. It is common in limestones of Palaeozoic age, but occurs also in Mesozoic strata (Jurassic, Cretaceous), sometimes forms rocks, and often contains petrifications. It passes

into flint and flinty slate. Its colours are gray, white, red, yellow, green, or brown. The name Chert is sometimes limited to the finer varieties, and the coarser are called Hornstone.—The name Chert is very commonly given to the siliceous concretions which occur as nodules and layers in limestone rocks, much in the same way as flints in the chalk. When these materials exist to such an extent as to render the limestone useless for economical purposes, it is said to be 'cherty.'

**Chertsey**, a town in Surrey, near the right bank of the Thames, here crossed by a seven-arch bridge (1785), 21 miles WSW. of London. It is irregularly built, chiefly consisting of two long cross-streets, and is surrounded by villas. The chief trade is in malt and flour. Many vegetables are raised for the London market. Chertsey arose in a monastery founded in 666, and refounded in 964 by Edgar for Benedictine monks. Charles James Fox lived on St Anne's Hill, an abrupt elevation about a mile from the town; and the poet Cowley spent the closing years of his life in Chertsey, in a house that is marked with an inscription. Pop. 15,000.

**Cherub** (Heb. *k'rûbh*), in the plural *Cherubim* or *Cherubs*, is the Hebrew name of a winged creature with a human countenance, which in the Scriptures is almost always represented in connection with Jehovah, and especially as drawing his chariot-throne. In Scripture the cherubim appear to be quite distinct from the angels, who are Jehovah's messengers, while the cherubim are found where God himself is personally present, and are the living bearers of God manifesting himself in his glory on the earth. It is possible to trace a development both of their form and their significance. While they are always conceived as living creatures, their perfectly free power of movement seems to suggest a connection with the thunder-clouds which reveal to the world the majesty of God. In the 18th Psalm it is said Jehovah 'rode upon a cherub, and did fly; yea, he flew swiftly upon the wings of the wind,' and elsewhere the clouds are called the chariot of Jehovah. To the Hebrew idea of the cherub (in this aspect of it) is allied the Indian conception of the bird Garuda, the swift bearer of Vishnu, and the swift-winged four-footed bird which in Æschylus carries Oceanus through the ether, as well as the (later) Greek and Roman representations of the griffins bearing Apollo or Artemis. According to Sayce, the word is probably connected with the Assyrian *kurûbu*, the name denoting the winged bull which guarded the house from the entrance of evil spirits, and at the same time with *kurubu*, the 'circling' bird—i.e., according to Franz Delitzsch, the vulture. Phœnicia took the idea from Babylonia, and the two cherubs made for Solomon (1 Kings vi. 23-28) were wrought by Phœnician artificers. Cherubim are mentioned in the Old Testament as guards of Paradise; a cherub with a flaming sword hindered the return of the expelled human pair. In the Holy of Holies cherubim wrought in embossed metal were represented above the mercy-seat, or covering of the Ark of the Covenant, so that they appeared to rise out of it. Figures of cherubim were also wrought into the hangings of the Holy of Holies. The cherubim that appear in the visions of Ezekiel and the Revelation of John depart much from the early representations. In Ezekiel they have the body of a man, whose head, besides a human countenance, has also that of a lion, an ox, and an eagle; they are provided with four wings, two of which serve to fly, while the other two cover the body; four human hands and arms are under the wings,

and the whole body, before and behind, and on the hands and wings, as well as the wheels of their chariot, is spangled with innumerable eyes. In the Revelation, four cherubim, covered with eyes, and having six wings, surround the throne of Jehovah; the first has the face of a lion, the second of an ox, the third of a man, and the fourth of an eagle. As the Gospel is a unity, but four-fold, the four elements of the cherub came to be divided among the four evangelists, the human countenance being the symbol of Matthew, the lion of Mark, the ox of Luke, and the eagle of John. Most Jewish writers and Christian Fathers conceived the cherubim as angels; and Dionysius the Areopagite, in his *Celestial Hierarchy*, makes them a separate class in the first hierarchy. Most theologians also considered them as angels, until Michaelis showed them to be a poetical creation. Herder, in his *Spirit of Hebrew Poetry*, compared them to the griffins that watch treasures and other fabulous figures. In Christian art they are generally represented as sexless figures, with wings from the shoulders, the legs also being either covered by wings, or having wings substituted for them. Very often they have also an aureole round the head.

**Cherubini**, MARIA LUIGI CARLO ZENOBIO SALVATORE, an eminent composer, was born at Florence on the 8th or the 14th September 1760, the tenth of a family of twelve children. He began to study music at the age of six, under his father, and at nine was sent to the academy of Bartolommeo Felici. Church works to the number of seventeen proceeded from his juvenile pen at this period, and were mostly actually performed in Florentine churches. In 1778 he went to Bologna and studied under the famous Sarti for four years, removing with him in 1779 to Milan; here he was grounded in the old Italian contrapuntal style, and also frequently assisted his master in writing minor parts of operas. In 1780 his own first opera, *Quinto Fabio*, was produced at Alessandria, and for the next fourteen years a succession of dramatic works followed. In 1784 he was invited to London, and held the post of composer to the king for one year. In 1785 he visited Paris, and a ter another short visit to Turin, returned in 1788 to Paris, which remained thenceforth his home. Up to this period his operas had been in the light Neapolitan style of Paisiello or Cimarosa; they are now forgotten. But after his arrival in Paris a change becomes gradually apparent, contemporaneously with and in the same direction as the development of the style of Mozart in *Figaro* and *Don Giovanni*. Cherubini, however, had no opportunity of hearing these works at this time, and advanced quite independently on the same path. This change is already distinguishable in his first Parisian opera, *Démophon*, given in 1788, but is more distinctly developed in *Lodoiska*, which was received in 1791 with astonishment and admiration. Subsequent works were *Elise* (1794), *Médée* (1797), *Les deux Journées* (or 'The Water-carrier,' 1800), his operatic masterpiece, and *Anacreon* (1803). His lofty unbending manner, however, had excited a prejudice against him in the mind of Napoleon. He visited Vienna in 1805, and made the acquaintance of Haydn, Beethoven, and Hummel. Two of his operas were produced there; but the war between Austria and Napoleon cut short his stay, and he returned to France dispirited. In 1808, on a casual visit to Belgium, he entered on a third period of musical activity with the composition of the first of his great church works, the Mass in F. In December 1814 Louis XVIII. made him a knight of the Legion of Honour. Next year he paid a short visit to England which left a bad effect on his health. Shortly after, he succeeded

to the post of *maître-de-chapelle* to King Louis. The list of his works from this period comprises a Mass in C (1816), and Requiems in C and D (1817 and 1836), all of the highest rank, besides numerous other church pieces, and six string quartets. In 1822 he became director of the Conservatoire of Paris, which his energetic administrative talent soon raised to the greatness it still preserves. His work on counterpoint and fugue appeared in 1835, and remains a standard book. His severe rule over the institution continued till 1842, when, after only a month's retirement, he died on 15th March. The universal feeling in musical Europe at the time was that its foremost figure was gone. Though the greater part of his career was run in Paris, and the most famous French operatic composers of the early part of the century, Boieldieu, Auber, Halévy, &c., came under his instructions, he has not permanently influenced the French school; his music lives and preserves a strong hold rather in Germany, with the musicians of which he has more affinity. His style has been aptly called that of effect, the means employed being unusual harmonic and orchestral combinations, the agreement of the music with the dramatic situation, and a remarkable architectural structure in point of form. He is always careful, however, to keep within orthodox limits. As already indicated, his operas have numerous parallels with those of Mozart; but along with the lustre and polish of skilfully cut gems, they possess also somewhat of their coldness. The emotional element is often strong, but is always dominated by the intellectual. His artistic ideal was a lofty one, and he never stooped from it. His music commanded high admiration from Beethoven, who even took him as a model of style in composition for the voice. His masses and overtures are well known, and frequently performed in this country, and at least *Médée* and the *Deux Journées* have kept a place on the stage. The stern manner of the 'grim Florentine' finds illustration in his stereotyped reply to all requests in connection with his office, 'It cannot be done,' from which, however, he frequently departed; and he inspired almost enthusiastic attachment in many of his pupils. The antagonism between him and Berlioz, on the other hand, is strongly brought out in the memoirs of the latter; and he was prejudiced against Beethoven. See the Life of Cherubini by Bellasis (1905); the Life by Pougin, which appeared first in *Le Ménestrel* (1882-83), and vindicates him from the repellent asperity with which he has been reproached; and Crowest's *Cherubini* ('Great Musicians,' 1890; new ed. 1915).

**Cherusci**, a German tribe first mentioned by Cæsar, whose exact locality is somewhat uncertain, save that they touched the Weser and lay north of the Harz Forest. They are chiefly memorable in connection with their great leader Arminius (q.v.).

**Chervil** (*Anthriscus Cerefolium*), an umbelliferous plant, which has been long cultivated, especially on the Continent, as a pot-herb, and used in soups and for a garnish, &c. in the same manner as parsley. The leaves have a peculiar, somewhat sweetish, pleasantly aromatic smell and taste, by which the plant may be known from its congener *Anthriscus vulgaris* or *Scandix Anthriscus*, a poisonous weed, whose leaves have a disagreeable smell, and which is also distinguished by its hispid fruit. *A. sylvestris* has large roots, for the sake of which it is cultivated. The allied *Venus' Comb* or *Shepherd's Needle* (*Scandix pecten-Veneris*), often found in cornfields, as also *S. australis* of southern Europe, have a similar taste and smell, and are used in the same way on the Continent. Sweet Chervil or Sweet Cicely (*Myrrhis odorata*; *Scandix*

*odorata* of the older botanists), a native of the south of Europe and of some parts of Asia, common in the neighbourhood of houses in Britain, although probably not a true native, is frequently cultivated in Germany under the name of *Spanish* or *Anise Chervil*. In Scotland the plant is popularly called *Myrrh*. Its smell is considered attractive to bees; and the insides of empty hives are sometimes rubbed with its leaves, to induce swarms to enter.—The species of *Cherophyllum*, coarse weeds, are also called chervil.

**Cherwell**, a stream falling into the Isis or Thames near Oxford (q.v.).

**Chesapeake Bay**, in Maryland and Virginia, and dividing the former state into two parts, is the largest inlet on the Atlantic coast of the United States, being 200 miles long, and from 4 to 40 broad. Its entrance, 12 miles wide, has on the north Cape Charles, and on the south Cape Henry, both promontories being in Virginia. The bay has numerous arms, which receive many navigable rivers, such as the Susquehanna on the north, the Potomac, Rappahannock, and York on the west, and the James on the south-west. Unlike the shallow sounds towards the south, this network of gulfs and estuaries, with its noble feeders, affords depth of water for ships of any burden, virtually carrying the ocean up to the wharves of Baltimore and the arsenals of Washington.—For the *Chesapeake* and *Shannon* sea-fight, see BROKE.

**Cheselden**, WILLIAM, a great surgeon and anatomist, was born in 1688, at Somerby, near Melton-Mowbray, and having in 1711 established himself in London as a lecturer on anatomy, was next year elected a Fellow of the Royal Society. He was afterwards appointed surgeon to St Thomas's, St George's, and Westminster hospitals, where he acquired great reputation, especially by his 'lateral operation for the stone' in 1727 (see LITHOTOMY). In 1728 he operated on a young man born blind, and the successful result of the operation did much to develop the theory of Vision (q.v.). He died at Bath, 10th April 1752. His four works included *Anatomy of the Human Body* (1713), long a textbook on the subject in England; and *Osteologia, or Anatomy of the Bones* (1733). See an article in the *Asclepiad* (1886).

**Chesham**, an urban district of Buckinghamshire, 28 miles NW. of London; pop. 8600.

**Cheshire**, a maritime county in the west of England, on the Welsh border, bounded N. by the river Mersey, separating it from Lancashire, and partly also by the Irish Sea. Its greatest length from north to south is 48 miles; greatest breadth from east to west, 32; total area of land and water, 1024 sq. m., of which 76 per cent. is under cultivation. The coast-line is confined to the hammer-headed peninsula, called Wirral, about 8 miles broad, between the estuaries of the Mersey and Dee. The surface forms an extensive nearly level plain between the Derbyshire and Welsh mountains, well wooded, and studded with small lakes or meres. This plain, comprising four-fifths of the surface, rests on new red sandstone, and is crossed, near the middle, by a tract of high ground running south-west from a promontory overlooking the Mersey, near the mouth of the Weaver, to Beeston Castle rock, 366 feet high. On the east border of the county is a line of new red sandstone hills. In the east are large tracts of peat, and much of the county is wet and rushy. Coal-measures appear on the Flintshire border, and also on the borders of Staffordshire and Derbyshire. The chief rivers are the Dee, Mersey, and Weaver, which are navigable. The Dee skirts the county on the west for 55 miles, and the Mersey on the north for 40 miles. The Weaver rises in the east part of the

county, and runs 40 miles west-north-west to the Mersey. In addition to its river navigation, the county has an almost unrivalled system of canals, and contains the greater part of the Manchester Ship Canal. It is well intersected by railways. The chief mineral products are rock-salt and coal. The rock-salt, discovered in 1670, and mined by gunpowder, is found near the Weaver and its branches, especially near Northwich (q.v.), and at Middlewich, Winsford, and Sandbach. Much salt is also made from brine-springs 20 to 40 yards deep. Coal is worked near Chester and on the eastern borders of the county. Lead and copper mining is now almost extinct. In almost every part of the county freestone, limestone, millstone, and marl are found. The climate is moist. The soil is mostly a clayey or sandy loam, with marl and peat, and very fertile. The soil and climate are well fitted for pasturing, and dairy-farming is largely carried on, the county being noted for its cheese (see CHEESE). In the cattle-plague of 1865-66 upwards of 70,000 cattle perished, 36,000 of these being slaughtered as a preventive measure. Pop. (1801) 194,305; (1881) 664,037; (1901) 815,555; (1921) 1,025,423. There are extensive manufactures (cotton, silk, iron, soap, railway rolling-stock, ships, machinery, &c.) in the principal towns, especially Birkenhead, Congleton, Chester (the county town), Crewe, Macclesfield, Stalybridge, and Stockport. The county is formed into nine parliamentary divisions, each returning one member, and includes the parliamentary boroughs of Birkenhead and Stockport, with the boroughs of Chester, Dukinfield, Hyde, Macclesfield, Stalybridge, and Wallasey. It is mostly in the diocese of Chester. Cheshire has some Roman roads, tumuli, barrows, remains of religious houses, and many old castles and halls. Egbert, in 828, added it to the English kingdom of Mercia. William the Conqueror erected it into a county palatine, under Hugh Lupus, with an independent parliament and eight barons. Henry VIII. subordinated it to the English crown; but Cheshire did not send representatives to the English parliament till 1549. See Ormerod's *History of Cheshire* (1819; new ed. 1875); the *Ancient Monuments Report* (1912); and books by Earwaker (1877), Coward (1903), Gallichan (1905), and Kelsey (1911).

**Cheshunt**, an urban district of Hertfordshire, 14 miles N. of London. It is famous for its rose-gardens, and was the seat of a college, founded in 1768 by the Countess of Huntingdon (q.v.) at Trevecca in Brecknockshire, removed hither in 1792, and in 1905 transferred to Cambridge. There is a college for working women (1914). Pop. 14,000.

**Chesil Bank** or BEACH, a bank of gravel and shingle extending 16 miles from Bridport harbour and Burton Bradstock to Portland. It varies in height from 20 to 43 feet, and in width from 170 to 200 yards. For some part of its course it hugs the shore, but the Fleet comes between it and the land for nearly 10 miles from Abbotsbury, famous for its swannery. Towards its west end the bank is composed of sand, grit, and fine gravel, but the materials get gradually larger and larger as it is followed eastward. Good authorities believe this bank was formed by the sea as a shingle beach in the ordinary way, that it formerly touched the land throughout its entire course, and that it has since been separated from the shore, and converted into a bar, by the denudation of the land behind it. (See map at BREAKWATER.)

**Chesney**, FRANCIS RAWDON, the explorer of the Euphrates, was born in 1789 at Annalong in County Down. He was gazetted to the Royal Artillery in 1805. In 1829 he inspected the route for a Suez canal, which he proved to be practicable.

His first exploration of the route to India, by way of Syria and the Euphrates, was made in 1831, and he made three other voyages with the same object. The idea was taken up by government, who made a grant of £20,000 after his first expedition, but owing to the opposition of Russia it was never brought to a practical issue. He commanded the artillery at Hong-kong from 1843 to 1847. In 1850 he published his *Expedition for the Survey of the Rivers Euphrates and Tigris*, and in 1868 a *Narrative of the Euphrates Expedition*. He died at Mourne, 30th January 1872. General Chesney's Life by his wife and daughter, edited by Stanley Lane-Poole, was published in 1885.—His nephew, Colonel Charles Cornwallis Chesney (1826-76), was the author of the well-known *Waterloo Lectures* (1861), which were delivered by him as professor at Sandhurst.—A younger brother of the latter, General Sir George Tomkyns Chesney, K.C.B. (1830-95), was appointed member of the Council of the Viceroy of India in 1886, and became M.P. for Oxford in 1892. He was the author of the clever *jeu d'esprit*, *The Battle of Dorking* (1871), and of a remarkable novel, *The Private Secretary* (1881).

**Chesnut**. See CHESTNUT.

**Chess** (Fr. *échecs*; Ital. *scacchi*; Span. *ajedrez*; Ger. *schach*; Dutch *schaak*; Low Lat. *ludus scaccorum*). Originally from Persian *shāh*, 'a king,' thus literally 'the game of kings'), a game of skill for two players or parties, played with figures or 'pieces,' which are moved on a chequered board. In consequence probably of its extreme difficulty, the game has acquired a unique importance throughout the world. It is the subject of a most extensive literature, and its study has become a science rather than a recreation. The laws governing its play are identical in nearly every country.

*History*.—The origin of chess is the subject of an almost hopeless controversy. It has been claimed, by writers and by legends, for China, India, Persia, and recently with some show of reason, by a Spanish archaeologist, for Egypt. As a matter of fact, traces of the game extend beyond history, and are found among races so widely different that any scientific investigation of the matter may now be considered impossible. The game was probably introduced into Western Europe by the Arabs, or about the time of the Arab invasion (8th century); at all events it was known among the cultured classes before the Crusades (1095). As then played, it differed somewhat from modern chess and from the game as played in the East. One of the earliest references to it in literature is in a work, written about 1300, by Jacobus de Cessolis, a preaching friar, and entitled *Liber de moribus hominum et officiis nobilium super ludo Scaccorum*. This work seems to have found its way into several European countries, MS. copies of it existing in various languages. An English translation from the French was printed by William Caxton in 1475 under the title of *The Game and Playe of the Chesse*, and was one of the first books printed with metal types in English. Modern chess—i.e. the game as now played—dates from about the middle of the 15th century. A MS. discovered in the university library of Göttingen, and dated 1490, is the earliest treatise extant, although frequent mention of chess is made by earlier poets and writers. The game found its first home in Spain, where Vicente (1495) and Lucena (1497) published two volumes, now of little value, of games. They were succeeded in 1510 by Damiano, a Portuguese, whose work, though restricted to a few openings, evinces considerable genius. It was plagiarised most unscrupulously by several later writers. Damiano was followed by Ruy Lopez, a cleric of Safra in Estremadura, who is perhaps

the most valuable of the earlier masters. His work, first published at Alcalá in 1561, may be said to have laid the foundation of the modern theory of play, and the opening which bears his name is that which modern analysis has shown to be one of the soundest yet invented. Lopez's treatise was republished in Venice in 1584, and from this date the game seems to have left Spain to find a home in Italy. Here should be mentioned Paolo Boi, a native of Syracuse, who, finding no worthy opponent in his own country, made a lengthened tour through the then most civilised part of Europe. He encountered and defeated every master of the game, including the hitherto invincible Ruy Lopez. His genius, added to a prepossessing appearance and a courteous demeanour, gained for him general admiration; he was patronised by Catharine de' Medici and by Sebastian, king of Portugal, both of whom conferred high favours upon him. The early Italian school, which extended from about 1550 to 1620, is identified with the names of Polerio (1590) and his followers, Salvio, Greco, and others. It may claim to be the most versatile and prolific yet founded, some of the most brilliant openings having come down to us from it. At its close, about the time of the Thirty Years' War, the study of chess was somewhat neglected, and there are no writers of note until the middle of the 18th century. At this time, however, two powerful, and to some extent rival, schools sprang up—the later Italian, led by Ercole del Rio and his commentators, Lolli and Ponziani, and the Northern school of Philidor. The former still confined itself to the study of openings and end-games; the latter turned its attention more to the middle game, advocating what is now known as 'play for position.' Both schools, though opposed in theory, were of the greatest practical benefit to students; their work was in a great measure combined by Allgaier, of Eltern, in his well-known treatise published at Vienna in 1795.

Begun in 1745 by Stamma, a Syrian, and led so powerfully by Philidor, the English school had, during this period, been steadily gaining strength and importance. Writers like Sarratt, Cochrane, Lewis, and Walker were doing their best to popularise the game, and they succeeded in giving it a footing in Britain which it has never since lost. Throughout northern Europe its study became general; in France, though there were few analytical writers—Alexandre being the only one of importance—such players as Deschappelles, Boncourt, and De la Bourdonnais earned for the Parisian school a very high reputation; the last-named player was by far the strongest of his day. In Germany, then as now, chief attention was given to theory; there were no very brilliant players, but the analytical work of Bilguer and Von der Lasa still remains the standard. England, however, continued to maintain its supremacy. Some of the greatest European players crossed the Channel and settled in London, and Howard Staunton, who defeated the French champion, St Amant, came to be regarded as the leading player in the world. Up to this time America had produced no player of more than local eminence; but at the congress held at New York in 1858, the first prize in the chief tourney was won by a youth of twenty-one, Paul Morphy (1837-84), of New Orleans. This player, who from the age of ten had shown a remarkable aptitude for the game, is admitted to be the greatest chess genius that has yet appeared. After his victory in New York he came over to Europe, meeting and defeating in turn the strongest players of London and Paris. It must always be a source of regret that the world so soon lost his wonderful power. After his visit to Europe he abandoned the game in order to follow his profession, that of

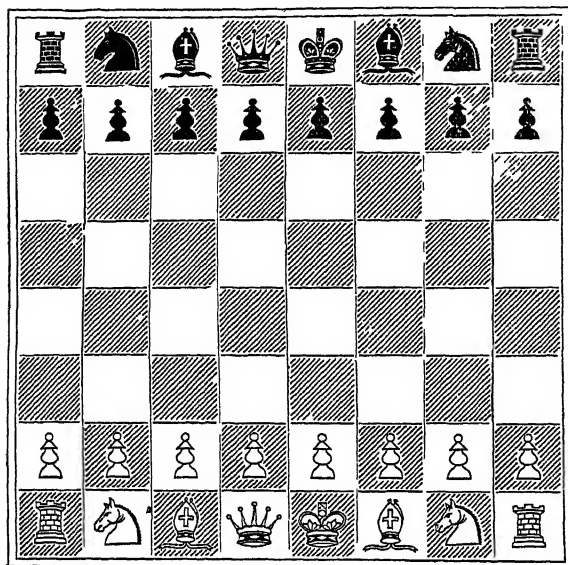
advocate. He only partially recovered from an attack of insanity, and died at the age of forty-seven. From this time the history of chess ceases to be that of a few celebrated players, and must be gathered from the magazines and weekly newspaper columns devoted to it in nearly every civilised country. Public interest in it has of late years increased with great rapidity, keeping pace, it would seem, with the progress of intellectual development. In England, where at one time or other nearly every great modern player has resided, the game has attained a dignity and importance altogether beyond that of a mere pastime, and its recognition by the state as a means of mental training has been seriously demanded. Every town and many villages have at least one club—London having upwards of a hundred; and such centres as Glasgow, Liverpool, and Manchester, five or six. There are also numerous county and district associations, holding periodical meetings in different towns in their provinces and offering prizes for competition among their members. The British Chess Association, the most important federation of this kind, may fairly claim to represent national chess. Having its administrative centre in London, it is governed by a committee of eminent players throughout the kingdom, and its Masters' Tournaments attract the strongest players from the Continent and America. In Germany, where almost equal enthusiasm for chess prevails, every town has its club; there are many state and class associations; national tournaments are held at least once every year, and international tournaments in turn with other countries. One significant association is that of the university and college chess clubs, which, supported by many of the professors and more advanced students, are already beginning to compete with the lay clubs in their respective cities. In France there are yet few provincial clubs, though their number is increasing. Paris is the centre of a very strong circle of players, who now meet in the Palais Royal. The Café de la Régence in the Rue St Honoré was for many years the most celebrated chess resort in Europe. The French government has shown its regard for the game by providing prizes in more than one national tournament. Among other European countries where chess is studied must be mentioned Austria and Italy. Of the former it is sufficient to say that when this article was first written the metropolitan club could produce ten players (the ordinary match team) who could probably defeat the same number from any club in the world. In Italy the game is played in every town, and the Italian Chess Association holds an annual tournament. In the New World, the United States of America is, as may be supposed, in advance of all other countries. Besides numerous city clubs (New York alone having nine), there are six state associations, and an organised federation of the university clubs. In Canada the game has gained entrance into the public schools; there are clubs in nearly every town, and a national association. In Australasia there are state associations in Victoria, New South Wales, and New Zealand. A national tournament has been held, and probably will now take place annually in one or other of the chief cities.

**Description.**—THE BOARD.—Chess is played on a square board divided by intersecting lines into 64 squares. To facilitate calculation, every alternate square is black, or of a dark colour. The board should be placed so that each player has a white square at his right-hand corner.

**THE MEN.**—There are 32 men: 16 white, or of light colour, and 16 black, or of dark colour. Each player has 8 *pieces* (one king, one queen, two rooks or castles, two bishops, and two knights)

and 8 pawns. The following diagram represents the board and men properly arranged for play :

BLACK.



WHITE.

Fig. 1.

(N.B.—The king and queen occupy the two middle squares, the queen being on the square of her own colour.)



The King, = K, moves only one square at a time, but in any direction.



The Queen, = Q, may move any number of squares in any direction in a straight line.



The Rook or Castle, = R, may move any number of squares, but only in a direction parallel to the sides of the board—not diagonally.



The Bishop, = B, may move any number of squares in a straight line diagonally. (It will be seen that each bishop remains throughout the game on squares of one colour.)



The Knight, = Kt (or sometimes in American literature, S, from the German *Springer*), moves to the next square but one of a different colour from that on which it rests. Its move forms the diagonal of a parallelogram of three squares by two. (The knight is the only piece having power to move over an intervening piece.)



The Pawn, = P, moves one square forward only, but captures diagonally. For its first move, but not afterwards, a pawn may move two squares, but if in doing so it pass an opposing pawn, the latter may take it as if it had moved one square only. A pawn which succeeds in crossing the board must be exchanged for a queen or any other piece of the same colour, except a king.

All pieces (not the pawns) capture in the direction of their moves.

The printed designs resemble the actual pieces sufficiently to enable the latter to be identified.

The object of the game is to take the opponent's king, and when the king is attacked, warning must be given by the call of 'check.' If the king cannot then escape capture by his opponent's next move, he is 'checkmate,' and the game is over. The game therefore always stops one move short of the actual capture of the king.

**Laws.**—Although the main rules governing chess play are identical throughout the world, there are several minor questions awaiting a general settlement. A complete code of laws, published with approval and authority of the various national associations, has become almost a necessity. Where no published code has been fixed upon, the following may be enforced without injustice:

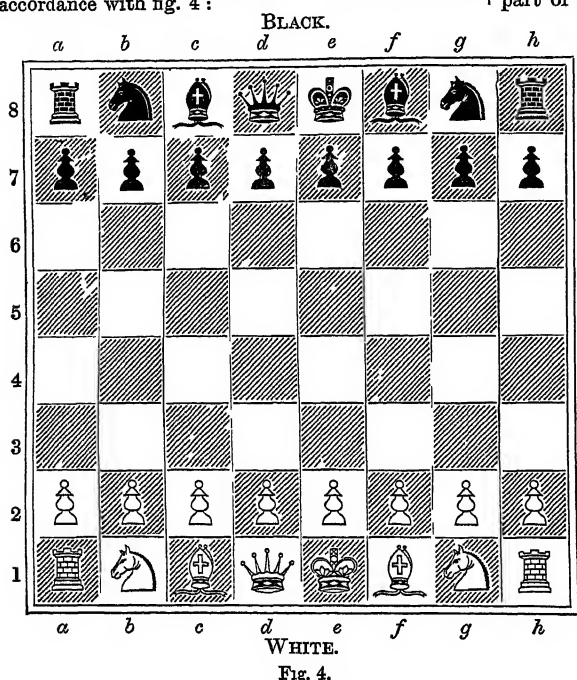
(N.B.—In cases where no distinction is implied, the word 'piece' is to be understood to include pawn.)

Lots to be drawn for first move, and afterwards throughout a match or sitting each player has the first move alternately, whatever has been the result of the previous game. The player having first move has a right to choice of men. If board or pieces have been wrongly placed at the beginning of a game, the mistake may be rectified before four moves have been made, but not after. A piece touched must be moved, if it can be legally, or unless, before touching it, the player say *f'adouble*, or words to that effect. (If the piece cannot be legally moved, the king must be moved, but may not castle.) If more than one piece be touched, the adversary may select which is to be moved. An enemy's piece touched must be taken if it can be legally; if not, the king must be moved, but may not castle. Moving the king is a penalty enforceable by the opponent, who must, however, enforce it before he makes his next move. A false or illegal move, and all moves made subsequently, must be revoked, and legal moves made in their stead. No penalty can be enforced if the opponent has made a move or touched a piece in reply. If a player move out of his turn, he must retract the move, but may be called upon by the opponent to play the piece touched on his next move. If a player touch more than one square with a piece, he may not, for that move, play it to any of the squares so touched. If he touch *all* the squares to which it can be played, he must play it to any one of them his opponent chooses. In castling, the king must be moved first, or both pieces together. A pawn advanced to the eighth square must be exchanged for a piece (not a king) of the same colour, and the move is not complete until a piece is demanded. It is not necessary to call 'check,' but the player neglecting to do so, cannot enforce a penalty if his opponent does not notice the 'check.' A player may at any time call upon his adversary to mate him within fifty moves, and if at the expiration of such fifty moves, no capture has been made, no pawn moved nor mate given, a draw may be claimed. Bystanders may not interfere unless appealed to by a player, unless board or men have been wrongly placed, or unless a false or illegal move has been made. In the last case, however, they have no right to interfere until a move has been made in reply.

**Notation.**—The necessity for some method of recording moves and games of chess has been recognised from a very early period. It is to be regretted that no universal notation has been adopted; as it is, the systems which are in vogue are all more or less dependent upon the language of the nation using them. The modern systems of notation are separable into two classes, which differ essentially: The first, that adopted by English and Latin speaking countries (France, Italy, &c.), has reference to the pieces. It is somewhat cumbersome, but is more descriptive and intelligible. The second, adopted by Germany and northern Europe, has reference mainly to the



of squares by a figure, and the files by a letter, in accordance with fig. 4 :



Thus, referring to the English system, the White king's square is denoted by e 1, the Black queen's square by d 8. In the German system all the squares are counted from White's side only. To denote a move, the first letter of the piece is given, then the square on which it stands, and lastly, the square to which it moves. The moves of pawns are not preceded by any initial letter. A capture is denoted by a colon placed after the move, check is represented by †, or a check and capture by ‡. Castling on the king's side is denoted by O-O, and on the queen's side by O-O-O. Taking the same moves as before, the game would be recorded therefore as follows :

- |                   |                  |
|-------------------|------------------|
| White.            | Black.           |
| 1. e 2 - e 4.     | 1. e 7 - e 5.    |
| 2. Kt g 1 - f 3.  | 2. Kt b 8 - c 6. |
| 3. B f 1 - c 4.   | 3. B f 8 - c 5.  |
| 4. B c 4 - f 7 ‡. | 4. K e 8 - f 7 : |

This system may be and is in some cases still further abbreviated by the omission (a) of the initial letters of the pieces, or (b) of the square from which the piece moves; and the moves may also be written in line or fractionally as in the Latin system.

**TECHNICAL TERMS.**—The following list is not exhaustive, only the terms in general use being given :

*Blindfold Chess*, or *Chess sans voir*, the game played mentally, without sight of board or men. This almost inexplicable feat is not altogether one of memory, as is generally supposed; it is rather the result of a special faculty not necessarily corresponding with that for ordinary chess. Some great masters, notably Mr J. H. Blackburne, of London, have conducted as many as twelve games blindfold simultaneously; and most players of first and second rate strength can play at least one in this way.

*Castling*, a double move allowed once on the part of each player in a game. The rook is moved to the square next the king, and the king is then moved to the other side. Figs. 5 and 6 show the operation of castling :

The conditions under which castling is allowed are : (a) That neither king nor rook have been moved; (b) that no piece intervene; (c) that the king be not in check; (d) that the king do not cross a square commanded by an opposing piece or pawn.

*Check*, the warning which must be given when the opponent's king is attacked.

*Checkmate*, a position in which the king cannot avoid capture on his opponent's next move. Checkmate is from the Persian *shāh māt*, 'the king is dead.'

*Discovered check*, an attack which is opened on the king by the removal of an intervening piece or pawn.

In the diagram (fig. 7) the king is not in check; but if the rook be moved, the diagonal with the bishop is opened, and the rook is said to 'discover' check.

*En passant*.—A pawn which, having moved two squares for its first move, and thus passed an opposing pawn, may be taken, on the next move only, by the latter, *en passant*.

*En prise*.—A piece is said to be *en prise* when it is in a position to be captured by an opposing piece or pawn, and is not properly defended.

*Exchange*, the capture of a piece in return for the loss of one of equal value. To 'win the exchange'

Fig. 5.—Castling with King's Rook.

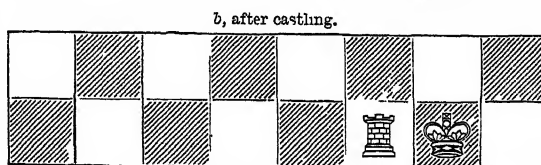
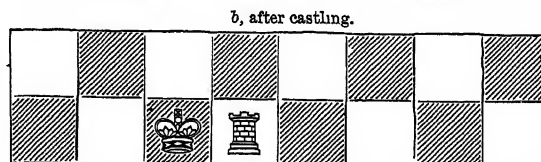
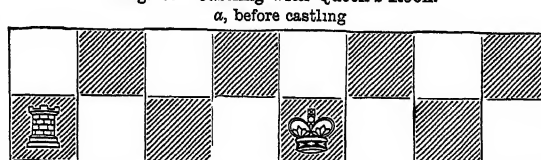


Fig. 6.—Castling with Queen's Rook.



is to capture a rook in return for the loss of a bishop or knight. To 'lose the exchange' is to capture a bishop or knight in return for the loss of a rook.

**Gambit**, a game in which one player, at the beginning, voluntarily sacrifices part of his force (often a pawn) for the sake of an ultimate advantage.

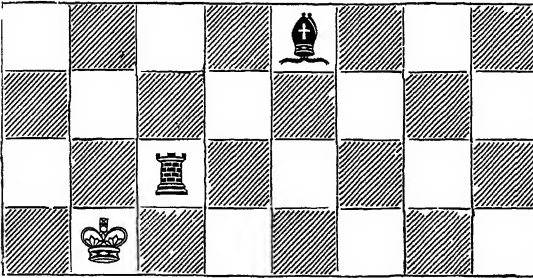


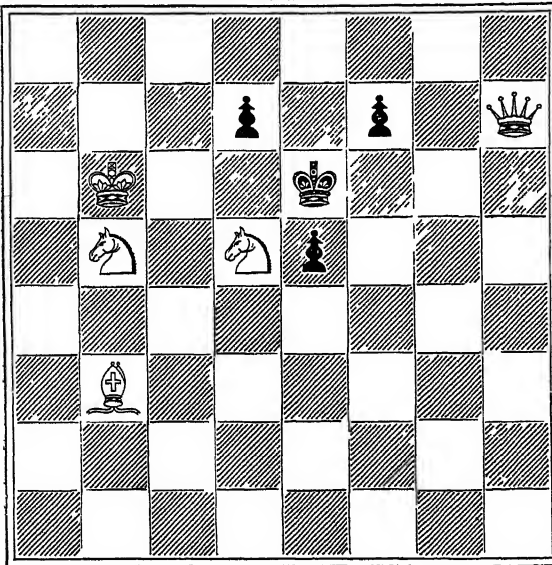
Fig. 7.—Discovered Check.

**Jadouble**, an expression necessary before a piece or pawn may be touched for the purpose of adjustment, &c. The rule otherwise is that a piece or pawn touched must be moved.

**Opening**.—The various methods of beginning the game have been the subjects of much study, and are so complex as to elude anything like exhaustive analysis. Openings are classed as: (a) *Gambits* (see above), (b) *Games*, in which the line of play does not involve any sacrifice, and (c) *Defences*, which have reference to the line of play adopted by the second player. Openings in which both players move the king's pawn to king's fourth square for their first moves are arbitrarily classed as 'Regular,' all others as 'Irregular.' All openings of repute have distinctive titles, often being named after their inventors or from some country where they are popular. Steinitz Gambit, Scotch Game, French Defence, are examples. The study of openings is most difficult and practically endless, and should not be begun until the student has some practical acquaintance with the game.

**Problem**, an imaginary position in which the winning line of play is artfully concealed, and has to be discovered in accordance with given conditions.

BLACK (4 pieces)



WHITE (5 pieces). White to play and mate in two moves.

Fig. 8.—Problem by W. Skinkman (Key move, B to R4).

**Queening a pawn**, the promotion of a pawn which has crossed the board, to the power of

another piece. (Of course a queen is selected in most cases, as the most valuable piece.)

**Stalemate**, a position in which the king, though not attacked, cannot move without being subject to capture, and in which no other move by any other piece or pawn is possible. The game in this case is drawn.

**Time Limit**, a condition of modern play under which each player is compelled to make a certain number of moves (generally twenty) in each hour. The time is recorded by an ingenious arrangement of clocks, one being set going when the other is stopped.

The following works on chess may be consulted with advantage. For history and literature, *The History of Chess*, by Forbes; *Quellenstudien zur Geschichte des Schachspiels*, by Dr A. van der Linde (Berlin, 1880), *The History of Chess*, by H. J. R. Murray (1913). For laws, &c., *The Chess Praxis*, by H. Staunton. For theory, *Handbuch des Schachspiels*, by Bilguer and Von der Lasa (Leipzig); *Führer durch die Schachtheorie*, by O. Cordel (Berlin); *Modern Chess Openings*, by R. C. Griffith and J. H. White. For practice, *Cook's Synopsis; The Chess Player's Compendium (Cook's Supplement)*, by A. Emery; *Morphy's Games*, and the books of various International Tournaments. Bell's Club Series of Handbooks of Games includes an elementary treatise on Chess. For Problems, *The Chess Problem*, by Planck and others, *The Modern Chess Problem*, by P. H. Williams. See also the Chess magazines.

**Chest**, or **THORAX**, is somewhat conical in form. Its sides are rounded, but in front and behind they are flattened. The apex, or upper end, is truncated, sloping downwards and forwards; of small size, it permits of the passage of the gullet, windpipe, certain large veins and nerves from the neck into the chest, and of certain large arteries out of the chest. The broad or lower end of the cone slopes downwards and backwards, and is shut in by the diaphragm—a large muscular partition which projects upwards from the lower ribs, being convex towards the chest, and concave towards the abdomen. In Respiration (q.v.) the diaphragm descends by its own muscular contraction, while at the same time the ribs are drawn upwards and outwards by the intercostal muscles.

The structures forming the walls of the chest are: (1) The backbone or spinal column; (2) twelve pairs of ribs; (3) the sternum or breastbone; (4) the Diaphragm (q.v.); and (5) the intercostal muscles. See **SKELETON, SPINAL COLUMN, &c.**

The contents of the chest are the heart, the great arteries and veins, the lungs, the trachea or windpipe, the bronchi or branches of the trachea, leading to the lungs, the œsophagus or gullet, and the thoracic duct, or general terminus of the lymphatic system of vessels, by which the chyle and lymph are discharged into the blood. For the organs of the chest, see the cut at **ABDOMEN**.

The very great importance of these parts to life, and their great liability to deranged action, renders the chest the seat of a large proportion of the diseases which afflict humanity, and especially of those which end in death; for of the three organs which Bichat called the 'tripod of life'—viz. the brain, heart, and lungs—the chest contains two. The diseases of the chest depend in some cases on alterations in its form, as by Rickets (q.v.) and other diseases affecting the bones in early childhood or in youth, as by too tight lacing in girls.

What are commonly called chest diseases are mainly those of the lungs and air-tubes, of which

the principal are consumption, pneumonia, pleurisy, and bronchitis. These are treated in special articles: and for the diseases of the heart and other organs of the chest, see HEART, AORTA, OESOPHAGUS, &c. The examination of the chest in disease is largely conducted by Auscultation (q.v.) and Percussion (q.v.). For measurement round the chest, see MAN. See also DIAGNOSIS.

**Chest**, MILITARY, is a technical name for the money and negotiable securities carried with an army, and intended to defray the current expenses. In the British army it is in the charge of officers of the Army Pay Department.—**CHEST AT CHATHAM** was the name of a fund for maimed and superannuated seamen, administered at Chatham from 1590 till 1803, and subsequently at Greenwich, till superseded by the regular naval pension system.

**Chester**, an ancient episcopal city, county borough, and river-port, the capital of Cheshire, on the right bank of the Dee, 5 miles from its estuary, 16 miles SE. of Liverpool, and 179 NNW. of London. One of the oldest and most picturesque towns in England, it stands on a rocky sandstone height, and (alone in England) has preserved the entire circuit of its ancient walls, nearly 2 miles round, 7 or 8 feet thick, now forming a promenade with parapets and towers, where two persons can walk abreast. The ancient gateways have been all rebuilt. The castle, except the Gateway Tower, which used to be called 'Caesar's Tower,' has been taken down, its site being occupied by barracks and county buildings. The Dee is crossed by an old picturesque bridge of seven arches; the Grosvenor Bridge (1832), with a noble single arch of stone 200 feet in length (see BRIDGE); and a suspension-bridge. The two main streets cross each other at right angles, and were cut out of the rock by the Romans 4 to 10 feet below the level of the houses. These streets exhibit the curious arrangement called the 'rows': the front parts of their second stories, as far back as 16 feet, form a continuous paved promenade or covered gallery, open in front, where there are pillars and steps up from the street below, with private houses above, inferior shops and warehouses below, and the chief shops of the town within. There are a considerable number of the picturesque old timber houses of the 16th century, and many of the more modern buildings are in the same style of architecture.

Chester Cathedral is an irregular massive structure of crumbling sandstone, 375 by 200 feet, with a massive tower of 127 feet. It was formerly the church of the abbey of St Werburgh, which for 650 years was one of the richest in England. It became a cathedral church after the dissolution of the monasteries. It is of various dates from Norman to Late Perpendicular, its most striking feature being the fine Perpendicular window of the west front. The building underwent extensive restoration under the direction of Sir Gilbert Scott. A part of St John's Church, a ruined Norman edifice, has also been restored. It was a cathedral church for some years during the 11th century, when the See of Lichfield was temporarily transferred to Chester. The present bishopric of Chester dates from 1541, when the King's School adjoining the cathedral was also

founded. Other public buildings are the town-hall, the Grosvenor Museum, the Royal Infirmary, the general post-office, the free library, and the music-hall. The Grosvenor Park was opened in 1867. On the common called the Roodee there is a race-course. Across the Dee is Eaton Hall, the Duke of Westminster's palatial residence. Chester, which now extends far beyond the walls, is an important railway centre, with a huge joint station of the London, Midland, and Scottish and Great Western Railways. The Dee has been canalised from the city to the estuary. Although commercially overshadowed by Liverpool, Chester has iron-foundries, lead, shot, paint, leather, and tobacco factories, and a monthly cheese fair. Pop. (1851) 27,756; (1871) 35,257; (1881) 36,794; (1901) 38,281; (1921) 40,794. The city returned two members to parliament from the reign of Henry VIII., but lost one seat in 1885, the other in 1918. Chester is the proud possessor of some sixty charters, and also boasts a famous collection of mystery plays (ed. Deimling and Matthews, E.E.T.S. 1893-1916).

Chester was *Deva* or *Devana Castra*, an important Roman station, and has yielded many Roman remains—as masonry, coins, inscriptions, fibulae, altars, a hypocaust, and a statue of Pallas. The British name was *Caeleion*, the Old English *Leganceaster* (the legion's camp). *Chester* in place-names denotes a Roman camp (*Castra*). After the departure of the Romans it was held by Britons, but about 613 it was laid waste by Æthelfrith of Northumbria. It remained an enclosure of waste walls—occupied at times, as in 894, by a body of marauding Danes,



In the Rows, Chester.

till in 908 it was rebuilt by Æthelred of Mercia and his countess Æthelflæd. Here in 973 Edgar was crowned on the Dee by the tributary kings. Chester was the last place in England that held out against William the Conqueror, being captured in 1070. Hugh Lupus, nephew of the Conqueror, was created Earl of Chester, and until the time of Henry III. the Earls of Chester had their own courts and parliaments at Chester, with eight subfeudatories and the superiors of the great religious houses, Cheshire being then a county palatine. On the death of John, Earl of Chester, Henry III. made his eldest son Earl of Chester, and since then (1254)—except in Simon de Montfort's case—the title has been held by the eldest sons of English sovereigns. Llewelyn ravaged Chester in 1255. After a long and memorable siege (1643-46), the inhabitants, who held out bravely for the king, were starved

into surrender. A projected Fenian attack on the castle in 1867 proved abortive. Among the bishops of Chester have been Pearson, Porteus, and Stubbs.

**Chester**, a city of Delaware county, Pennsylvania, on the Delaware, 15 miles SW. of Philadelphia by rail, with a Baptist theological seminary, shipbuilding yards, and many manufactures. Originally called Upland, it was founded by the Swedes in 1643, and is the oldest town in the state. It is traversed by three railways. Pop. 58,000.

**Chester**, JOSEPH LEMUEL (1821-82), genealogist, born in Norwich, Connecticut, was a newspaper editor in Philadelphia, and in 1858 came to England, where he edited the *Registers of Westminster* (1876) and other registers; part of his copy of the Oxford matriculation register has been printed (1887), and his extracts from the Bishop of London's register were published under the title *London Marriage Licenses* (1887). See Dean's *Memoir* (1884).

**Chesterfield**, a municipal borough in Derbyshire, on the Rother rivulet, 12½ miles SSE. of Sheffield by rail. All-Saints' Church (*circa* 1350) has a curious crooked spire, 228 feet high, and 8 feet off the perpendicular; in Trinity Church (1838) is buried George Stephenson. Other buildings are the town-hall (1857), the Stephenson memorial hall, and the grammar-school (1574; rebuilt 1846). There are manufactures of silk, lace, earthenware, and machinery; and the neighbourhood is rich in coal, iron, oil, and other minerals. Brindley's Chesterfield Canal (1776) runs 46 miles to the Trent. Pop. 61,000.

**Chesterfield**, PHILIP DORMER STANHOPE, EARL OF, was the eldest son of the third Earl of Chesterfield, and was born in London, 22d September 1694. He studied at Cambridge, made the grand tour, and sat in the House of Commons as member for St Germans in Cornwall from 1716 to 1726, when he became Earl of Chesterfield. In 1730 he was made Lord Steward of the Household. Being ousted from office because he had objected to an excise bill of Walpole's, he went over to the opposition. He joined the ministry formed by the Pelhams in 1744, was Lord Lieutenant of Ireland, and in 1746 one of the principal secretaries of state. In 1748 he was compelled by ill-health and deafness to retire from public life. He was at one time on terms of intimacy with Swift, Pope, and Bolingbroke. Later in life, by obtruding on Samuel Johnson the patronage which he had withheld till the publication of the Dictionary, he drew from the lexicographer the famous indignant letter. He died on 24th March 1773. The object of Chesterfield's well-known *Letters to his Son* (first published 1774) was to form his natural son, Philip, into an accomplished man of the world. Brilliant, if often coarse in expression, they contain a good deal of shrewd and solid observation, but their teaching is not of an elevating nature. To shine in the world, to conform to the minute code of etiquette which then ruled society, are the ends on which the writer sets most store. *Letters to his Godson* were published in 1890, *Letters to Lord Huntingdon* in 1923.

His letters were edited by Lord Mahon (1845-53), Lord Carnarvon (1890), J. Bradshaw (1892), and C. Strachey (1901). See the Life by W. H. Craig (1907), the *Memoirs* by W. Ernst (1906), and Essays by Sainte-Beuve, Churton Collins, and Austin Dobson; also a book by R. Coxon (1925).

**Chesterfield Inlet**, a narrow gulf penetrating to the westward from the NW. of Hudson Bay, its extreme dimensions being 250 and 25 miles.

**Chester-le-Street**, an urban district in the county of Durham, near the left bank of the Wear, 6 miles N. of Durham city. The seat of the Bishop of Bernicia from 883 to 995, it has an old collegiate church (restored 1862), with a spire 156 feet high;

whilst in the neighbourhood are Lambton, Lumley, and Ravensworth Castles. Coal-mines and iron-works are numerous. Pop. 15,600.

**Chesterton**, GILBERT KEITH, born in Kensington in 1874, studied at the Slade School of Art, and entered journalism as an art critic. *The Wild Knight* (1900) and, still more, *The Ballad of the White Horse* (1910) showed him to be a hale and hearty poet. In *The Napoleon of Notting Hill* (1904), *The Flying Inn* (1914), and other tales he likewise gives rein to his exuberant fancy and his whimsical humour. Paradoxical essays, such as *Heretics* (1905) and *Orthodoxy* (1908); discerning books on Browning, Dickens, and Victorian Literature; a *Short History of England* (1917); a *Life of St Francis of Assisi* (1923); and a spook play—*Magic* (1913)—are among the other productions of this versatile, vivacious journalist, this dogmatic, satirical critic, whose initials are as familiar in print as those of Mr G. B. Shaw, of whom he has written a study and with whom he loves to tilt.

**Chestnut** (*Castanea*) is a genus of the natural order Fagaceæ, and is thus closely allied to the Beech (q.v.) and the Oak (q.v.); but it has no botanical affinity with the Horse-chestnut (see below). It is characterised by having long male catkins, longitudinally set with groups of flowers, a 5-8-celled ovary, and compressed rounded nuts. The name is derived from the town of Castanum, in

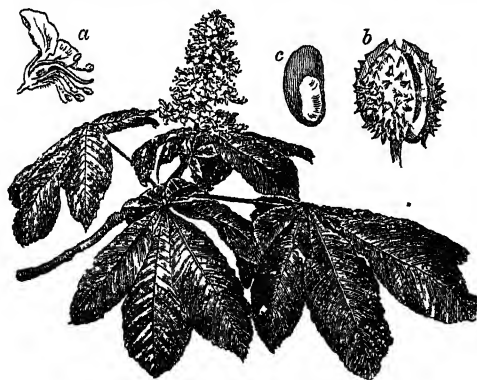


Branchlet, with Catkins, of Common Chestnut (*Castanea sativa*):  
a, fruit; b, seed.

Thessaly. The Common, Spanish, or Sweet Chestnut (*C. sativa*) is said to have been first brought from Asia Minor, but has long extended over the south of Europe, where it has become completely naturalised, and forms extensive woods. It is an ornamental and stately, or in exposed situations a very spreading, tree, of great size and longevity: the famous chestnut-tree of Tortworth in Gloucestershire was a boundary-mark in the reign of King John; while a yet more celebrated tree on Mount Etna is said to have measured 204 feet in circumference. The timber is durable and hard, and is used in house-building, for making furniture, wainscoting, parquetry, &c. The timber described as chestnut in ancient buildings is usually, however, really oak. It is seldom grown as a timber-tree in

our woodlands, but is frequently found among the underwood in copses in Sussex, Hants, Devon, and other southern counties with a warm climate, where the young poles (formerly highly prized as hop-poles) are now largely used in making split-fencing consisting of thin wire-bound palings (first imported from France). In Devonshire, however, and in the warmest parts of England, it is planted as a fruit-tree. It grows well throughout all the middle latitudes of Germany, but dislikes a damp foggy atmosphere. It prefers a dry light soil, and lime seems to act on it as a poison. The nuts are generally three in each husk. They form an important article of diet throughout the south of Europe, being used either roasted or boiled, and are ground into flour, and made into a kind of bread. They contain 15 per cent. of sugar, and by pressure yield a fermentable sugary juice. When cultivated as a fruit-tree it is generally grafted, by which means the better varieties are secured. A variety with golden-edged leaves, and another with thin thread-like divided leaves, are sometimes cultivated for their foliage. Other species also bear eatable fruits: those of the American Chestnut (*C. americana*), a tree much resembling the common chestnut, and of the Dwarf Chestnut, or Chinquapin (*C. pumila*), a low tree, or more generally a shrub of 7-8 feet high, are used in America.—A number of species are natives of the East. The inhabitants of the mountains of Java eat the fruit of the Silvery Chestnut (*C. argentea*) and the Tungururt (*C. Tungururt*), boiled or roasted, like the common chestnut. Both of these are large trees, the Tungururt reaching a height of 150 feet. Closely akin to the true chestnuts is the genus *Castanopsis*, with many species in eastern Asia and America.

The HORSE-CHESTNUT (*Æsculus Hippocastanum*) is a large tree, handsome both as to foliage and flowers, which belongs to the Hippocastaneæ tribe of the natural order Sapindaceæ. Indigenous to the mountains of Greece, it was introduced into Britain about 1629 (for avenues chiefly), and is now widely spread throughout Europe. Other species are found in Asia and America. Its botanical name is due to



Branch, with Blossom, of Horse-chestnut  
(*Æsculus Hippocastanum*):

a, vertical section of single flower; b, fruit; c, a single seed,  
its coat partly removed.

the Greeks and Turks using the seed for curing glanders and chest diseases among horses. Its wood being soft and not durable, the tree is chiefly grown for ornament. It attains 70-80 feet high, and 4-6 feet in diameter. The leaves are palmate with 7 leaflets, the flowers white tinged with red and clustered in terminal racemes or panicles, and the fruit a 3-lobed prickly (echinate) capsule containing 1-3 large, shining brown seeds. Other

species and varieties have also been introduced, of which *Æ. indica* is probably the handsomest. *Æ. rubicunda*, the so-called scarlet-flowered horse-chestnut, although sometimes described as a native of North America, is perhaps only a variety of the preceding. The American genus *Parva* is very closely allied to *Æsculus*, and two species of it are often planted for ornament in the warmer parts of Britain and on the continent of Europe, the YELLOW BUCKEYE (*P. flava*) and the PURPLE BUCKEYE (*P. rubra*). They are, however, much smaller trees than the horse-chestnut, and are not suited for the colder parts of Britain.

In Queensland the seeds of *Castanospermum*, a leguminous tree, are sometimes eaten like chestnuts, and so called; similarly is it at the Cape with the seeds of *Brabejum stellatifolium*, a potted plant. The so-called water-chestnut of Europe is the curious horned nut of *Thapa natans* (order Haloragadaceæ), and is an article of food in southern Europe, China, and Kashmir. See TRAPA.

**Chetham, HUMPHREY** (1580-1653), a Manchester merchant and cloth manufacturer, founder of a bluecoat hospital and of a public library at Manchester (q.v.). See BOOK-CLUB.

**Chettle, HENRY**, a dramatist and pamphleteer of the 16th century, was editor of Greene's *Groat's-worth of Wit* (1592), wrote thirteen plays of considerable merit, and was part author of thirty-five others, including *Robin Hood* in two parts, *Patient Grisel*, *The Blind Beggar of Bethnal Green*, and *Jane Shore*. In Meres's *Palladis Tamia* (1598) he is mentioned as one of 'the best for comedy amongst us.' He died about 1607.

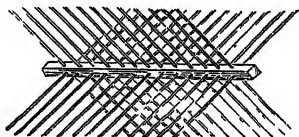
**Chevalier**, an honorary title given, especially in the 18th century, to younger sons of French noble families. Brought up in comparative luxury, and left at the death of their fathers almost entirely unprovided for, these men generally lived at the expense of others, as a sort of aristocratic parasites, if not by positively dishonourable expedients. In the plays of the 18th century the chevalier is a constant figure.—Both the Old and Young Pretender were called the Chevalier by their partisans.

**Chevalier, ALBERT** (1861-1923), song writer and comedian, was born in London, son of a French teacher. He commenced life as an actor at the Prince of Wales Theatre in 1877. In 1899 he took to the music-hall stage with his popular coster songs, and in 1903 commenced touring with his own entertainment. He is the author of over 100 sketches, monologues, and plays, and published his memoirs (*Before I Forget*) in 1901.

**Chevalier, MICHEL**, an eminent French economist, was born at Limoges, January 13, 1806, and was trained as an engineer. At first an ardent St Simonian and busy contributor to the *Globe*, he attached himself to the party of *Enfantin*, and took an active part in the compilation of the famous propagandist *Livre Nouveau*. After six months' imprisonment in 1832, he had the prudence to retract all that he had written in the *Globe* contrary to Christianity and against marriage. Soon after he was sent by Thiers to inquire into the systems of water and railway communication in the United States. In 1837 he published his chief work, *Des Intérêts Matériels en France*. He was made a councillor of state in 1838, and was appointed in 1840 to the chair of Political Economy in the Collège de France. In 1845 he was returned by Aveyron to the Chamber of Deputies. After the revolution of 1848 he made onslaughts that were never met upon the socialism of Louis Blanc in *Questions de Travailleurs*, as well as in the *Revue des Deux Mondes* and the *Journal des Débats*. A number of these vigorous and masterly articles were collected under the titles, *Lettres sur*

*l'Organisation du Travail* (1848) and *Questions politiques et sociales* (1852). A free-trader in economics, Chevalier in 1860 aided Cobden in carrying into effect the commercial treaty between France and England. For this he was created a senator and Grand Officer of the Legion of Honour. He took an active interest in the great exhibitions at London (1862) and Paris (1867). He died at Montpellier, 28th November 1879.

**Chevaux-de-Frise** (Fr., 'Friesland horses,' so called as having been first used in Friesland during the wars of the 17th century), a military obstacle of the form shown in the



Chevaux-de-Frise.

figure. The structure is difficult to make unless skilled labour and such materials as iron railings, gas-pipes or hop-poles, are at hand, but is kept in a fortress as an article of store. The pattern used by the British army consists of a cylindrical iron tube, 6 feet long and about 5 inches in diameter, pierced with 12 holes to receive as many spears of the same length, which are packed in the tube when not required. Several lengths connected by chains may be used as barriers or as obstacles in the ditch of a fort, or in any place where required. It is, however, generally easy to roll them out of the way, though at the siege of Badajoz, during the Peninsular war, one formed of sword-blades fixed into beams of wood, and placed in the breach, was found to be a very serious obstacle by the British storming party.

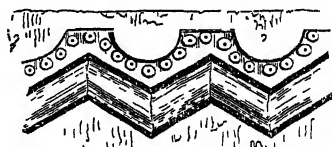
**Chevet.** See APSÉ.

**Cheviot Hills**, a mountain-range occupying contiguous parts of the counties of Northumberland and Roxburgh, on the English and Scottish borders, and running 35 miles from near the junction of the Till and Tweed, in the N.E., to the sources of the Liddel, in the S.W. The principal points are Cheviot Hill (2676 feet) and Peel Fell (1964). West of Carter Fell, these hills chiefly consist of Silurian rocks overlaid by Old Red Sandstone, and Lower Carboniferous strata, with which various igneous rocks are associated. The east portion of the range, including higher and more or less conical and abrupt hills, is built up almost exclusively of ancient lava-flows and tuff (andesite and andesite-tuff), which are traversed by a mass of augite-granite, and by veins of felsite, dikes of basalt, &c. In the Cheviot Hills are the sources of the Liddel, Tyne, Coquet, and some of the branches of the Tweed. Grouse abound, and the golden eagle is occasionally seen. These hills afford pasture for the Cheviots, a superior breed of sheep. They have been the scene of many a bloody contest between the English and Scots, and the name is perhaps commemorated in that of the famous old ballad of *Chevy Chase*, for the history in which see OTTERBURN. See Professor James Geikie's *Fragments of Earth Lore* (1893).

**Chevreul**, MICHEL EUGÈNE, a great French chemist, born at Angers, August 31, 1786. At seventeen he went to Paris, where he pursued the study of chemistry at the College of France, under the famous Vauquelin, with such zeal and success that at twenty he was allowed to take charge of the laboratory. He next lectured at the Collège Charlemagne, and was appointed special professor of Chemistry in charge of the dyeing department

at the Gobelins. In 1826 he took his seat in the Academy of Sciences, and in 1830 became director of the Museum of Natural History. One of his earliest discoveries was that of margarine, oleine, and stearine in oils and fats. His studies in fatty bodies and his theory of saponification have opened up vast industries. Between the years 1828 and 1864 Chevreul studied colours, publishing important memoirs from time to time. This patriarch of the scientific world, 'le doyen des étudiants de France,' as he loved to be called, kept up his studies almost to his death, April 9, 1889. In 1886 the hundredth anniversary of his birth was celebrated with great enthusiasm. A medal was struck, and a grand fête given at the Museum in his honour, while he was presented with his bust by his colleagues at the Academy of Sciences. Chevreul was F.R.S. and a Commander of the Legion of Honour. Besides papers and memoirs innumerable in the learned journals, he published works on dyeing (1831), on the optical effects of silk stuffs, on colours and their application to the industrial arts (1864), and histories of chemical science (1866) and of theories of matter (1878). He wrote also *De la Baguette divinatoire, du Pendule explorateur et des Tables tournantes* (1854).

**Chevron**, in Architecture, a moulding in the form of a succession of chevrons, otherwise called a zigzag moulding. In general, it is characteristic



Chevron or Zigzag, Andover, Hants.

of Norman architecture, but is also found with the pointed arch, during the transition period from Norman to Early English.

**CHEVRON**, in Heraldry, an ordinary formed of two bands, joined together at the top, and descending to the extremities of the shield in the form of



Chevron. Chevronel. Per Chevron.

a pair of compasses. *Chevronel*, a diminutive—half the size—of the chevron.

**CHEVRON** is also the name of a V-shaped band of worsted braid or gold lace, worn on the sleeve by non-commissioned officers of the British army as a badge of rank. Four chevrons indicate a sergeant-major or staff-sergeant, three a sergeant, two a corporal, and one a bombardier in the artillery, a second corporal in the engineers, and a lance-corporal in other branches. Good-conduct badges are precisely similar, but the point is upwards instead of downwards. They are worn by non-commissioned officers below the rank of sergeant, and by private soldiers as well. A similar use is made of chevrons in the army of the United States and other countries.

**Chevrotains**, or MOUSE-DEER (*Tragulidae*), a family of small ungulates, intermediate between true deer and hogs. The family includes two genera, *Tragulus* and *Hyomoscopus*, often confused with musk-deer, with which they have no special connection. As to characters it may be noted that they have no upper front teeth, but well-developed

pointed canines, especially in the males; there are four complete toes on each foot; there are no horns nor musk-glands; the stomach has no distinct manyples. *Tragulus* is represented by a number of small species from S. and SE. Asia, Malay Archipelago, &c. *Hyomomochus*, represented by a single species from the west coast of Africa, has aquatic habits. See **UNGULATES**.

**Chevy Chase.** See **OTTERBURN**.

**Chewing-gum**, a preparation the use of which has become a widespread habit in the United States. It is mostly made from *Chicle*, the latex or 'gum' of the tree that bears the *Sapodilla Plum* (q.v.), first imported in 1867 with a view to its employment in india-rubber manufacture. The gum-resin of liquidambar, tamarack, and other forest trees is also employed, as are some preparations of paraffin. The chicle is reduced to a fine powder, softened by heating, and sweetened, and may be flavoured with peppermint, liquorice, tolu, or other flavouring substances, and is now supplied by automatic boxes at railway stations.

**Cheyenne**, capital of Wyoming, on the eastern slope of the Laramie Mountains, 6000 feet above the sea, is an important station of the Union Pacific Railroad at its junction with the Denver Pacific and Colorado Central railroads, and is 106 miles N. of Denver, and 516 miles W. of Omaha. Coal and iron are found in its neighbourhood. Cheyenne, settled in 1867, had in 1870 a population of 1450; in 1880, 3456; in 1900, 14,087; in 1920, 13,829.

**Cheyenne Indians**, a warlike branch of the Algonquin stock, originally coming perhaps from north of the Great Lakes, later settling on the Cheyenne River in Wyoming, and as far south as the Arkansas. From 1861 to 1867 the government had frequent wars and other troubles with them. They are now divided into northern and southern groups, the former in Montana, the latter in Oklahoma. They number about 3000.

**Cheyne, GEORGE**, physician, was born in 1671 at Methlick, in Aberdeenshire, and, after studying at Edinburgh under Pitcairn, started a London practice in 1702, in which year he was elected a Fellow of the Royal Society. Full living made him enormously fat (thirty-two stone weight), as well as asthmatic, but from a strict adherence to a milk and vegetable diet he derived so much benefit that he recommended it in all the later of his dozen medical treatises, which included *A New Theory of Fevers* (1701); *Philosophical Principles of Natural Religion* (1705); *Essay of Health and Long Life* (1725), and *The English Malady, a Treatise on Nervous Disorders* (1733). Cheyne died at Bath, 13th April 1743.

**Cheyne, THOMAS KELLY**, one of England's foremost Old Testament scholars, was born in London, 18th September 1841. Educated at Merchant Taylors' School, Worcester College, Oxford, and Göttingen, he became Fellow of Balliol College in 1868. He was rector of Tending in Essex from 1881 to 1885, and in 1885-1908 was Oriel professor of the Interpretation of Holy Scripture at Oxford, and Canon of Rochester. He was a member of the Old Testament Revision Company, and was joint-editor of the *Encyclopædia Biblica* (1899-1903). A critic of ripe scholarship and remarkable clearness in exposition, he allowed his later work to be marred by the extent to which he developed Winckler's theory of a conquest of Israel by Jerahmeel (a North Arabian nation); to which he found in the Old Testament constant allusions wilfully obscured by copyists or redactors. He died on 16th February 1915, a few months after publishing his last work. His chief books are *The Prophecies of Isaiah* (1880-81); *Exposition of Jeremiah and Lamentations*

(1883); *Book of Psalms* (1888); *Introduction to Isaiah* (1895); *Isaiah* (revised text and translation, 1897-99).

**Chhatisgarh** is the south-east division of the Central Provinces of India, with an area, excluding feudatory states, of 53,158 sq. m. and a pop. of over 5,000,000. It is mainly a vast, fertile, grain-producing plateau. Raipur is the capital.

**Chiabrera, GABRIELLO**, an Italian poet, born at Savona, 8th June 1552. He was educated at Rome under the care of his uncle, after whose death he entered the service of Cardinal Cornaro, but was obliged to leave it for revenging himself upon a Roman nobleman who had wronged him. He married at fifty, and after an easy and well-spent life, died at eighty-five, 14th October 1637. Chiabrera's poetical faculty blossomed late. An enthusiastic student of Greek, he conceived a great admiration of Pindar, and strove not unsuccessfully to imitate him. He was not less happy in catching the naïf and pleasant spirit of Anacreon; his canzone being distinguished for their ease and elegance, while his *Lettere Famigliari* was the first attempt to introduce the poetical epistle into Italian literature. Chiabrera also wrote several epics, bucolics, and dramatic poems. Collections of his lyrics, under the title *Rime*, were published at Rome in 1718 (3 vols.), at Venice in 1737 (5 vols.), and at Milan in 1807 (3 vols.). Prefixed is a naïf but interesting fragment of autobiography.

**Chiana** (ancient *Clanis*), a river of Central Italy, originally a tributary of the Tiber, watering the perfectly level Val di Chiana, which its overflow (see **CHIUSI**) rendered once the most pestilential district of Italy. The bed was deepened in 1789-1816, and in 1823 extensive hydraulic works were undertaken for further improving the river-course, and for leading a northern branch, through canals, to the river Arno, a few miles below Arezzo, the southern stream reaching the Tiber through the Paglia at Orvieto. The double stream is 60 miles long, and  $\frac{1}{2}$  to 1 mile broad; and the district has since become one of the most fruitful in all Italy.

**Chianti**, an Italian mountain-range, in the province of Siena, clothed with olive and mulberry trees and vines; the mountain gives name to an excellent red wine grown here.

**Chiapas**, LAS, a state of Mexico, on the Pacific, adjoining Guatemala. Largely a part of the tableland of Central America, it enjoys a delicious climate; and where the navigable Río Chiapas cuts through the middle of the plateau, the valleys are among the most fertile portions of the republic, although the country is still almost everywhere clothed with primeval forest. Area, 27,527 square miles; pop. 420,000, chiefly aborigines. Capital, Tuxtla-Gutiérrez. Near Palenque, one of its towns, are most extensive and magnificent ruins. See **MAYAS**.

**Chiaromonte**, a town of Sicily, 30 miles W. of Syracuse, with trade in wine; pop. 10,000.

**Chia'ri**, a town of Lombardy, 13 miles W. of Brescia, with manufactures of silk. Once strongly fortified, it is memorable for the victory of the Austrians, under Prince Eugene, over the French and Spaniards, under Villeroi, 2d September 1701.

**Chiar-oscuro** (Ital.), an artistic term, composed of two Italian words, the one of which signifies light, the other darkness or shadow. But chiar-oscuro signifies neither light nor shadow; neither is it adequately described by saying that it is the art of disposing of both the lights and shadows in a picture, so long as either is regarded apart from the other. It is rather *the art of representing light in shadow and shadow in light*, so that the parts represented in shadow shall still



The height of buildings is limited to 260 feet. Many of the poorer suburbs consist almost wholly of mean wooden houses. Besides several high schools, there are a large number of public schools. The Chicago University, founded in 1892, and housed in a grand range of granite buildings, between Jackson Park and Washington Park, has an endowment of over \$50,000,000 (largely given by John D. Rockefeller). The telescope of its observatory (Yerkes Observatory at Williams Bay, Wisconsin), costing \$750,000, has an aperture of 40 inches (as compared with the 36 inches of that in the Lick Observatory). There are also medical and commercial colleges; the North-western University, under Methodist government, partly at Evanston, 12 miles to the north of the centre of the city, partly in Chicago itself; schools in law, dentistry, and the fine arts; and several religious seminaries in the city and its suburbs. The public library is one of the largest in the United States; while the Newberry Free Library, founded in 1888 by a legacy of \$2,000,000, and the John Crerar Library, of scientific books, have each about half a million volumes. The Chicago Historical Society has a fine collection of Americana.

The park system is of remarkable extent and beauty; it embraces Lincoln Park, with fine zoological collection, on the lake shore to the north, Jackson Park to the south, and several other large parks; by means of magnificent connecting boulevards, extending to some 80 miles, the park system all but encircles the city. Among other open spaces are large cemeteries, beautifully laid out, besides hundreds of smaller parks and squares, and a number of driving-parks. There is also a Forest Preserve District of over 20,000 acres outside the city. The water-supply system is considered to be the finest of any in the country, with tunnels running 4 miles out into Lake Michigan. The sewerage of the city is emptied, by a canal connecting the Chicago and Illinois rivers, into the Mississippi, and thence to the Gulf of Mexico; and the garbage is disposed of by fire.

Economically Chicago is situated in the very heart of one of the world's most fertile valleys, and at the natural cross-roads between the industrial east and the agricultural west, the ore-producing north and cotton-growing south. It is to the exploitation of this favourable position, by the development of transport facilities by rail and water, that the prodigious growth of the city must be traced. Fully one-third of the railroad system of the United States centres in Chicago—the greatest railway centre of the world. But the great waterway by Lake Michigan and its connections is unquestionably of most importance for the prosperity of the city. Most of the lake-vessels, though they are often large and handsome craft, differ considerably in build and rig from sea-going vessels. In 1888 a steamer from London direct landed her cargo at this city. This was the first event of the kind, although sailing-vessels had previously cleared thence for European ports.

In the city are the Union Stock-yards, established in 1866, the largest live-stock market in the world, occupying 400 acres of land. There is an enormous business in canned meats of all kinds. Chicago is also the leading grain market of the world, and has unequalled facilities for handling, storing, and marketing this produce. Across the lake lie the immense 'pineries' of the states of Michigan and Wisconsin, whence the Chicago market is mainly supplied with lumber, the transactions in which exceed those of any other city. The manufactures of the city include nearly every conceivable variety of production, from a child's toy to the largest steam-engine, and in almost all Chicago holds a commanding position.

Chicago is a highly cosmopolitan city. At the census of 1920 the number of native-born was 2,300,000, and 400,000 were foreign-born. Of the native-born about half are of foreign parentage; of the foreign-born the most numerous are Germans, Irish, Bohemians, Poles, Swedes, Norwegians, English and Scots, French, Canadians, Russians, &c. The negroes numbered 30,000 in 1900, 109,000 in 1920. Whereas the area in 1887 was 36·7 square miles, it had in 1900 increased to 190, in 1920 to 200.

The water-supply of Chicago is obtained, as above stated, from Lake Michigan, and to preserve it from pollution by drainage, which had hitherto gone into the lake, a drainage canal was constructed. The canal extends from the south branch of the Chicago River, about 5 miles from the lake, to Joliet, where it joins the Des Plaines River, one of the head-streams of the Illinois River, a total distance of 40 miles from the lake. By diedging the current of the river has been reversed, so that the water runs from the lake, and the whole directed into the canal. The canal varies in width from 160 feet to 300 feet, with a minimum depth of water of 22 feet. It was opened in January 1900. It was made of a size suitable for ship navigation, so that when the Illinois River was improved, access to the sea through the Mississippi should be obtained.

What is known as the great fire, which broke out on Sunday, 7th October 1871, destroyed a total area, including streets, of nearly 3½ sq. m.; about 17,450 buildings were burned, 98,500 persons rendered homeless, and some 200 lives sacrificed, the total money loss being estimated at \$190,000,000. As a result of this disaster, when this central portion was rebuilt, brick, iron, and stone structures were erected, and stone pavements also were substituted for wood. Another conflagration, on 14th July 1874, destroyed about \$4,000,000 worth of property, including over 600 houses, mostly frame shanties. On the evening of 4th May 1886 occurred the 'Haymarket Massacre,' in which eight policemen were killed and sixty maimed by a dynamite bomb thrown by an anarchist from among a crowd of labour agitators. Fatal race riots occurred in 1919. Much has been done of late years in reform of the administration.

**Chicha.** See MAIZE.

**Chichele,** or **CHICHELEY, HENRY** (1362?–1443), a great archbishop of Canterbury in the time of Henry V. and Henry VI.

**Chichén Itza,** one of over fifty ruined towns in the Mexican state of Yucatán, a few miles WSW. of Valladolid, with temples, &c.

**Chichester,** a municipal borough and episcopal city in Sussex, 17 miles ENE. of Portsmouth, and 28 W. of Brighton. It stands on a plain between an arm of the sea and the South Downs, which rise gently on the north. It is well built, and has wide streets. The two main streets cross at right angles, and meet in an elaborate eight-sided market-cross (circa 1500). Within the suburbs the city is surrounded by an ancient wall, 1½ mile in circuit, with some semicircular bastions, and now a promenade under the shade of elms. The cathedral, erected in the 12th and 13th centuries, on the site of a wooden one founded 1108, and burned 1114, measures 410 by 131 feet, with a spire 277 feet high (rebuilt 1865–66, after its fall in 1861), and a detached bell-tower or campanile, 120 feet, the only structure of the kind retained by an English cathedral. The aisles are double—a mode of construction elsewhere seen only in Manchester Cathedral and in some parish churches. The choir, lady-chapel, and cloisters offer interesting features. The bishop's palace is supposed to have been erected on the site of a Roman villa. Chichester

has ten parish churches, a market-house and corn exchange, guildhall (formed out of the chapel of the Franciscan monastery), council-house, a theological college (1872), and several other educational establishments. The chief trade is in agricultural produce and live-stock. Wool-stapling, malting, brewing, and tanning are also carried on. Pop. (1851) 8662; (1921) 12,410. From the time of Edward I. till 1867, Chichester returned two members, and till 1885 one. The port of Chichester, 2 miles to the south-west of the city, is situated on a deep inlet of the English Channel, of about 8 square miles, and is connected with Chichester by a canal. Chichester was probably the Roman *Regnum*, and has afforded Roman remains—as a mosaic pavement, coins, urns, and an inscription of the dedication of a temple to Neptune and Minerva. *Regnum* was taken and partly destroyed by the South Saxons. It was soon after rebuilt by Cissa, their king, and called Cissanceaster, or Cissa's Camp. It was for some time the capital of the kingdom of Sussex. The South Saxon see was removed by Stigand from Selsey to Chichester towards the close of the 11th century. Among its bishops have been Reginald Pecock, Lancelot Andrews, Henry King, John Lake, and Simon Patrick. In December 1642 the royalists of Chichester surrendered to the parliamentarians after an eight days' siege. They recaptured the city in the December of 1643, but had again to surrender to Waller a month later after a siege of seventeen days. Chillingworth, a prisoner of war, died in Chichester, and lies buried in the cathedral, where William Collins, a Chichester man, has a monument. See works by Willis (1861), Stephens, Swainson, Corlette (1902).

**Chickadee** (*Parus montanus* or *atricapillus*), a North American titmouse, of sober black and gray plumage, and lively active habit. It is fond of pine-trees, feeds on insect larvæ, has a hardy constitution, and remains through the winter. Its cheerful song is echoed in one of Emerson's poems. See **TITMOUSE**.

**Chickahom'iny**, a river of Virginia, which flows within 5 miles of Richmond, and enters the James, after a south-easterly course of 90 miles. Four battles were fought near its banks in June 1862.

**Chickamauga**, a tributary of the Tennessee River, rising in Georgia, and flowing north-west into Tenne-see, in which state the Confederate General Bragg defeated Rosecians in a battle fought on the banks of the stream, 19th and 20th September 1863.

**Chickaree** is a name given to the red, pine, or Hudson Bay squirrel. See **SQUIRREL**.

**Chickasaw**, a tribe of Indians, allied to the Cherokees (q.v.), formerly occupying the northern parts of Alabama and Mississippi, but now settled in Oklahoma. They number about 11,000.

**Chicken-pox**, a contagious febrile disease, chiefly of children, bearing some resemblance to a very mild form of Smallpox (q.v.). Chicken-pox is distinguished by an eruption of vesicles or blebs, which rarely become pustular or yellow, and leave only a very slight encrustation, which falls off in a few days, leaving little or none of the marking or pitting which is such a prominent feature in smallpox. From its vesicular character it has been called the *crystal pox*. It has been argued that chicken-pox is, in fact, only smallpox modified by previous vaccination, but this opinion, though maintained on good authority, is not accepted by most medical men. It is a disease of little or no danger, the fever being often hardly perceptible, and never lasting long.

**Chick Pea** (*Cicer*), a genus of the vetch tribe of Leguminosæ. The common chick pea (*C. arietinum*) is an annual 1½ to 2 feet high, of a stiff upright habit, covered with glandular hairs, with inflated pods containing a few angular and wrinkled peas. It is largely cultivated in southern Europe and in many parts of the East, and hence occurs frequently also as a weed in cornfields. It is also grown in Spanish America. Large quantities of the peas are exported from British India under the name of *gram*, now well known in commerce; but the name is extended to other East Indian kinds of pulse. The peas are used as food, either boiled or roasted, and are the most common *parched pulse* of the East. They are a notable article of Spanish and French cookery; while their importance in Roman times is evidenced by the phrase *fricti ciceris emptor* ('buyer of roasted chick peas') as a conversational equivalent for a poor fellow. Its cultivation extends as far as southern Germany; but in the climate of Britain it is found too tender to be profitable. The herbage affords fodder, and the seeds are one of the occasional substitutes for coffee. In summer weather drops exude from this plant, which, on drying, leave crystals of almost pure oxalic acid. The too free and prolonged use of chick peas as food is believed to be liable to become the cause of dangerous and obstinate forms of disease.

**Chickweed**, one of the most common weeds of gardens and cultivated fields, is a species of stitchwort or starwort, a genus (*Stellaria*) of plants of the natural order Caryophyllacæ, having a calyx



Greater Stitchwort (*Stellaria Holostea*).

of five leaves, five deeply cloven petals, ten stamens, three styles, and a many-seeded capsule opening with six teeth. The species are numerous, and several are very common in Britain, annual and perennial plants, with weak stems and white flowers, which in some are minute and in others are large enough to be very ornamental to woods and hedge-banks, as in the Wood Starwort (*S. nemorum*) and the Greater Starwort (*S. Holostea*). Common Chickweed is a native of most parts of Europe and of Asia, appearing during the colder months even on the plains of India; an annual, with a weak procumbent stem and ovate leaves, very variable; some of the smaller varieties in dry sunny situations sometimes puzzling young botanists from having no petals or only five or three instead of ten stamens; but always characterised by having the stem curiously marked with a line of hairs, which at each pair of leaves changes from one side to another, and in four changes com-

pletes the circuit of the stem. The leaves of chickweed afford a fine instance of the *sleep of plants*, closing up on the young shoots at night. Chickweed is a good substitute for spinach or greens, although generally little regarded except as a troublesome weed, or gathered only by the poor to make poultices, for which it is very useful, or for feeding cage-birds, which are very fond of its leaves and seeds. A number of species of a nearly allied genus, *Cerastium*, also bear the name of Chickweed, or Mouse-ear Chickweed. Chickweed-wintergreen is *Trientalis*.

**Chiclana**, a pretty town of Andalusia, Spain, 12 miles SE of Cadiz, with a notable bull-ring, vineyards, and mineral baths; pop. 12,000.

**Chiclayo**, a town of Peru, 12 miles SE. of Lambayeque, is the centre of a valuable sugar district; pop. 13,000.

**Chicle**. See CHEWING-GUM, SAPODILLA PLUM.

**Chicopee**, a city of Hampden county, Massachusetts, on the east bank of the Connecticut River, 4 miles N. of Springfield, with manufactures of cottons, firearms, hardware, and motor-cars. Pop., including the manufacturing village of Chicopee Falls, 36,000.

**Chicory**, or **SUCCORY** (*Cichorium*), a genus of Compositæ (sub-order Ligulifloræ), with few species, all herbaceous perennials, with spreading branches and milky juice, natives of Europe and West Asia.

The Common Chicory or Succory (*C. Intybus*) is wild in England and most parts of Europe, growing in waysides, borders of fields, &c. It has a long carrot-like root, externally of a dirty or brownish-yellow colour, and whitewithin. The stem rises 1 to 3 feet, the leaves resembling those of the dandelion; the flower-heads are sessile, axillary, large (1 to 1½ inch), and beautiful,



Chicory (*Cichorium Intybus*):  
a, single flower; b, a separate floret.

generally blue, more rarely pink or white. Chicory is pretty extensively cultivated, both in England and on the continent of Europe, as also in California, for its roots, while its herbage is good food for cattle. The blanched leaves are sometimes used as a salad, and are readily procured in winter by placing the roots in a box with a little earth in a cellar. To this genus belongs also the Endive (q.v.).

Chicory has been used as a substitute for coffee, or to mix with coffee, for at least a century. The roots are pulled up, washed, cut into small pieces, and dried on a kiln, which leaves a shrivelled mass not more than one-fourth the weight of the original root. It is then roasted in heated iron cylinders, which are kept revolving as in coffee-roasting, during which it loses 25 to 30 per cent. of its weight, and evolves at the same time a disagreeable odour, resembling burned gingerbread. An improvement to the chicory during roasting is the addition of 2 lb. of lard or butter for every cwt. of chicory,

which communicates to it much of the lustre and general appearance of coffee. It is then hand-picked, to remove chips of wood, stones, &c., and is reduced to powder, and sold separately as *chicory powder*, or is added to ordinary ground-coffee, and is sold as a mixture. Chicory contains a good deal of sugar, but otherwise does not serve to supply the animal economy with any useful ingredient. It gives off a deep brown colour to water when an infusion is made, and hence its main use in coffee. Some people dislike the taste of chicory, and when largely used, it has a tendency to produce diarrhoea; but many people prefer to use coffee mixed with chicory owing partly to the taste it communicates, but mainly to the appearance of strength which it gives to the coffee. See ADULTERATION.

**Chief**, in Heraldry, an ordinary consisting of the upper part of the field cut off by a horizontal line. It is generally made to occupy one-third of the area of the shield. The expression 'in chief' means not on a chief, but that the charge is borne in the upper part of the shield.



In Chief.

**Chief-justice**. See JUSTICE (LORD CHIEF).

**Chiem-See**, a lake of Upper Bavaria, the largest in the country, lies about 40 miles SE. of Munich, at an elevation of 1650 feet above the sea, with a length of 12 miles, a breadth of 7, and a greatest depth of 512 feet. Its surplus water is discharged by the Alz into the Inn.

**Chieng Mai**, chief town of northern Siam, in Chieng Mai state, on the river Meping, is the centre of the teak trade; pop. 50,000.

**Chieri**, a town of northern Italy, 9 miles SE. of Turin, with some fine churches, and silk, cotton, and linen manufactures; pop. 15,000.

**Chieti**, an archiepiscopal city of Italy, beautifully situated on a hill near the Pescara, 43 miles E. of Aquila, and only 8 from the Adriatic. It has a fine Gothic cathedral, a lyceum, and a theatre, and produces cloth, asphalt, &c. Pop. 29,000. The town stands on the site of the ancient *Teate* of the Romans, many of the remains of which are still visible. In 1524 Cardinals Caraffa and Cajetan founded here the order of the Theatines.

**Chiff-chaff** (*Sylvia hippolais*), a small species of warbler, of very wide distribution. It is common in the south of Europe, and arrives in Britain in early spring as a summer visitor, but does not reach Scotland. Its general colour is brown; the under parts lighter. It is a very sprightly little bird; but its song consists merely of a frequent repetition of two notes resembling the syllables chiff-chaff. It is also called the Lesser Pettychaps. *Phylloscopus tristis* is sometimes called the Siberian Chiff-chaff. See WHITETHROAT.

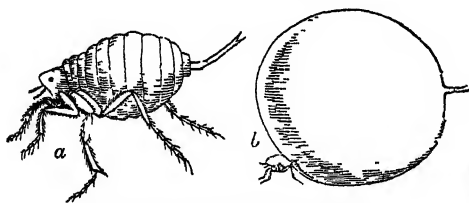
**Chigi**, a princely Italian family, whose founder was Agostino Chigi (died 1512), of Siena, who in Rome became banker to the popes, and was noted for his pomp and encouragement of art. See CIGNONI'S *Agostino Chigi et Magnifico* (Rome, 1881).—A descendant, FABIO CHIGI, occupied the papal throne as Alexander VII. (1655-67).—FLAVIO CHIGI, born in 1810, was till 1848 in the papal guard, and then became Bishop of Mira *in partibus*, nuncio at Munich, and till 1873 at Paris, and died a cardinal, 15th February 1885. The head of the family is Prince of Campagnano and Duke of Ariccia, and is also hereditary marshal of the Conclave.

**Chignecto Bay**, an inlet at the head of the Bay of Fundy. It separates Nova Scotia from New Brunswick, is 30 miles long and 8 broad, and has an isthmus 14 miles wide, with an unfinished and

abandoned ship-railway (1889) between it and the Gulf of St Lawrence.

**Chignon** (Fr., originally the 'nape of the neck'), a general term for the long back hair of women when gathered up and folded into a roll on the back of the head and neck. Padded and powdered, it was a common mode of the 18th century; in 1866 it reappeared, and with the generous assistance of false hair attained such ungraceful proportions as by 1875 brought about its dismissal.

♂ **Chigoe**, or **JIGGER** (*Sarcophylla penetrans*), a genus of flea, somewhat smaller than the familiar *Pulex*, and without its jumping legs. It is an American pest, found for about 30 degrees on each side of the equator, but especially abundant in the West Indies and in the north of South America. It is found also in the West African coast region.



Chigoe (*Sarcophylla penetrans*):  
a, male, b, gravid female.

One of its many names—the 'sand-flea'—indicates its favourite haunt among sand. It seems always to keep near the abodes of men. The males and immature females live like other fleas on chance bites, and relish of course the blood of animals as well as of man. It is the impregnated female which is the chief trouble. Like many other animals it seeks a safe and quiet breeding-place. This is found under the skin of animals, on the feet or under the toe-nails of man. There the minute creature swells up enormously, attaining under the pressure of the growing eggs the size of a pea. Respiratory communication with the outer world is kept up by an air-hole at the posterior end. In less than a week the eggs are ready to be liberated, for the larvæ are not parasitic. The mother-animal has meanwhile undergone a marked degeneration, the internal organs being much squeezed and atrophied by the growth of the ova. The entrance of the female chigoe is marked by a tingling and itching sensation, but if the development be allowed quietly to proceed no evil results seem to follow. Pressure and premature attempts to isolate the intruder may, however, lead to ulceration. Its evil effects seem to have been exaggerated. When the development of eggs has been completed, the entire animal with its progeny may be gently removed, and in this operation the West Indian negroes are experts. Washing with tobacco-juice is also resorted to, and the leaves are sometimes pressed on the feet as a preventive.

**Chigwell**, a village of Essex, on the border of Hainault Forest, 13 miles NE. of London. Its 'Maypole Inn' is familiar to readers of *Barnaby Rudge*; and it has a grammar-school, founded by Samuel Harsnet, Archbishop of York, in 1629, and improved and enlarged since 1871. Penn was a pupil.

**Chihuahua**, the largest state of Mexico, bounded on the N. and NE. by New Mexico and Texas, has an area of 90,000 sq. m., and a population of 400,000. In the east, extending into Coahuila and Durango, is the *Bolsón de Mapimi*, a vast desert of sand and alkali plains, now largely cultivated; in the south and west the surface is mountainous,

and there are numerous rivers. The state is better adapted for stock-raising than for agriculture; the fertile districts are mainly confined to the valleys and river-courses. Cotton is grown in the south. The silver-mines were for centuries among the richest in Mexico, and though many are now abandoned, mining is still the chief industry.—The capital, Chihuahua, 225 miles S. of El Paso by rail, rises like an oasis in the desert, among roses and orange-groves, and has an imposing cathedral (1717-89) and an aqueduct 3 miles long. Pop. 30,000.

**Chikislar**, a small port in Russian Turkestan, on the eastern shore of the Caspian, north of the mouth of the river Atrek.

**Chilas**, a village in the NW. Frontier Province of India on the left bank of the Indus. It is of considerable military importance in connection with the Kashmir-Gilghit route, and a British force occupied it in 1893.

**Chilblains** are localised inflammations of the skin which occur in cold weather, and affect the parts farthest from the centre of the circulation—viz. the hands and feet, more rarely the ears or nose. They are at first bright red, but as they disappear assume a purplish tinge. Sometimes they break and give rise to ulcers, which are slow to heal. They occur most frequently in young people, affect women more often than men, and are generally associated with weak health and a sluggish circulation. They are often extremely irritable and painful, especially when the affected part has been chilled, and is quickly warmed again. In their treatment, regard must be had to the general health; good feeding, exercise, and tonics should be prescribed. It is very important that tight shoes, gloves, garters, and bracelets should be avoided; and that the affected parts should be warmly covered when exposed to the open air. Locally, when the skin is whole, some stimulating agent answers best; tincture of iodine, spirit of camphor, or mustard applied moist and rubbed till it dries. If the skin be very tender, collodion painted over it is useful. Broken chilblains should be dressed with resin ointment or boracic ointment on lint or painted with friar's balsam.

**Child**. See BIRTH, FETUS, FOUNDLING, HEREDIT, INFANTS (FEEDING OF), MAN; for legal standing, see AGE, PARENT AND CHILD, GUARDIAN, HEIR, INFANT, KIN (NEXT OF); see also ABDUCTION, CHILDREN, FACTORY ACTS, HYGIENE, ILLEGITIMACY, INSURANCE, INFANTICIDE.

**Child**, FRANCIS JAMES, the most learned of ballad editors, was born in Boston, Massachusetts, February 1, 1825. He graduated at Harvard in 1846, and was an instructor there for some time in the department of mathematics, and afterwards in that of rhetoric. After a year or two spent in Europe, he was in 1851 appointed to the chair of Rhetoric at Harvard, which he exchanged in 1876 for that of Anglo-Saxon and Early English Literature. His first work was *Four Old Plays* (1848); but more important were his annotated edition of *Spenser* (5 vols. Boston, 1855), and of the *English and Scottish Ballads* (8 vols. Boston, 1857-59), in a great American series of 'British Poets.' The latter was at once recognised as the best collection of Scottish and English ballad poetry—a place which it lost only on the completion of the great comparative collection by the same editor (10 parts, Boston, 1882-97). This may be accepted as the final work on its subject, as it contains all the versions and variants collected from all sources, while the introductions to each ballad are masterpieces of luminousness and learning. An *édition de luxe* in form, and singularly free from typographical and other errors, this work will continue to be indispensable to all serious students of

popular poetry. Professor Child also contributed some valuable notes to Hales and Furnivall's reprint of Bishop Percy's folio manuscript (1867-68). His 'Observations on the Language of Chaucer and Gower,' reprinted in Ellis's *Early English Pronunciation* (1869), show a marvellous grasp of Middle English grammar. He died 11th September 1896. A one-volume edition of his *Ballads*, only slightly abridged, appeared in 1904.

● **Child, SIR JOSIAH**, writer on commerce, was born in 1630, the second son of a merchant of London. He himself made a fortune of £200,000 as a navy victualler at Portsmouth and a director of the East India Company. In 1678 he was made a baronet, and he died 22d June 1699. His principal work is *Brief Observations concerning Trade and the Interest of Money* (1668); a 3d edition (1690), much enlarged, is entitled *A New Discourse of Trade*, and has as an appendix, 'A small Treatise against Usury.' In this work he explains his plans for the relief and employment of the poor, including the substitution of districts or unions for parishes, and the compulsory transportation of paupers to the colonies.—His brother, **SIR JOHN CHILD**, was governor of Bombay, where he died, 4th February 1690.

● **Childermas**, or **HOLY INNOCENTS' DAY** (28th December), is observed in commemoration of the children killed by Herod.

● **Childers, HUGH CULLING EARDLEY** (1827-96), born in London, was educated at Trinity College, Cambridge, and after seven years in Australia, sat as a Liberal for Pontefract 1860-85, and for South Edinburgh 1886-92, and was First Lord of the Admiralty in 1868-71, Chancellor of the Duchy of Lancaster in 1872-73, War Secretary in 1880-82, Chancellor of the Exchequer in 1882-85, and Home Secretary in 1886. See *Life* by his son (1901).

● **Childers, ROBERT CESAR** (1833-76), orientalist, a cousin of H. C. E. Childers (q.v.), was born at Nice, held a civil service post in Ceylon (1860-64), and in 1873 became Pali professor at University College, London.

● **Childers, ROBERT ERSKINE** (1870-1922), son of the foregoing, was educated at Haileybury and Trinity College, Cambridge, and served in the South African and European wars. He was secretary to the Irish delegates at the London Conference of 1921, but became a leader in the guerrilla warfare against the treaty, and was executed by the Free State authorities. He was author of several books on warfare, and of *The Riddle of the Sands* (1903), a German invasion story.

● **Children** are not infrequently grossly maltreated by parents, their natural protectors, and special legislation has been found necessary to secure their proper treatment. The Factory Acts (q.v.), the Education Acts, the Reformatory and Industrial Schools Acts, and a long series of modern statutes, culminating in the Children Act, 1908, which has incorporated and extended much of the former law on the subject, are all evidence of this fact. The operations of *Societies for the Prevention of Cruelty to Children* show in the strongest light the necessity for their action. The first societies of the kind were established in the United States. Liverpool in 1833, and London in 1884, followed this example. In 1885 the National Society for the Prevention of Cruelty to Children was incorporated by royal charter. In Scotland there is a similar society with a distinct organisation. Many other agencies are also engaged in similar work. The main objects of such societies are to further the interests of children; to secure that they be sheltered and fed, and to bring prosecutions for cruelty. The Children Act, 1908, applies to children up to the age of fourteen, and to 'young persons' up to

the age of sixteen. Under the act any person over the age of sixteen who, having the custody of a child or young person, wilfully assaults, ill-treats, neglects, or abandons it, in a manner likely to cause it unnecessary suffering or injury to its health, is guilty of a misdemeanour punishable with fine or imprisonment, or with both. Neglect within the meaning of the act occurs when a parent or other person legally liable to maintain the child fails to provide adequate food, clothing, medical aid, or lodging for the child, or when he, being unable to provide these, fails to take steps to procure them under the Poor Laws, so causing injury to the health of the child. Provision is made by the act for the care and maintenance of children against whom such offences have been committed. The act also contains elaborate provisions designed to protect children from the dangers of suffocation, fire, and intoxication; to discourage juvenile smoking in public places; and to prevent the sale of cigarettes to persons under sixteen. Under the Licensing Act, 1910, it is an offence for the holder of a licence to sell any kind of intoxicating liquor to a child under fourteen, for consumption on or off the premises, unless such liquor is sold or delivered in corked and sealed vessels for consumption off the premises only; and it is also an offence to send such a child to obtain any such liquor unless in a corked or sealed vessel. The Children's Dangerous Performances Acts, 1879 and 1897, forbid the employment of any boy under sixteen, or any girl under eighteen, in any dangerous public exhibition or performance. If the child is injured in such performance, the employer can be prosecuted for assault. Further, under the Children (Employment Abroad) Act, 1913, no parent or other custodian of a child or young person may cause or allow it to be sent out of the United Kingdom for the purpose of performing in public for profit, except with a magistrate's licence, upon pain of heavy punishment. Other statutes impose restrictions on the employment of children. Thus it is an offence to cause children under certain age-limits to beg, sing, frequent licensed premises, or to sing, play, or be exhibited at places of public amusement. Local authorities also are empowered to make by-laws as to the employment of children, their age, hours of work, and the nature of their employment, and as to street-trading by young persons under the age of sixteen. See also ABDUCTION, HYGIENE, INFANTICIDE, INFANTS (FEEDING OF).

● **Childs, GEORGE WILLIAM**, born in Baltimore, Maryland, 12th May 1829, became clerk in a bookstore in Philadelphia, by 1850 was head of a publishing firm, and in 1864 founded the *Public Ledger*. He died 2d February 1894. He devoted much of his wealth to beneficence, and he erected a memorial window in Westminster Abbey to Cowper and George Herbert, a monument to Leigh Hunt at Kensal Green, and a fountain to Shakespeare at Stratford-on-Avon. See his *Recollections* (1890).

● **Chile** (sometimes written **CHILI** by English-speaking people), one of the republics of South America. It is situated on the west coast, and may be described as a long strip of territory lying between the summit of the Andes and the Pacific Ocean, extending from about the 18th parallel of south latitude to the southern extremity of Tierra del Fuego. It is bounded in the N. by Peru, E. by Bolivia and Argentine Republic, W. and S. by the Pacific Ocean. By recent treaties the territory of Chile has been considerably extended. After the war with Bolivia and Peru (1879-81), Chile acquired the coast between 23° and 25° S. claimed by Bolivia, and annexed the Peruvian province of Tarapacá. She also occupies the Peruvian provinces of Arica and Tacna, subject to

the payment of a war-indemnity by Peru. In the south the disputed claims of Chile and Argentina to Patagonia have been settled by Chile taking all territory and islands south of the 52d parallel and west of 68° 30' W. This includes the larger portion of Tierra del Fuego. The Strait of Magellan is by treaty considered neutral. The length of Chile is about 2500 English miles. Its breadth varies from 40 to 200 miles. The Andes extend in two parallel lines throughout nearly the entire length of the country. Between these two ranges of the 'Cordillera' there is a central valley or tableland which attains its greatest breadth between 33° and 40° S. The streams in the north are of little importance, being mostly shallow brooks, which, after a short course, are licked up by the thirsty land; in the south they are larger and more numerous, although most are navigable for only a few miles. The principal are the Maipo, which waters the valley of Santiago; the Maule; the Biobío (q.v.), the largest river in the country; the Cautín, or Río Imperial; the Bueno; and the Callecalle, or Río de Valdivia (100 miles), the most important of all, because of the sheltered harbour at its mouth. In the south are also many deep lakes, such as Llanquihue (30 miles long by 22 broad) and Ranco (32 miles by 18). Mineral waters, chiefly saline and sulphureous, are abundant; the principal spa is at Chillán (q.v.). The most important islands are those constituting the province of Chiloé (q.v.); Juan Fernández (q.v.) and Easter Island (q.v.) also belong to Chile. Owing to its great extension from north to south, Chile comprises regions of very different nature and climate. The north provinces, Tarapacá, Atacama, and part of Coquimbo are arid, rainless districts, where the principal industry is mining and extraction of sodium nitrate. Great government irrigation schemes are entertained. The middle and southern provinces—Aconcagua, Valparaíso, Santiago, Colchagua, Curicó, Talca, Linares, Maule, Nuble, Concepción, Arauco, Biobío, Valdivia, &c.—are agricultural and viticultural, and have valuable coalfields. Patagonia is densely wooded and sparsely inhabited. There are yet a few Indians. The climate of Chile is temperate. In the north it is moderately hot and rainless, but banks of clouds always hang overhead, and heavy dew falls at night. In the south it is dry for about eight months of the year, and rainy the other four. The temperature is remarkably even and pleasant, and always cool at nights. The south wind blows fiercely during many days of summer, dry and cold; the north wind brings heat, tempest, and rain; other winds are unknown. In southern Chile generally the land is poor and of hardly any value for agriculture, which, indeed, is carried on in a very primitive fashion; but the soil of the valleys, where large herds of cattle graze, is very fertile. Vines, also, grow well on the hillsides, and the wines of the country are superseding in Chile the French red wines. The Andes are almost everywhere visible, covered with perpetual snow. The highest peak is Aconcagua, 22,867 feet. The average height of the great range is 8000 feet. There are many volcanic peaks, mostly extinct—among them Tupungato, Descabezada, Chillán, Osorno, and Villa Rica. Chile is subject to frequent shocks of earthquake. In 1822 the coast near Valparaíso was lifted permanently between 3 and 4 feet; this elevation extended over 100,000 sq. m. In 1835 Concepción and Talcahuano were destroyed by an earthquake which produced disaster all over the southern provinces. In 1868 and 1875 Iquique was destroyed. On 10th August 1906 a severe shock left Valparaíso in ruins. In November 1922 Copiapó and Vallenar were overthrown, the accompanying wave overwhelming part of Coquimbo, Chanaral, and other parts.

The population of Chile according to the census of 1907 was 3,249,279, an increase of 222,000 since 1885, making allowance for the new territories. In 1920 the population was given at 3,754,723. The number of foreign residents is about 150,000 (10,000 British). The natives of Chile are a mixture of Spanish with the Araucanian Indians. In the upper classes the race has been kept more purely Spanish than in any other South American country. The working-classes were once docile, but labour has raised its head of late. The recent constitutional changes have been in its favour. Wages are still very low; but on estates labourers are allowed a patch of land to cultivate for themselves. Since the acquisition of the territory of the Araucanian Indians in 1881 the government has been anxious to attract European immigrants, but British adventure in that direction has been deprecated. Manufactures, properly so called, are confined to copper-smelting, sugar-refining, tanning, brewing, manufactures of soap and candles, biscuits, boots and shoes, woollens, flax, and nitrates. A special effort is being made to introduce new manufacturing industries which will be protected by tariff.

The established religion of Chile is Roman Catholic, but public opinion is very liberal, and all other religions are tolerated. Education receives much attention, and is gratuitous and at the cost of the state. Primary education was made compulsory in 1920. There are 3000 public elementary schools, with 500,000 pupils, besides many private schools; but in spite of the elaborate educational apparatus, only some 60 per cent. of the population can read and write. There are two universities at Santiago; normal, agricultural, and other colleges; and a lyceum in every provincial capital. The language spoken in Chile is Spanish, but with many local words of Indian origin.

The value of imports in 1920 was £34,000,000, and of exports £58,000,000; most of the imports and exports represent trade with the United States and the United Kingdom. Mineral products represented five-sixths of the total exports. The chief articles of export were nitrate and iodine, copper, silver, gold, manganese, hides, wool, wheat, and barley. The principal imports were cotton, woollen, and jute goods, iron, hardware, coal, machinery, timber, rice, sugar, earthenware, cement, paper, beer, glassware, kerosene, tallow, matches, tea and coffee.

The railway system of Chile is well developed. A government broad-gauge line runs from Valparaíso to Santiago, crossing the coast-range of the Andes, and thence southwards through the central valley to Concepción, and through Araucanía to Valdivia and Puerto Montt. This, with the narrow-gauge line to the north, forms the 'Longitudinal Railway.' A branch from the Valparaíso and Santiago line also runs to Santa Rosa at the foot of the Andes, from which a line has been constructed, to unite with the Argentine railway system, *via* the Uspallata Pass, which it crosses at the elevation of 9843 feet above sea-level by means of a tunnel 6½ miles in length. By means of this line there is through communication from the Pacific to the Atlantic Ocean, and by many it is argued that this is the shortest route from England to Australia. The length of the railway from Valparaíso to Buenos Aires is 880 miles. In the northern provinces there are several private railways. From Antofagasta and Arica lines run to La Paz in Bolivia.

The financial position of Chile is satisfactory enough, in spite of the various political crises to which the country has been subjected, for its natural resources have been a steady source of wealth. Official accounts are partly in gold pesos, partly in paper pesos. The public debt in 1923 comprised an external debt of £26,700,000 and

\$28,000,000, while there was an internal debt of 231,600,000 paper and 154,400,000 gold pesos. The revenue of 1925 was stated at 138,600,000 gold and 216,700,000 paper pesos, and the expenditure at 56,000,000 and 472,700,000 respectively. The revenue is mainly derived from customs, especially the export duty on nitrate. The currency system of Chile was originally bimetallic. From 1873 the obligation became of silver. A restricted bank-note issue stood at par. The necessities of the government caused an issue of inconvertible paper notes which subsequently fell to a serious depreciation. The par value of a peso was equal to 5 francs or a little over 48d., but its value in exchange during the war with Peru was as low as 16d. The gold standard was adopted by Chile in 1895, the sterling value of the peso being fixed at 18d., and in 1898 a loan of \$20,000,000 was authorised for the conversion of paper currency within four years, extended in 1901 to six years, and postponed from time to time. The currency is largely paper. A Bank of Issue was established in 1912, enabling banks to issue paper against gold or equivalent deposits. A Central Bank was instituted in August 1925 to act as a government reserve, and control the currency. In September 1925 the parity of the peso was established at 6d.

The constitution of Chile is republican, based on that of the United States, and insists on the separation of powers. It was amended 18th October 1925. To be entitled to a vote a citizen must be able to read and write, and be twenty-one years of age. All elections are by secret and direct ballot. The president exercises the executive power, holds office for a term of six years, and is not immediately re-eligible. Legislative power rests with the National Congress, comprising the Senate and Chamber of Deputies, which must be in session from May to September. The Chamber of Deputies is in the proportion of one to every 30,000 inhabitants; the senators number one to every three deputies. Deputies are elected for a term of four years, and senators for eight, though the Senate is renewed by halves every fourth year. The president has a veto on legislation, but this can be over-ridden by a two-thirds majority in Congress. There is a high court of justice in Santiago, with seven courts of appeal in various towns, and numerous subordinate courts. For local government purposes, Chile is divided into provinces under *Intendentes* and departments under *Gobernadores*.

*History.*—The name Chile is supposed to be derived from an ancient Peruvian word signifying 'snow.' The northern portion, as far as the river Maule, formed part of the dominions of the Incas of Peru. The southern was held by the valiant Araucanians, the only aboriginal race which was not subdued by the Spaniards, and until a few years ago maintained its independence against the Chileans. The first European to land in Chile was the Portuguese discoverer Magellan, after his famous voyage through the strait which now bears his name. He landed at Chiloe in 1520. After the conquest of Peru by Pizarro, an expedition was made to Chile from that country overland under the leadership of Diego de Almagro in 1535. This expedition penetrated as far as the Rio Clano, but returned unsuccessful. Another was sent under command of Pedro Valdivia in 1540, which succeeded in annexing the territory as far as the river Maipo. Santiago, the capital, was founded by Valdivia in 1542. During the colonial period the governors of Chile were appointed by the viceroys of Peru. In 1810 a revolt against the Spanish power broke out, in which Don Bernardo O'Higgins, son of one of the last viceroys of Peru, but a native of Chile, played a conspicuous part, and finally became the first dictator of the new

republic. The conflict continued until 1826, when peace was definitely settled, and Chile left to govern itself. The first constitutional president was Francisco Antonio Pinto. The government was unsettled until 1847, and revolution broke out in 1851. In 1864 Chile gave Peru very valuable support in her war with Spain. Valparaiso was bombarded by the Spaniards in 1866. In 1879 Chile declared war against Bolivia, and immediately thereafter against Peru, with which Bolivia was allied. For a time the Peruvian fleet kept the Chileans in check, but later the success of the Chileans was uninterrupted—Peruvian towns were bombarded, warships captured, and Lima taken by storm 21st June 1881. The Chileans occupied Lima and Callao until 1883, when a treaty of peace was signed. President Balmaceda's unconstitutional government led to civil war in 1891, when the congressionalists were victorious. The subsequent presidency of Montt was generally beneficial for Chile, but under Errázuriz territorial disputes with Argentina, Bolivia, and Peru threatened trouble. Settlements with Argentina and Bolivia were arrived at in 1902 and 1905, but the Tacna-Arica question, the discussion of which was postponed for twenty years in 1913, came up again amid ill-feeling in 1918, and is still unsolved (see PERU). Chile remained neutral during the Great War, but joined the League of Nations in 1919. A considerable amount of economic and political unrest in the years 1924 and 1925 culminated in constitutional reforms (18th October 1925) and the election of President Figueroa.

See books on Chile by Hancock (1894), Sir Clements R. Markham (1883), Scott Elliot (1907), Pourier (1910), Canto (1912), and Koebel (1913); the *Historia General* by Arana (1893-1902), and that by Rosales (1878).—For Chile Pine, Chile Nettle, Chile Saltpetre, see ARAUCARIA, I OASACEAE, SODIUM.

### Chiliasm. See MILLENNIUM.

**Chilkoot Pass**, a difficult pass through the coast range of the Rocky Mountains, on the main route from the South Alaskan strip of coast to the Canadian north-western district of Yukon, including Klondike and other rich gold-bearing regions in the upper basin of the Yukon River.

**Chillán**, capital of the Chilean province of Nuble (pop. 30,000), with bathing establishments, near the extinct volcano of Chillán (9445 feet).

### Chilli. See CAPSICUM.

**Chillianwalla**, in the Punjab, 5 miles from the east bank of the Jhelum, and 85 miles NW. of Lahore, was the scene of an indecisive battle during the second Sikh war (1849); see SIKHS.

**Chillico'thé**, in 1800-10 capital of the state of Ohio, stands on the Scioto River, 50 miles S. of Columbus; pop. 16,000.

**Chillingham**, a village in the north of Northumberland, on the river Till, 8 miles SW. of Belford. To the south is Chillingham Castle, seat of the Earl of Tankerville, with its famous herd of wild white cattle (see CATTLE).

**Chillingworth**, WILLIAM, was born at Oxford in 1602, the son of a prosperous citizen, and in 1618 became a scholar, in 1628 a fellow of Trinity. Through the arguments of an able Jesuit, 'John Fisher,' he embraced Catholicism, and in 1630 went to Douay, where, urged to write an account of his conversion, he was led to renounce that faith by examination of the questions at issue. He became thereafter involved in controversies with several Catholic divines, and his answers are contained in his *Additional Discourses*. In the quiet of Lord Falkland's house at Great Tew in Oxfordshire he wrote his famous book, *The Religion of Protestants a Safe Way to Salvation* (1637)—a demonstration

of the sole authority of the Bible in the matter of salvation, and of the free right of the individual conscience to interpret it. His conclusion is, in his own oft-quoted words: 'The Bible, I say, the Bible only, is the religion of Protestants.' He left also nine sermons, and a fragment on the apostolical institution of episcopacy. In 1638 he took orders, and was made Chancellor of Salisbury, with the prebend of Brixworth in Notts annexed. In the Civil War he accompanied the king's forces, and before Gloucester devised a siege-engine like the old Roman *testudo*. At Arundel Castle he fell ill, and after the surrender was lodged in the bishop's palace at Chichester, where he died, 30th January 1643.

See Lives by Des Maizeaux (1725) and Birch (1742), the 1838 edition of the Works (3 vols.), and Tulloch's *Rational Theology* (1872).

**Chillon**, long the state prison of the Dukes of Savoy, on a rock projecting into the eastern end of the Lake of Geneva, 1½ mile SSE. of Montreux. —For the 'Prisoner of Chillon,' see BONIVARD.

**Chiloé**, a province of Chile, consists of the island of that name on the west coast, a number of neighbouring islets, mostly uninhabited, and a portion of the mainland. The island is cut off by a narrow strait on the N., and a gulf 30 miles wide on the E., and is 115 miles long and 43 miles wide. Area of province, 7000 sq. m.; pop. about 100,000, almost all Indians of the Araucanian family, living on the principal island. Chiloé proper is hilly in the interior, and everywhere covered, except immediately along the shores, with nearly impassable forest. The climate is mild and not unhealthy, although inordinately wet.

**Chilog'natha, Chilop'oda.** See MYRIPODA.

**Chiltern Hills**, the southern part of the low chalk range which runs north-east, about 70 miles, from the north bend of the Thames, in Oxfordshire, through Bucks and the borders of Herts and Beds. They are 15 to 20 miles broad, and the highest point is near Wendover (950 feet). They are continued SW. as the White Horse Hills. In his sketch of John Hampden's home, Green paints finely 'the quiet undulations of the chalk country, billowy heavings and sinkings as of some primeval sea suddenly hushed into motionlessness, soft slopes of gray grass or brown-red corn falling gently to dry bottoms, woodland flung here and there in masses over the hills. A country of fine and lucid air, of far shadowy distances, of hollows tenderly veiled by mist, graceful everywhere with a flowing unaccentuated grace, as though Hampden's own temper had grown out of it.'

**Chiltern Hundreds.** In former times the beech-forests which covered the Chiltern Hills were infested with robbers, and in order to restrain them it was usual for the crown to appoint an officer, who was called the Steward of the Chiltern Hundreds. The hundreds in question (see HUNDRED) are those of Bodenham, Desborough, and Stoke, in Buckinghamshire. The stewardship, which has long ceased to serve its primary purpose, now serves a secondary one. A member of the House of Commons cannot resign his seat unless disqualified either by the acceptance of a place of honour and profit under the crown, or by some other cause. Now, the stewardship of the Chiltern Hundreds is held to be such a place, and it is consequently applied for by, and granted, usually as a matter of course, to any member who wishes to resign, though it has been refused in a case of bribery. As soon as it is obtained, it is again resigned, and is thus generally vacant when required for the purpose in question. The granting of the

Chiltern Hundreds to this end began in the year 1750; the gift lies with the Chancellor of the Exchequer. The powers, duties, and remuneration are equally things of nought. Northstead in Yorkshire has been used in the same way since 1841; and other manors formerly so used were Old Shoreham in Sussex (1756-99), East Hendred in Berks (1763-1840), Poynings in Sussex (1841-43), Hemp-holme in York (1845-65). See *Quarterly Review*, Jan. 1894, and Foster's *Chiltern Hundreds* (1897).

**Chimæra**, a fire-breathing monster, with a lion's head, a goat's body, and the tail of a dragon; she devastated Lycia until killed by Bellerophon (q.v.).

**Chimæra**, a genus of cartilaginous fishes, and type of a distinct order, Holocephali, which is often ranked along with the sharks and rays (Elasmobranchs). There are only two living genera — *Chimæra* and *Callorhynchus*. The best-known *chimæra* (*C. monstrosa*), called King of the Herrings, is occasionally taken in herring-nets in British seas — an ugly fish, seldom over 3 feet in length, of a whitish colour, spotted with brown above.

**Chimborazo**, a conical peak of the Andes, in Ecuador, 20,498 feet above the sea, but only about 11,000 above the level of the valley of Quito, to the north. — The peak, whose summit was first reached by Whymper in 1880, gives name to a province; area, 5523 sq. m.; pop. 120,000.

**Chimney**, a flue constructed in the thickness of a wall or in a separate 'stalk' for the purpose of carrying off the smoke from a fireplace or furnace. Chimneys are of comparatively modern origin; only traces of them are found in classic antiquity. The earliest medieval examples, the chimneys of 12th-century Anglo-Norman castles, have only a short flue ascending a few feet, and discharging by an oblong aperture in the outer face of the wall. In the English halls the centre hearth was long retained, without any chimney, the smoke being allowed to find its way out through an opening in the roof called the *louvre*. In the late Gothic and Elizabethan styles the chimneys are amongst the most striking features of the design, being carried up in lofty and highly ornamental stalks, frequently built in brick. Modern chimneys have received a great development in connection with furnaces and steam-engines; in order to create a draught and so cause the fire to burn with intense heat these chimney-stalks are carried to a great height. An act to regulate domestic chimney-sweeping was passed as early as 1789, and in 1842 to prevent the fearful cruelties practised on young chimney-sweepers it was rendered penal to compel or knowingly allow any person under the age of twenty-one to ascend or descend a chimney or enter a flue for the purpose of cleaning or curing it, and no child under sixteen could be thereafter apprenticed to the trade. The act was extended and made more stringent in 1864 and 1875. See SMOKE, VENTILATION, WARMING.

**Chimonanthus**, a genus of Calycanthaceæ, of two species, natives of China. *C. fragrans*, a hardy deciduous shrub, is grown for its scented flowers, which appear before the leaves. *C. nitens* is ever-green.

**Chimpanzee** (*Anthropopithecus* or *Troglodytes*), one of the four genera of Anthropoid Apes (q.v.), nearly related to the gorilla (*Gorilla*). These seem to be two distinct species (*A. troglodytes* and *A. calvus*) from the African equatorial forests.

**Characteristics.** — As the general features of Anthropoid Apes have been already sketched, it will be enough to sum up the more striking characteristics of the chimpanzee. The animal stands about four feet high, has very dark, all but black hair, a broad, leathery, reddish-brown face,

small nose, large mouth, protruding lips, large brow-ridges, and small ears. The face has an angle of 70 degrees. The head hangs down upon the chest. There are no cheek-pouches. The arms are very long, and reach the knee; their span is about half as much again as the height. The hand is narrow, but as long as the foot. The sole of the foot can rest flatly on the ground, and the animal readily stands or walks erect. But his favourite attitude is leaning forward, and supporting himself on the knuckles of the hand. The backbone begins to exhibit the curves characteristic of man, and the chimpanzee is alone among anthropoids in having the spine of the second neck vertebra bifurcated as in man. It has one pair of ribs in addition to the twelve possessed by man. There is of course no tail, nor are there any sitting-pads or ischial callosities. 'The volume of the brain is about half



Chimpanzee (after Hartmann).

the minimum size of a normal human brain.' All the *gyri* (ridges) of the human brain are represented in the cerebral hemispheres of the chimpanzee; but they are simpler and more symmetrical, and larger in proportion to the brain.

**Habits.**—The chimpanzee is very thoroughly arboreal, but goes well on the ground, with its soles flat, and with or without the help of the arms. The food consists chiefly of fruits, but animal food seems to be occasionally eaten. They live in small societies, and are monogamous. In contrast to the fierce and gloomy gorillas, they seem to be playful and lively, and may continue to show this disposition in captivity. The notorious 'Sally' of the Zoological Gardens in London gave many evidences of quick intelligence.

**China.** The Chinese Empire, consisting of *China Proper* and Manchuria (q.v.), with its dependencies of Mongolia, Ili, and Tibet (q.v.), up to 1914 embraced a vast territory in Eastern Asia only inferior in extent to the dominions of Great Britain and Russia. The dependencies were not so much colonies as subject territories; and China Proper itself, indeed, may be said to have been the subject territory of a military oligarchy from Manchuria since 1644. It will be convenient, however, to confine ourselves in this article to China Proper.

China is not known among the people themselves as the designation of the country. In the oldest classical writings the country is called *Hwa Hia*, 'The Flowery Hia,' *Chung Kwo*, 'The Middle State,' or kingdom, grew up in the feudal period

as a name for the royal domain in the midst of the other states; or, by extension, for those states as a whole in the midst of the uncivilised states around them.

*Serica*, *Sera*, and *Seres*, in Ptolemy and other ancient geographers, indicate China and the Chinese as the country and people producing *silk*, being taken from *sz* (silk), originally the pictorial symbol of a packet of cocoons.

*Cathay*, a poetical name with us, and still apparent in the Russian name for China (*K'itai*), came into use as a designation for the northern part of the empire through Marco Polo and other medieval writers. It was the Mongol and Persian designation of the Tatar *K'itan* tribes which contended with the Sung dynasty for the supremacy of the empire; the *K'itans* were then overcome by subjects of an allied Tatar race (early Manchus), who substituted in North China the dynasty of Chin (*Kin*), which was in turn extinguished by the Mongol conquest. The country south of the Yang-tsz River was then styled *Manzi* or *Man-tsz*, from the old name of *Man* for all the southern aboriginal tribes, even in our own days occasionally used officially by haughty administrators.

The name China has come to us from India through Buddhism. In a conversation (apocryphal probably), related by Nien Ch'ang in his *History of Buddhism* (down to 1333 A.D.), between the Han emperor who welcomed them to his capital and the first two of the Buddhist missionaries in the first century of our era, there appear the names of *Chi-na* and *Chin-tan* ('the Land of Chin').

CHINA PROPER was divided in the K'ang-hi reign (1662-1722) into eighteen provinces; from 1887 to 1895, when it was ceded to Japan, Formosa, detached from Fu-kien, was a separate province under the name of T'ai-wan; and in 1884 the constitution of Sin-kiang as a new province on the extreme west of the empire raised the number of provinces to nineteen. Since the 'Boxer' and Russo-Japanese wars of 1894-95 and 1904-5 the three divisions of Manchuria have been properly constituted regulation provinces, which brings the number up to twenty-two; and there has long been an incomplete project to carry out the same reform for Mongolia and Tibet—which would mean five or six more provinces. One of the easternmost portions of the Asiatic continent, bordering on the Pacific Ocean, China Proper lies, if we include the island of Hai-nan, between 18° and 49° N. lat., and 98° and 124° E. long. Its area used to be given at 1,298,000 sq. m., being more than twenty-five times that of England; but if we include outlying parts of Chih-li and Kan-su (i.e. Sin-kiang), the total area is not much, if at all, short of 2,000,000 sq. m. (The whole empire would have an area more than twice as large.)

On the north there are four provinces—Chih-li, Shan-si, Shen-si, and Kan-su; on the west, two—Sz-ch'wan (the largest of all), and Yün-nan; on the south, two—Kwang-si and Kwang-tung; on the east, four—Fu-kien, Che-kiang, Kiang-su, and Shan-tung. The central area enclosed by these twelve provinces is occupied by Ho-nan, An-hui, Hu-peh, Hu-nan, Kiang-si, and Kwei-chow (parts of which last are largely occupied by tribes of aboriginal Miao-tsz). The province of Sin-kiang, as recently constituted, includes Eastern Turkestan (q.v.), Western Kan-su, Ili, and Zungaria (q.v.). Formosa, till then Chinese, was ceded to Japan in 1895; and (Triple) Manchuria, one of the most valuable of the outer provinces, was under Russian control from 1898 till the war between Russia and Japan in 1904-5 (see JAPAN), but after the peace was restored to China's nominal sovereignty. Japan and Russia, however, gradually asserted their influence in such a way as to cripple the

independent efforts of the Chinese High Commissioner and two governors, and it is impossible to forecast final arrangements until the aftermath of the Great War and the peace negotiations has been gathered in.

The population of these twenty-two provinces has been so variously estimated that no definite figures can be confidently stated until there has been some kind of methodical census guaranteed by government. The *Almanach de Gotha* for 1906 gives for the provinces of China proper a population of 320½ millions, and for the whole empire, including Manchuria, Mongolia, and Tibet, but without Korea, 330½ millions; in any case, Korea is now no longer Chinese. It is probably safe to say that 350 millions is hardly an over-estimate of the population of the Chinese empire; indeed, the latest semi-official attempts at a census published in 1910 give a total of 433 millions; but at least one viceroy stated openly in 1911 that his returns were but a poor makeshift. Of the forty-nine (or more) ports open to foreign commerce, only about a dozen have a population under 50,000. That of Canton has been estimated at 900,000; of T'ien-tsin at 750,000; of Hankow at 870,000; of Foochow at 624,000; of Shanghai at 651,000; of Soochow at 500,000; but there is no certainty. Besides the forty-nine sea or river ports, there are an ever-increasing number of land trading-places on the Russian, French, British, and Japanese frontiers. The total number of foreigners resident in the open ports was in 1904 stated by the Customs authorities at 27,227, of whom 9139 were Japanese, 5981 British, 3887 Portuguese, 3220 Americans, 1871 Germans, and 1374 French. Since then, however, the Japanese population has enormously increased, and in 1920 it was estimated that out of 220,485 foreigners in China two-thirds were Japanese. Both the Russian (51,310) and the Japanese population in Manchuria show a tendency to expand enormously, as both nations have been encouraging immigrants from the home land to settle in what were their respective spheres. The population of Peking is variously estimated from 500,000 to 1,650,000. In 1907 the number of 'households' was officially given at 123,790.

As to the *physical features* of China proper, the whole territory may be described as sloping from the mountainous regions of Tibet and Nepal towards the shores of the Pacific on the east and south. The most extensive mountain-range is the Nan Ling or Southern Range, a far-extending spur of the Himalayas. Commencing in Yun-nan, it bounds Kwang-si, Kwang-tung, and Fu-kien on the north, and, passing through Che-kiang, enters into the sea at Ningpo. It thus forms a continuous barrier, penetrated only by a few steep passes (of which the Mei Kwan is the best known), that separates the coast regions of South-eastern China from the rest of the country. This great chain throws off numerous spurs to the south and east, which, dipping into the sea, appear above it as a belt of rugged islands along the seaboard. Of this belt the Chusan Archipelago is the most northerly portion.

North of this long range, and west of the 113th meridian, on to the borders of Tibet, the country is mountainous, while to the east and from the great wall on the north, to the P'o-yang lake in the south, there is the *Great Plain*, comprising the greater part of the provinces of Chih-li and Shan-tung, Ho-nan, An-hui, and Kiang-su—an area of about 210,000 sq. m., estimated to support a population of 177,000,000.

In the provinces west from Chih-li—Shan-si, Shen-si, and Kan-su—the soil is formed of what are called the loess beds, which extend even to the Koko-nor and the head-waters of the Yellow River. The name loess is adopted from that of a Tertiary

deposit which appears in the Rhine Valley—a brownish-coloured earth, extremely porous, crumbling easily between the fingers, and carried far and wide in clouds of dust. It covers the subsoil to an enormous depth, and is apt to split perpendicularly into clefts which render travelling difficult. And yet by this cleavage it affords homes to multitudes of the people, who live in caves excavated near the bottoms of the cliffs. Sometimes whole villages are so formed in terraces of the earth that rise above one another. But the most valuable quality of the loess is its fertility, the fields composed of it hardly requiring any other manure than a sprinkling of its own fresh loam. The husbandman in this way obtains an assured harvest two and even three times a year. This fertility, provided there be a sufficient rainfall, seems inexhaustible. The province of Shan-si has for thousands of years borne the name of 'the Granary of the Nation'; and it is no doubt to the distribution of this earth over its surface that the Great Plain owes its fruitfulness.

The *rivers* of China—called for the most part *ho* and *kiang*—are one of its most distinguishing features. Two of them stand out conspicuously among the great rivers of the world—the Ho, Hoang-ho, or Yellow River, and the Kiang, generally misnamed the Yang-tsz. They rise not far from each other; the Ho, in the plain of Odontala, called in Chinese the 'Sea of Stars'—i.e. of springs or lakelets—in 35½° N. lat., and 96° E. long.; and the Kiang from among the mountains of Tibet. The Ho pursues a tortuous eastward course to Kan-su, and the Kiang with a southern inclination enters China at Batang, in Sz-ch'wan. From the prefecture of Lan-chou the Ho flows north-east more or less along the Great Wall, till it arrives nearly at the northern limit of Shen-si, when it turns directly south, and, flowing for 500 miles between that province and Shan-si, comes to the edge of the Great Plain, and pursues an eastward course. The Kiang, on the contrary, flows south from Batang, between Sz-ch'wan and Yun-nan, till it reaches the southern limit of the former province. Then it turns north, holding its way eastward through Sz-ch'wan and the other intervening provinces till it enters the ocean in lat. 32°. The Ho does not pursue so regular a course. Its direction, indeed, from the edge of the plain is eastwards, but in the course of time it has ever and anon changed its channel. Chinese history opens, in the Book of History or Shu King, about the 24th century B.C., with an account of one of its inundations—described in terms which have suggested to some students the Noachian deluge—and the labours on it of the Great Yü. The fearful calamities caused by it so often have procured for it the name of 'China's Sorrow.' So recently as 1887 it burst its southern bank near Ch'eng Chou, and poured its mighty flood, with hideous devastation and the destruction of millions of lives, into the populous province of Ho-nan. It is now the task of the republican rulers of the empire to remedy this disaster, and to regulate the terrible river for the future. Both the Ho and the Kiang must have a course of more than 3000 miles, though their sources are close together. These two rivers are incomparably the greatest in China, but there are many others which would elsewhere be accounted great; and among those rivers we may well reckon the *Grand Canal*, intended to connect the northern and southern parts of the empire by an easy water communication; and this it did when it was in good order, extending from Peking to Hang-chou in Che-kiang, a distance of more than 600 miles.

After the Grand Canal a few sentences may be given to the *Great Wall*, which has been quite recently explored from end to end by an American

traveller (William Edgar Geil). Not so useful as the canal, and having on the whole failed to answer the purpose for which it was intended—to be a defence against the incursions of the northern tribes—there it still stands, while the walls of Hadrian and Antoninus in our own country have crumbled to the ground, and their course can only be indistinctly traced here and there. It was in 214 B.C. that the 'First Emperor,' or Shi Hwang-ti, determined to complete a grand barrier all along the north of his vast empire. The wall commences at the Shan-hai Pass (40° N. lat., 119° 50' E. long.), where it was visited by a squadron of British vessels of war in 1839, and was seen, as Lord Jocelyn describes it, 'scaling the precipices, and topping the craggy hills of the country.' In our own times the allied troops occupied the place during the 'Boxer' hostilities of 1900, and the railway to Manchuria runs through it. From this point it is carried westwards till it terminates at the Kia-yü barrier gate, the road through which leads to the 'Western Regions.' Its length in a straight line would be 1255 miles, but if measured along its sinuosities, this distance must be increased to 1500. It is not built so grandly in its western portions after it has met the Ho or Yellow River, nor should it be supposed that to the east of this point it is all solid masonry. It is formed by two strong retaining walls of brick, rising from granite foundations, the space between being filled up with stones and earth. The breadth of it at the base is about 25 feet, at the top 15, and the height varies from 15 to 30 feet. The surface at the top was covered with bricks, and is now overgrown with grass. It must here be stated, however, that extensive portions of the Great Wall were built by local kings many centuries before the 'First Emperor' (of the Ts'in dynasty) already mentioned took the matter seriously in hand as a whole. What foreigners go to visit from Peking is merely a loop-wall of very much later formation, enclosing portions of Chih-li and Shan-si.

The *lakes* are very many, but not on so great a scale as the rivers. It will be sufficient to mention three—the Tung-ting Hu, the largest, having a circumference of 220 miles, and entering into the names of the provinces Hu-pei and Hu-nan; the P'o-yang Hu, in the north of Kiang-si, the seat of the manufactories of the best porcelain; and the Tai Hu, partly in Kiang-su and partly in Che-kiang, famous for its romantic scenery and numerous islets.

The country is rich in the *products* necessary for the support and comfort of the people, and for the adornment of their civilisation. There is in it every variety of *climate*; but the average temperature is perhaps lower than that of any other country in the same latitude. Wheat, barley, maize, millet, and other cereals are chiefly cultivated in the northern regions, and rice in the southern.

The original writer of this once had a bag of oatmeal sent to him from Kalgan, north of the loop-wall mentioned above, and the supplementary writer has eaten dishes of both oatmeal and buckwheat at one of the Kalgan hotels. Culinary or kitchen herbs, mushrooms, and aquatic vegetables, with ginger and a variety of other condiments, are everywhere produced and largely used. From the provinces of Kwang-tung and Fu-kien there comes sugar, and the cane thrives also in other southern provinces. The way to manufacture sugar from the cane to advantage was introduced from India about 1000 years ago. Oranges, pumeloes, litchis, pomegranates, peaches, plantains, pine-apples, mangoes, grapes, and many other fruits and nuts, are supplied in most markets. Tea is specially noted below. Opium had been increasingly grown of late within the country, but the year 1906 will be ever memorable for a deter-

mined effort to put an end to both opium-smoking and poppy-growing. With the sympathetic aid of the British and Indian governments this commendable effort seemed (1911) likely to be crowned with success, though there was a guilty recrudescence of poppy-growing in the rebellious western provinces in 1920. The Chinese are emphatically an agricultural people. From time immemorial the sovereign initiated the year, which begins with the spring, by turning over a few furrows in the 'sacred field'; and in each province the highest civil authority is still supposed to perform a similar ceremony—to impress on the people the importance of husbandry. The hoe largely holds the place of our spade; the plough retains its primitive simplicity; irrigation is assiduously and skilfully employed. Fowls, including ducks and geese, are abundantly bred and consumed; of ducks, immense numbers are artificially hatched. Comparatively little beef is eaten, not so much because of the prevalence of Buddhism, which forbids the taking of life, as from a feeling of gratitude to the animal which renders the most important service in tilling the ground. Pork is the most used of all flesh meat, and the number of pigs is enormous. In addition to these animals, the seaboard, rivers, lakes, and ponds supply an immense quantity of excellent fish taken by the net. Angling is not much practised; but a boat with its complement of comorants, trained to dive for the fish and bring them to their masters, is a pleasant sight. Shellfish and snakes also yield their quota to the food of the people. An idea is prevalent that the Chinese are gross feeders, but this is true only of the very poor. A first-class Chinese dinner with its twenty-seven courses or more may hold its own with the most luxurious tables. The famed birds'-nest soup is partly a misnomer. Nests of the *Collocalia esculenta*, brought from the coasts of Annam and from the Indian Archipelago, are sliced into other soup; they are supposed to impart to the compound an invigorating and stimulating quality, but the writers have never felt that it added either to its flavour or piquancy. See the articles NESTS, SWIFT.

For *beverages* the use of tea amongst the well-to-do has nearly superseded every other, but the poorer classes are usually content to drink boiling water, or the water in which their rice has been boiled. The tea-plant does not grow in the north, but is cultivated extensively in the western provinces, and in those central and coast provinces south of the Great Kiang. The infusion of the leaves was little, if at all, drunk in ancient times, but now its use is universal. Fu-kien, Hu-pei, and Hu-nan produce most largely the black teas; the green comes chiefly from Che-kiang and An-hui; both kinds come from Kwang-tung and Sz-ch'wan. Next to silk, tea was, and perhaps still is, China's most valuable export; but only one-third as much in quantity was exported in 1917 when compared with 1886. To the people themselves its use has been invaluable, and perhaps more than anything else has promoted the temperance that is characteristic of them. They are acquainted with distillation, and from rice and millet produce alcoholic liquors. Drinking tea, as an established habit, may be traced back at least to the 7th century of our era. As compared with the populations of Western nations, the Chinese are sparing in the use of strong drink, and it is rare to see one of them intoxicated; indulgence in strong drink is commoner amongst the Mongols and Manchus than amongst the Chinese in any case. The use of opium will be discussed in a separate article. It must be repeated here, however, that the export of tea from China is now *in value* but two-thirds of what it used to be, first Assam and then Ceylon having gradually supplanted it in the

favour of British drinkers, who seem to prefer a less delicate and more 'rasping' article.

The next essential to food and drink in the economy of life is *clothing*, and for this China has abundant provision in its stores of silk, linen, and cotton. It was no doubt the original home of *silk*. From the 23d century B.C. and traditionally earlier, the care of the silkworm, and the spinning and weaving of its produce, have been the special work of woman. As it was the duty of the sovereign to turn over a few furrows in the spring to stimulate the people in the pursuit of their agricultural tasks, so in imperial times his consort should perform an analogous ceremony with her silkworms and mulberry-trees. The suitable tree grows almost everywhere, and in all the provinces some silk is produced, if not from worms feeding on the mulberry, then, especially in the north and west, from those feeding on oak-trees; but Kwang-tung, Sz-ch'wan, and Che-kiang furnish the best and the most material. The manufactures from silk are not inferior or less brilliant than any that are produced in Europe, and nothing can exceed in perfection of workmanship the embroidery of the Chinese. Indigenous to the country also are hemp, flax, and other fibrous plants, such as the *Bahmeria nivea*, from which the so-called grass-cloth is made. The cotton-plant, though not indigenous, appears to have been introduced from Khoten and other states of Turkestan in the 6th century. The Chinese cotton cloth is inferior to the imported in its finish, but is heavier, warmer, and more durable. During the present century numerous cotton-mills on the European plan have sprung up in various parts of China, chiefly at the treaty-ports, such as Shanghai and Hankow; the low price of labour, of course, gives them an advantage, which, however, is often nullified by financial mismanagement, apart from excise disabilities under treaty stipulations. Of *woollen fabrics* the production is not large; but we meet with felt caps, rugs of camels' hair, and furs of various kinds. As the houses have no fireplaces, people keep themselves warm in cold weather either by using portable stoves and braziers, or by increasing the number of garments which they wear. The well-to-do appreciate our fine broadcloths, but on the whole few provinces require, and few families can afford to buy, our foreign woollen goods.

The most *picturesque buildings* are the pavilions and pagodas. Of the former the most striking is one in what has become famous by being loosely called the 'Summer Palace' at Peking; it is about 14 feet square and 20 high, made of pure copper. The pagodas of China are Buddhist structures, borrowed from the topes of India, where they were built at first as depositories for the relics of Buddha and distinguished Arhats. In China they have taken a peculiar form, and are supposed to exercise mysterious geomantic influences. They are the most remarkable objects in the landscapes of the country, and there are few cities which cannot boast of one or more, always with an uneven number of storeys. The most celebrated of them, the Porcelain Tower of Nanking, is now a thing of the past, having been blown up by the iconoclastic T'ai-p'ings in 1856. It was of an octagonal form, and was intended to be of thirteen storeys, rising to a height of 329 feet; but only nine storeys were completed, the building of which took nineteen years (1411-30). It was built massively of brick, and faced with slabs of glazed porcelain—green, red, yellow, and white; with lamps hanging outside from the projections of the different storeys—one of the architectural wonders of the world.

In the cities, and studding the country also, are many *P'ai-lous* or *Honorary Portals*, tokens of former imperial favour, erected in honour of distinguished persons.

The *streets* of the cities, especially in the south, are not wider than so many lanes, and the streams of people hurrying through them give the stranger an idea that towns are more populous than they really are. They are paved with slabs of stone, but badly drained, and the heat and stench render a promenade through them anything but agreeable. Most of them have high-sounding names, such as 'The Street of Benevolence and Righteousness.'

When you enter the house of a well-to-do family, you find the *furniture* sufficient, though somewhat scanty, and not luxurious; indeed, the Chinese consider our European rooms much overcrowded with ornament. The floor may be covered with matting, but not with a carpet or rugs. The tables and straight-backed chairs are of a dark, heavy wood resembling ebony. A few pictures, not exactly works of art, are hung on the walls, along with scrolls of fine writing, expressing moral sentiments or historical and topographical references, while some jars and other specimens of fine porcelain are put down here and there. There may be a couch or two made of bamboo and rattan, and stools of the same materials. The *bamboo*, that queen of the Arundinaceæ, deserves especial mention. A clump of bamboos adds a graceful charm to the scenery, and there seems to be no end to the uses which the plant serves. The school-master employs it for his ferule, and the mandarin or magistrate for his most common instrument of punishment. The writing-paper is often made from its pulp. The young shoots are used for food, and for comfits and pickles. Its stems, according to their size, are employed for pencil-handles, for canes, and for poles. Fans, cages, baskets, and fish-creels are all constructed with it. Its roots are carved into grotesque figures, and fashioned into blocks of a peculiar shape to be used in divination. China, indeed, would not be China without the bamboo. (For the flora of China, see ASIA.)

The country is too thickly peopled and well cultivated to harbour many *wild and dangerous animals*, though one occasionally hears of a tiger that has ventured from the forest and been killed or captured. The lion was never a denizen of China, and is only to be seen fancifully rampant in stone in front of temples. The rhinoceros, elephant, and tapir are said still to exist in the forests and swamps of Yun-nan; but the supply of elephants at Peking for the carriage of the emperor when he proceeded to the great sacrificial altars had been decreasing for several reigns; they always came from Nepal, Indo-China, or Burma as 'tribute' presents. Both the brown and black bear are met with, and several varieties of the deer family. The musk-deer is greatly valued. Among the more *domestic quadrupeds*, the breed of horses and ordinary cattle is dwarfish, and no attempts seem to be made to improve them. The water buffalo, however (used for ploughing), is a huge beast. The ass is a more lively animal in the north than with us, and receives more attention. About Peking one is struck by many beautiful specimens of the mule. Princes used to be seen riding on mules, or drawn by them in elegant carts and litters, while their attendants accompanied them on horseback. The camel is only seen in the north. One of the first things that strike a stranger in the capital is the troops of the shaggy animal lying or feeding about the walls, with their Mongol keepers looking as uncouth as their charges.

The *birds of prey* are many. Minahs, crows, and magpies abound. The last are 'sacred birds,' which it is sometimes not safe for the solitary or unwary traveller to shoot. The people are fond of song-birds, especially the lark, the thrush, and the canary. Song-birds are common enough, but their respective names are uncertain at present. The

smaller birds are not so afraid of man as with us. Buddhism, with which life is sacred, has done much to secure for birds, both from old and young persons, immunity from molestation and death. Many persons purchase birds and animals in order to 'earn merit' by letting them go free. The lovely gold and silver pheasants are well known, and also the *Yuan-yang* (*Anas galericulata*), or mandarin duck, the emblem to the Chinese of conjugal fidelity.

While the Chinese have, as we have seen, done justice to most of the natural capabilities of their country, they have greatly failed in developing its *mineral resources*. The skill which their lapidaries display in cutting crystal and other quartzose minerals is well known, and their work in jade, a substance they so highly prize, is very fine. But a mineral more valuable than any other has been comparatively neglected. The *coalfields* of China are enormous—much more than twenty times the extent of those of Great Britain; but up to the beginning of this century the majority of them can hardly be said to have been more than scratched. However, the Peking Syndicate, Anglo-Chinese Mining Company, the Japanese 'Hanyehp'ing,' and other enterprises are rapidly effecting a change for the better; notably also in what was up to 1914 the 'German sphere' of Shan-tung there had been activity. Immense quantities of iron ore, moreover, must have been extracted from the earth during the millenniums of China's history, but a much greater store is still untouched, though modern syndicates are making a good beginning in this respect too. Copper, lead, antimony, tin, silver, and gold exist in many places, but comparatively little had been done to make the stores of them available until the first decade of this century. An exception, however, must be made with the copper-mines of Yün-nan, which have for many generations past supplied the Peking mints with much of the metal necessary for the coinage of the official, but now obsolescent, 'copper cash.' More attention has been directed to mining since the government and the semi-official companies began to have steamers of their own; and a scheme had been carried out for some years with fair success by the government for working the gold-mines in the valley of the Amur River. The Bolshevik unrest since 1917 has, however, temporarily disturbed the smooth working of these arrangements. As usual, financial mismanagement had already more than once handicapped a promising enterprise; and, what is more serious, the latest intelligence seems to indicate that disputes with Russian workmen rivals may possibly end in the Dragon's rights being transferred to the Bolshevik Bear or possibly even to Japan. The much-harassed republican government has, however, of late years become seriously conscious of its mineral wealth, and there is no calculating the resources to which it may ultimately attain when exchanges right themselves and capital begins to flow freely and safely once more.

A gold and silver currency is one of the first things which it has to provide. Up to quite recent times the only *currency* had been the above-mentioned copper *cash*, cumbrous and often debased, varying in its relative value in every district, and the source of endless trouble to the traveller. Even foreign silver coins were, and often still are, more commonly treated as bullion than as tokens, to be taken by weight. What is called 'sycee silver' is thus made from them, *sai-si* being the Macao pronunciation of two words signifying 'fine thread' (marks in the chopped silver). After they have been defaced, marked with the 'chop' or banker's name, and broken to pieces, they are melted and cast into ingots of different sizes called 'shoes.' When defaced dollars are used as tokens,

they are known to traders in South China as 'chop' dollars, for the reason just given, and are there often preferred to 'clean' dollars, which latter alone are current north of Foochow. Much inconvenience is caused by the necessity of keeping small fine scales or steelyards to weigh every outlay and receipt. Since 1890 silver dollars have been coined at Canton, and subsequent to that date several other provinces have started dollar mints of their own. Moreover, the old copper cash are gradually giving way to a lighter, handier, and more artistic red copper coin on the European model. All these changes have led to such financial confusion that in the month of April 1911 a heroic decision was taken to reform the whole currency with the aid of a foreign loan in which four powers equally participated; but practically nothing had been done when the Chinese minister of finance in August 1918 issued his proposals for genuine reform, and the matter is still under discussion by the Consortium of Entente powers. Paper money is indeed in circulation, but the new native banking system, as represented chiefly by the Bank of China and the Bank of Communications, exists as yet only in an unsettled condition, except in so far as remittance drafts and general exchange are concerned. The Great War, and the political unrest in China connected therewith, has left a legacy of financial and exchange confusion which at the time of our going to press renders it impossible for us to hazard any informative conclusions.

Another want in China is that of *good roads and comfortable conveyances*. The necessity for good roads first presented itself to Shi Hwang-ti (214 B.C.), who, after he had extended his empire to nearly China Proper limits, ordered the preparation of highways seven years before he commenced the extension or building of the Great Wall; and it has been said that there are now 20,000 roads in China; but according to the universal reports of modern travellers, the good roads among them are very few. The government couriers used to perform their journeys on horseback, and there is abundant evidence of express despatches reaching Peking from Burma, Tibet, Annam, Nepal, &c. within a fortnight. During the first two decades of the 20th century, however, North China has gradually been covered with a network of railways, and consequently in North China the old stage-express courier services have become unnecessary, and have, indeed, in most cases been entirely abolished. In South China river communications are so extensive and complete that railways are, on the one hand, less of a necessity, whilst, on the other, they are not so easy to construct as in the dry north. For the same reason, where communication by water is abundant the want of ordinary roads is not so much felt; but because of their absence in times of scarcity it has often been a most difficult thing to convey supplies to starving populations. Around the treaty-ports, and wherever foreigners congregate for health or pleasure, there are many excellent roads of limited length.

*Social Habits.*—The dress of the poor previous to the numerous republican changes was much alike in both sexes; and, though regulated for all classes by sumptuary laws, it was varied among the wealthy by the richness of the materials and the various ornamentation. The most striking thing in the appearance of the men to a foreigner used to be the *queue* or *plaited tail* from the hair of the crown, all the rest of the head being shaved. This was not the old fashion of doing up the hair, but was enforced step by step on the Chinese by the Manchus in 1627, when they had commenced that career of conquest which ended in 1644 in their assumption of imperial sway over the empire.

inscriptions on stone tablets in old temples in Japan, erected by refugees of the 17th century, mention this degrading requirement as one of the reasons why they had fled from their country. All sumptuary and political dislike to the custom, however, had long disappeared, and it was not without a pang that the majority of the male sex made the 'extreme sacrifice' when the 1911 revolution gradually put an end to the very existence of the *queue*, except, of course, in the case of the Manchu pensioners, who were guaranteed many of their old rights by treaty. A foreigner used to be surprised in the same way by the *small feet* of the more respectable women. These were not enforced upon them by the Manchu conquerors, whose women always allowed their feet to grow to the natural size; nor was it a very ancient practice in the country, though it seems to have prevailed since our 6th century. The distortion is produced by bandaging the feet in early years, so as to prevent their further growth. The very poor and servants were not subjected to this torture, but such is the force of fashion that we have known humble girls of twelve or thirteen vainly try to reduce the size of their feet, thinking thereby to make themselves more attractive. After the reforms following the 'Boxer' fiasco were introduced, determined efforts were made by highly placed Chinese to discourage and put a stop to this absurd custom, and this with every hope of success, as the Manchu imperial family had given its official support to the movement. Mrs Archibald Little, as a determined pioneer of the reform, has achieved well-deserved renown, and since the 'rights of women' movements following upon the revolution of 1911, more and more mothers are being convinced that persistence in this unnatural practice can bring no social advantage to their girls.

We read little or nothing of any literary training for the daughters of Chinese families within historical times, though history is not without instances of learned women and distinguished authoresses. So far, nothing about the organised education of women appears in the rules and regulations of the Board of Instruction at Peking; but girls' schools, women's training colleges, and even women's political rights are either 'in the air' or well on their way to development, chiefly, it would appear, under the auspices of foreign missionaries. In the important event of *marriage* the parents in most cases still exercise a supreme control; and this has given rise to the class of *match-makers* or *go-betweens*, who are consulted by the parents, make inquiries, and by an examination of the horoscopes of the parties and other methods of their profession determine the question of the mutual suitability of the match. When a marriage has been agreed upon, it is carried through with a great variety of ceremonies, the parties most concerned being supposed never to have previously seen each other. In the majority of cases the husband and wife thus brought together seem to take to each other very well. Notwithstanding its defects and differences from our ideal, the result seems to be a fair amount of peace and happiness. When the wife becomes a mother, she is treated as a sort of divinity in the household. There is but one proper wife (*chéng-ts'í*) in the family, but there is no law against a man's having secondary wives or concubines; and such connections are common wherever the means of the family are sufficient for their support. Until a few years before the revolution of 1911 there were no legitimate marriages between Manchus and Chinese, but even princely Manchus had already begun to give daughters in marriage to the sons of high Chinese officials; and now, of course, there are no social distinctions, except in so far as, under the abdication terms of 1912, the dynastic Manchus and their im-

mediate retainers are left free to keep up their old military banner customs in any way they please.

The charge of *infanticide* has been brought against the family life in China, the victims in the vast majority of instances being the female children. That several Chinese provinces are seriously stained by this crime—though China as a whole is not so to the extent that has often been alleged—cannot be denied. It is among the very poor that the barbarity is chiefly perpetrated, and their poverty is the chief reason of it. From the ancestral worship which prevails among the people, the *desire for male children* is greater in China than perhaps in any other country. Public opinion in general is certainly against the crime of infanticide; the Manchu government, though it launched forth occasional anathemas against it, was to blame in that it did not address itself more seriously to punishing the deed and putting it down. Even the public opinion against it is not so emphatic as it ought to be, nor have the successive republican governments taken any steps in the matter. Foundling hospitals and asylums for the aged are to be found in most of the large towns, but their cleanliness and management are not satisfactory.

The *complexion* of the Chinese inclines to yellow. The coarse black hair and oblique eyes, with high cheekbones and roundish face, belong to all, with local variations, from the Great Wall to the island of Hai-nan. They are sturdy and muscular as compared with other Eastern peoples, temperate, industrious, cheerful, and easily contented. They are addicted to gambling, and are generally held to be given also to mendacity and larceny; but in these two respects they are not much worse than the rest of mankind; the difference lies chiefly in the 'form' of the offence. Many of them are thieves, or liars, or both; but where is the country in which there are not many such? The longer one lives among them, however, the less one blames them, and the better one thinks of them.

They *bury* their dead in graves, the more showy of which are built round in the form of a horse-shoe, and often with much display and at great expense. The mourning rites are apt to be tedious, and embrace a variety of sacrifices and other observances. No subject occupies so large a portion of the Classic of Ritual Observances, which has lately been translated in *extenso* by the Rev. John Steele.

There was no *weekly day of worship and rest* like our Sunday, but so far as business is concerned foreign example is beginning to have effect. At the New Year the government offices are more or less shut, or at least the official seals are 'closed' for about a month. It must be added, however, that for many purposes the old lunar year is popularly observed in preference to the foreign solar year officially adopted since the establishment of the republic. New-year's Day is the one universal holiday, and at this time shops are closed for several days. The whole nation seems to be dissolved in festivity and joy. The people dress in their best; the temples are visited; gambling-tables are surrounded by crowds; the noise of fireworks or 'crackers' is incessant. Throughout the year every month has its festivals, of which the most general are those of 'Lanterns', on the full moon of the first month; of the 'Tombs,' later on in the spring; of 'Dragon Boats,' in the fifth month; and of 'All Souls,' in the seventh month, for the benefit of departed relatives and hungry souls in the world of spirits. Of course, all these presuppose adhesion to the lunar calendar. Theatrical representations are immensely popular. 'Strolling companies' can easily be hired; with the bamboo and matting, sheds, often very large, can be readily erected for the exhibition. Individual actors become celebrated as with us, and their services are well remunerated. Females do not under the time-

honoured old practice appear on the stage. Their parts are performed by boys got up for the purpose. Of late years fixed theatres have become more general, and creature comforts from the foreign point of view have been carefully studied. Moreover, women actors are often admitted on the stage.

*History.*—The chronology of China is measured not by centuries, but by sexagenaries, the first cycle being made to commence with the sixtieth year of the 'Yellow Emperor,' or Hwang Ti, in 2637 B.C. But this is merely a conventional arrangement. There were Chinese in China before Hwang Ti, and the cycle dates for the years prior to 827 B.C. cannot be fully relied on. The documents of the Shu King begin with the reigns of Yao and Shun (2356-2206 B.C.); and from various intimations in that work we are brought to conclude that the nation then consisted of a collection of tribes or village clans of the same race, ruled by a sovereign, nominated by his predecessor, and approved by the people as the worthiest man to reign over them.

With Yü, the successor of Shun, and the hero of Yao's deluge to which we have already made reference in treating of *Rivers*, there came a change from election or nomination in the shape of family succession to the throne as a principle. As it is expressed, 'He *familied* the kingdom.' Then commenced the *Feudal State*, which lasted under three dynasties (Hsia, 2205-1767 B.C.; Shang or Yin, 1766-1123 B.C.; and Chou, 1122-255 B.C.) for a period of nearly two thousand years. The feudal system of China was in some respects similar to that which prevailed in Europe during what we call the middle ages. At a grand *darbar* held by Yü after his accession there were, it is said, ten thousand princes present with their jade symbols of rank. But the feudal states were constantly being absorbed by one another. On the rise of the Shang dynasty they were only somewhat over three thousand, which had decreased to thirteen hundred when King Wu established the sovereignty of the Chou family. In 403 B.C. we find only seven great states all sooner or later claiming to be 'the kingdom,' and contending for the supremacy, till Ts'in put down all the others; in 221 B.C. its king assumed the title of Hwang-ti, or 'August-Emperor,' and determined that there should be no more feudal principalities, and that, as there is but one sun in the sky, there should be but one supreme ruler in the nation. (This general term must not be confused with the other specific name Hwang Ti above mentioned.)

From that year dates the *imperial* form of the Chinese government, which has thus existed for more than 2100 years. The changes of dynasty have been many, two or more families sometimes ruling together, each dynasty having but a nominal supremacy over the whole nation. The greater dynasties have been those of Han (206 B.C.-220 A.D.), T'ang (618-906), Sung (960-1279), Yüan (the Mongol, 1260-1367), the Ming (1368-1643), and the Ts'ing (Manchu-Tatar, 1643 to the abdication of 1912).

The long and persistent existence of the Chinese nation has been owing partly to its geographical position having kept it apart from other great nations possessing records, and partly to the homogeneity of its educational culture and training. Where the race came from at first is a question that takes us beyond the tracks of history; the word *indigenous* may, there as elsewhere, be taken to connote 'than which the memory of man runneth not to the contrary.' The Chinese were not, on the other hand, necessarily the earliest inhabitants of the country. They may, of course, have made their way from the north and west of China proper, pushing before them the older inhabitants, exterminating them or absorbing them, or leaving portions of them within their own ever-enlarging borders, as wrecks

of tribes still subsisting here and there, and apparently mouldering to extinction. On the other hand, they may have worked their way from the south, the whole of which is to this day monosyllabic and 'tonic' in speech, whether that speech be Chinese or no. From the first appearance of the Yellow River valley Chinese, we find them in self-alleged possession of written characters (see below), and certain elements of intellectual and moral culture or religious beliefs. (The connection of Chinese culture with that of ancient Babylonia has been suggested, but not proved; but it is quite certain from excavations made in the latter, and recent bone inscriptions unearthed in the former, that the Sumerians were already quite artistic, and had passed from the hieroglyphic to the fully conventionalised cuneiform stage, at least 1500 years previous to the date when we find the Chinese still using the clumsiest and most inartistic forms of partially conventionalised hieroglyphics.)

The *Ruler* and the *Sage* confront us in the earliest records of the nation—the Ruler to govern the people, and the Sage or Man of Intelligence to assist and advise him, and spread abroad among them the lessons of truth and duty. It is said in a document of the 18th century B.C.: 'Heaven gives birth to the people with such desires that without a Ruler they will fall into manifold disorders, and Heaven again gives birth to the Man of Intelligence to regulate them.' Thus the sovereign and the sage are both the ordinances of heaven; and it has been the rule in the various stages of the nation's history that officers of the government should possess whatever educational culture its institutions could supply. The same written character-sign serves to designate both a scholar and an officer, and of the 'four classes of the people, scholars or officers, agriculturists, mechanics, and merchants,' the first has always been held to be 'the head.' Even in the feudal times the system of examinations for the selection of the officials existed in a rudimentary stage, though it was not until our 7th century that it began to assume its modern form, open to all, excepting, in Manchu times, 'monks, play-actors, and menial servants.' It need hardly be said that the old examination system has gone by the board in the course of the multitudinous social and political reforms introduced with the 20th century. Foreign and native universities are now in full swing all over China, not to mention that hundreds of young Chinese annually return from the United States, Japan, Great Britain, France, &c., armed with degrees or educational qualifications of some sort.

The old *competitive system* continues to be of interest, if only to record what the now suspended practice was. The students of each province who had attained at the district examinations to the style of *Siu-ts'ai*, or 'Ornate Talent,' used to assemble at the provincial capital, where as a rule every third year special examiners from Peking were wont to conduct the examination for the degree of *Kü-jên*, or 'men for promotion,' which perhaps three in a thousand of them might succeed in obtaining, and which entitled them to some minor appointments. To take the third degree of *Tsin-shi*, or 'men to be presented' to the emperor, the successful *Kü-jên* from all the provinces had to proceed to the metropolis, perhaps about six thousand of them in all, and there, also as a rule triennially, pass a test examination, the successful candidates at which then entered for the *palace examination*, conducted within the precincts of the imperial palace itself; after which the lists were published in three classes, the first being a tripos of the three best men, who became for the time the heroes of the day. They and a proportion of the others were admitted to the ranks of the members of the Han-

lin, the 'Forest of Pencils,' or 'Grand Academy of Literature.' The remainder received appointments in the provinces or at the capital, according as vacancies occurred. Such is an outline, as large as our space will allow, of the competitive system of examinations by which the government of China sought to secure the ablest men of the empire for its service. The examinations were sufficiently testing, and as often as not fairly conducted. The subjects were always taken from the literature of the country itself; and this is the point in which the modern system, based largely upon European knowledge and science, differs from the old, though a certain *quantum* of 'classical' lore is still of importance. There are many indications that the system still in process of incubation will undergo further modifications made necessary by the new relations with other countries which have arisen since the recent upheavals, and which continue to arise in unexpected forms; mathematics became a subject of examination so early as 1888. The venerable but obsolete old system has at least tended to impress the people with the value of education; but it must not be supposed that as a whole they are or ever were highly educated. Everywhere indeed there were primary schools, not governmental, but maintained by the people themselves. A smattering of practical education was always widely diffused; but apart from the official classes, those who could read freely or write readily in a cultured sense always were, and still are, very few; moreover, it almost invariably happens that a good scholar from a foreign point of view fails to retain the aroma of Confucian culture.

The *three religions* of China are Confucianism, Taoism, and Buddhism. Most writers represent the first not exactly as a religion, but as a morality; yet there always underlies in its teachings a recognition of the *religion* which prevailed in the country from the most ancient times—the belief in a Supreme Power, expressed at first by the name 'Heaven,' which soon came to be designated also by the personal names *Ti*, 'the Ruler,' or 'Emperor,' and *Shang-ti*, 'the Supreme Ruler,' or 'Emperor Aloft.' The annual state worship of Heaven or God was, and still is, confined to the sovereign (now the president) as the father and priest of the people. The will of God is to be learned from the moral principles of man's nature. Government is ordained by God for the good of the people, and so soon as a sovereign ceases to seek that good and his rule becomes antagonistic to it, he has forfeited his title to the throne; and thus it is that the changes of dynasty are always referred to as 'the will of Heaven,' and the sovereign professes to be such 'by the grace of God.' Associated with the worship of Heaven or God, there was the worship of heaven and earth and the powers of nature, but only as subordinate to God and fulfilling His will for the good of men; and also of distinguished men, as having by their discoveries and achievements defended, benefited, and blessed the people of their own and future times. There was also common to their sovereign and to all the people the worship of ancestors. This last was and is considered as an expression of *filial piety*, the perpetuation of 'the duty which every one owes to his parents—the first and chief of all virtues.' On this Confucius laid great stress, endeavouring to develop all other virtues from it. His great object may be said to have been the inculcation of *duty*, setting forth with persistent iteration the character of his superior or ideal man. Several times he enunciated 'the golden rule' in a negative form: 'What ye would not that men should do to you, do ye not to them.'

*Taoism* derives its name from the treatise of Li Erh—commonly styled Lao-tsz, a senior contem-

porary of Confucius—called 'The *Tao* or *Way*, and its Characteristics.' The *Way* is the quiet, passionless discharge of all that our nature and relations prompt or require us to do, without striving or complaining, and also the method of maintaining and preserving life. 'Heaven' in this 'Way' is not a ruler or legislator as in Confucianism, but only a *pattern*. The system was older than Lao-tsz, and indigenous in China, but associated—possibly from the first, certainly in later days—with many superstitions; Lao-tsz only crystallised it into serviceable political shape; but after the formal and official entrance of Buddhism into China it lost much of its purely philosophical form, and, driven to this course by competition, adopted many of the peculiarities of its rival. The recognised head of Taoism has his seat on the Lung-hu Mountain in Kiang-si. Lao-tsz has the merit of having formulated the grand principle that good will overcome evil, and should be returned for it. For Buddhism, which was introduced, or rather invited, to China in our first century, see the article **BUDDHISM**.

There is no true priesthood in Confucianism; but Buddhism has its monks and nuns, and Taoism its monks. The Manchu government, while not interfering with the internal organisation of either of these systems, had long established a scheme of gradations of rank and authority in order that it might have the control of them in its own hands. It would no doubt have recognised Christianity in the same way if the different missions could possibly have been amalgamated, and if they would unitedly try to adapt themselves to the bed of Procrustes which even the republican government would gladly prepare for them in the various departments and districts. This is not the place in which to speak of the comparative number of the adherents of the 'three religions' in China. To claim a majority for those of any one of them is very absurd. As a matter of fact, Confucianism represents the intelligence and morality of China; Taoism (in its modern corrupt form) its superstitions; and Buddhism its ritualism and idolatry, while yet it acknowledges no God; but at the same time all classes, from the highest official personages downward, coquet with both Buddhism and Taoism to the extent of keeping up 'good form' in solemn family matters.

The **GOVERNMENT** of the empire (omitting the regulation under the abdication treaty of 1912 of the imperial court and family, or the special Manchu Banner department) is supposed to be conducted from the capital, supervising, directing, controlling the different provincial administrations, and exercising the power of removing from his post any official whose conduct may be irregular or considered dangerous to the state. But this only refers to leading principles; nearly all details of administration are purely local, and, after nine years of political strife, it must be confessed that in most matters the military governors of more than half the provinces are a law unto themselves.

There was until 1911 the *Cabinet*, or privy-council of the emperor, in whose presence it met daily to transact the business of the state, between the hours of four and six A.M. ! It bore to the last its old name of 'military council,' dating from its origin in 1730. Like our English cabinet it had no special quarters or organised existence. Its members were few, and held other substantive offices. There was also the *Grand Secretariat*, formerly the supreme council, but under the Manchu dynasty very much superseded by the cabinet. It consisted of four grand and two assistant-grand secretaries, three of them Manchus and three Chinese. At the time these amended lines were written one of the leading reform questions at Peking was the organisation of a Responsible Cabinet, including

the thorough reform and reconstruction of these two bodies, or possibly in lieu of one or both; and it is still possible to say that matters continue in a state of uncertainty and flux, the Premier's office and the General Staff office being the nearest approach to the old cabinet and Grand Secretariat combined.

The business on which the cabinet deliberated came before it from the *Boards*—of Civil Office, Households, Ceremonies, War, Education, Commerce, Communications, Interior, Laws, and Dependencies; but, here again, things are in a state of flux; the names of some of these new Boards have already been repeatedly changed, and fresh Boards have been added. In 1861 the changed relations between the empire and foreign nations first led to the formation of what we may call an additional Board, over and above the ancient original *Six*, styled the '*Ya-mén* (or court) of Foreign Affairs,' and until the end of the 19th century there were no further additions. There was also another important department which should be mentioned—the *Censorate*—members of which exercised a supervision over the Boards, and, distributed through the provinces, had it as their duty to memorialise the emperor on all subjects connected with the welfare of the people and the conduct of the government. Under the republic the nearest approach to a *Censorate*, so far, is a body of deputies charged with the duty of reporting on the shortcomings of civilian officers, but its organisation is as loosely defined as its success is problematical. Since 1905, when commissioners were first sent to study foreign methods of government, the foundations of a constitution, to be built up gradually, have been laid. During the year 1910 provincial parliaments were established in each province, and a National Assembly (the nucleus of a central parliament) even sat for a few months at Peking. Both these representative councils at the time were thought big with future possibilities, and already the popular will, after innumerable struggles to establish generally acceptable parliaments and councils, has brought the whole official body 'to their bearings;' but at present things are so unsettled that it would not be safe to state at any moment what may be the precise condition of affairs six months ahead; nor is it yet safe to describe as permanent the methods of election, the qualification of voters, representatives, &c. The only thing of outstanding importance we can point to is the sudden rise of student opinion all over China, from Peking to the remote frontiers. By combining college strikes with commercial boycotts, callow youths have shown that foreign teachings have at least suggested to them effective methods of dealing with corrupt statesmen.

In the administration of the *provinces* in Manchu times a governor-general and governor were for the most part associated as colleagues. Below these two functionaries there were the lieutenant-governor (commonly called the treasurer), the provincial judge, the salt comptroller, and the grain intendant. After repeated republican changes and amalgamations, each province has been provided with a military governor (*tuchun*) and a civil governor (*sheng-chang*), either at times acting for both, and in a few cases the rule of a usurper being excellent; but, bad or good, both military and civilians practically ignore Peking, and appropriate provincial revenues to provincial (or private) uses. The provinces used to be further divided for the purposes of administration into *fu* or prefectures, *chou* or departments, and *hien* or districts. Under the republic the *fu* and *chou* have been abolished, and all walled cities (with the thousand square miles or so of territory around) are now *hien*. The old 'button' dis-

tinctions once worn on the hat are now, with the hat itself, utterly abolished, and as a matter of fact most officials wear foreign-style clothes. The Manchu pigtail has, of course, disappeared.

No official statement of the revenue and expenditure of China was issued until the year 1910. The governor of each province was instructed annually by the Board of Households (now called Finance) what amount would be required from his province for the year, and this sum, *plus* the amount necessary for local administration, was provided by local collectors. Since the establishment of the republic in 1912 the confusion has been absolute, and things have persistently gone on from bad to worse; nor can any reorganisation be effective so long as the country is in its present unsettled political condition. One comforting observation may, however, be made, and that is popular life in China goes on much as usual; the crops are produced, trade is active, and the people really govern themselves. In spite of all political troubles and universal official corruption, the foreign trade of China for 1919 was an absolute 'record,' whether viewed in gold (with its low value) or silver (with its abnormally high value); moreover, the chief threads of revenue (i.e. customs and salt gabelle) are under British guardianship, so that the interest on loans is fairly safe. In other words, 'though everything may be going to perdition, there are still cakes and ale for all and sundry.'

China had no foreign debt before 1874, but in 1905 the debt amounted to £120,755,000, including £64,000,000 as indemnity to the powers for the 'Boxer' outrages. The debt is secured on the imperial maritime customs, and in February 1907 £114,000,000 of it was still outstanding, to which total must be added about £12,000,000 for railway loans up to the end of 1906, and perhaps quite £20,000,000 more for further railway, financial, naval, and other loans up to the spring of 1911. But all that is already past history. China's present foreign indebtedness may be divided into indemnity loans, railway loans, general loans, and provincial loans; the annual amount of debt service (including amortisation) is (excluding the 'Boxer' indemnity, which is likely to be written off as an act of war grace) about £11,000,000; but as China has been at the close of the war in luck on account of silver being three or four times its gold value in 1911, this means that she has only to find, say, \$25,000,000 Mex. instead of \$100,000,000. Thus her political cloud has a decidedly silver lining. (See below.)

The *imperial army* proper consisted in imperial days of Manchus, Mongols, and the descendants of Chinese who revolted from the Ming dynasty and joined the Manchus on their invasion of the empire, the first important defections taking place in 1633. These are still divided each into eight *corps* with different coloured banners, and as a whole are styled 'The Eight Banners.' What takes place with the money grant under the abdication treaty no one seems to care, but all Banner promotions, &c., are still solemnly reported to and approved by the Chinese War Office. The Banner headquarters remain in Peking. The utter inadequacy of the Green Standard and Braves—i.e. non-Banner or general army system—was shown by the collapse of China as a military power in the war with Japan in 1894-95; and even the much-vaunted navy, though it fought with bravery at the battles of the Yalu and Wei-hai Wei, effected little: five vessels—an armour-clad barbette and four cruisers—were sunk in the first engagement, and the most of the remaining ships subsequently fell into the hands of the Japanese. The Russo-Japanese war ten years later convinced the Chinese government once for all that both the Green Standard and the Braves were quite useless

for purposes of national defence; really capable armies were in progress of organisation on Japanese, German, or French models in nearly all the provinces, notably in Chih-li, where Yuan Shu-k'ai, previous to his downfall as premier in 1909, had as viceroy really achieved most creditable results. The total neglect of the Turkestan armies showed that China was quite unable to resist the peremptory demands of Russia in the spring of 1911. On the other hand, the Sz-ch'wan armies surprised Europe in 1910 by suddenly and summarily ejecting the Dalai Lama of Tibet and taking effective possession of his country; but the Tibetans regained the upper hand. Whereas under the Manchus civilians were everything and military men despised, the central government has now discovered that the zeal for military reform has reared in China a Frankenstein monster with a soul for money alone, military men being everything and civilians despised. The supreme control of the army is supposed to be vested in the General Staff and the Ministry of War at Peking, and the metropolitan gazette nowadays consists chiefly of military rewards and promotions. Pages might be written here to explain the various steps of army 'reform;' but present history may be summed up in a line: the *tuchuns* do exactly what they like, and the pay-sheets will not bear examination. Province is either actually at mock war with province, or is threatening war. The army or armies are rapidly ruining China—subject to the remarks above made about China quietly governing itself. Probably things will gradually 'come round,' as all Chinamen have a substratum of hard practical common-sense.

#### *Intercourse with Western Nations and Commerce.*

—It was not till after the Cape of Good Hope was doubled, and the passage to India discovered by Vasco da Gama in 1497, that intercourse between any of the European nations and China was possible by sea. It was in 1516 that the Portuguese first made their appearance at Canton; and they were followed at intervals of time by the Spaniards, the Dutch, and finally in 1635 by the English. The Chinese, noticing their roughness, received none of them cordially; and the dislike of them was increased by their mutual jealousies and collisions with one another. The Manchu sovereignty of the empire, moreover, was then in the throes of its birth, and the new rulers were the more disposed to assert their own superiority over all other questionable potentates. They would not acknowledge them as their equals, but only as their vassals. They felt the power of the foreigners whenever they made an attempt to restrict the strangers' operations by force, and accordingly began to fear them. As they became aware of foreign conquests in the Philippines, Java, and India, they would gladly have prohibited their approach to Chinese territories altogether. In the meantime trade gradually increased, and there grew up the importation of opium (see article OPIUM) from India, and the wonderful eagerness of multitudes to purchase and smoke it. Before 1767 the import rarely exceeded 200 chests, but that year it amounted to 1000. In 1792 the British government wisely sent an embassy under Lord Macartney to Peking with presents to the emperor, with a view to placing the relations between the two countries on a secure and proper footing; but though the ambassador and members of his suite were courteously treated, the main objects were not accomplished. In 1800 an imperial edict expressly prohibited the importation of opium, and threatened all Chinese who smoked it with condign punishment. It had been even before this a smuggling traffic, but henceforth there could be no doubt of its real character. Still it went on, and increased from year to year. A second embassy

from Great Britain in 1816 was dismissed from Peking suddenly and contumeliously because the ambassador would not perform the ceremony of the *kotow* (prostrations), and thereby acknowledge his own sovereign to be but a vassal of the empire.

So things went on till the charter of the East India Company expired in 1834, and the head of its Canton factory was superseded by a representative of the sovereign of Great Britain, who could not, however, conduct his intercourse with the Hong or Guild merchants as the others had done. The two nations were thus brought defiantly face to face. On the one side was an irresistible force, determined to prosecute its enterprise for the enlargement of trade, and the conduct of it as with an equal nation; on the other side was the old empire, seeming to be unconscious of its weakness, determined not to acknowledge the claim of equality, and confident in its power to suppress the import of opium. The government of China made its grand and final effort in 1839, and in the spring of that year the famous Lin Tsé-hsi was appointed to the governor-generalship of the Kwang provinces, with mission to bring the barbarians to reason. Out of his measures came our first war, which was declared by Great Britain against China in 1840. There could be no doubt as to the result of so unequal a contest; and we hurry to its close at Nanking, the old capital of the Ming empire, where a treaty of peace was signed on the 29th August 1842 on board Her Majesty's ship *Cornwallis*. The principal articles were that the island of Hong-kong should be ceded to Great Britain; that the ports of Canton (in Kwang-tung), Amoy, and Foochow (in Fu-kien), Ning-po (in Che-kiang), and Shanghai (in Kiang-su) should be opened to British trade and residence; and that thereafter official correspondence should be conducted on terms of equality according to the standing of the parties. Nothing was said in the treaty on the subject of opium, the smuggling traffic in which, by Americans as well as British, went on as before.

Before fifteen years had passed away, because of troubles at Canton not all of them quite creditable to Great Britain, and the obstinacy of the governor-general, Yeh Ming-shén, in refusing to meet Sir John Bowring (q.v.), it was thought necessary by the British government that war should be commenced against China again. In this undertaking France, having missionary grievances, joined as our ally. Canton was taken on the 29th December 1857, when Yeh was captured and sent a prisoner to Calcutta. Canton being now in the possession of the allies, arrangements were made for its government by a joint commission; and in February 1858 the allied plenipotentiaries, accompanied by the commissioners of the United States and Russia as non-combatants, proceeded to the north to lay their demands before the emperor at Peking. There was not so much fighting as there had been in 1842, and on June 26 a second treaty was concluded at T'ien-tsin, renewing and confirming the earlier treaty, but with many additional stipulations, the most important of which were that the sovereigns of Great Britain and China might, if they saw fit, appoint ambassadors, ministers, or other diplomatic agents to their respective courts; and that the British representative should not be required to perform any ceremony derogatory to him as representing the sovereign of an independent nation standing on an equality with China. Other stipulations provided for the protection of Christian missionaries and their converts; for liberty for British subjects to travel, for their pleasure or for purposes of trade, under passports, into all parts of the interior of the country; for the opening of five additional ports for commerce—Newchwang (in Shéng-king, the chief pro-

vince of Manchuria), T'eng-chou (with port of Chefoo, in Shan-tung), T'ai-wan (Formosa, several ports), Ch'ao-chou (with port of Swatow, in Kwang-tung), and K'uang-chou (in Hai-nan)—and for authority for merchant-ships to trade on the Yang-tsz River, ports on which would be opened when rebellion should have been put down and peace and order restored. Treaties on the same lines were concluded also with the United States, France, and Russia. A revision of the tariff regulations of 1842 was to take place subsequently in the year at Shanghai. This was done in October, when opium was (unhappily) entered among the legitimate articles of import, and the arrangement confirmed that the government should employ a foreign official in the collection of all maritime duties. It might seem that these treaties secured everything which foreign nations could require, and that the humiliation of the Chinese government was complete. But they were nearly wrecked by one concluding stipulation in all of them but that of the United States, that the ratifications of them should be exchanged at Peking within a year. The emperor and his advisers, when the pressure of the force at T'ientsin was removed, could not bear the thought of the embassies entering the sacred capital, and foolishly cast about to escape from the condition. The forts at Taku, guarding the entrance to the Pei-ho, and through it the approach to T'ien-tsin and thence to Peking, were rebuilt and strongly fortified. When the English, French, and American ministers returned to Shanghai with the ratified treaties in 1859, the Chinese commissioners who had signed them at T'ien-tsin were waiting for them, and urged that the ratifications should be exchanged there. The French and English ministers then insisted on proceeding to Peking as the place nominated for the exchange. But when they arrived at the mouth of the river (Pei-ho) with the gunboats under their command, they were unable to force the defences. A severe engagement ensued, and the allied forces sustained a repulse with heavy loss. It was the one victory gained by the Chinese. The British and French governments took immediate action. A third expedition under the same plenipotentiaries as before, with a force of nearly 20,000 men, was at the same place in little more than a year. The forts were taken on August 21, 1860, and on the 25th the plenipotentiaries were again established in T'ien-tsin. We can but give a bare word to their march in September on Peking, with all its exciting details. The emperor (Hien-feng) fled to Jeh-ho in the north of Chih-li, the imperial summer retreat; and his brother, Prince Kung, whose name became afterwards so well known, stepped to the front in the management of affairs. On the 13th October he surrendered the north-east gate of the city; and on the 24th the treaties were exchanged; an additional convention was signed, under which, of course, an additional indemnity was exacted from the Chinese; besides this, an arrangement was made about the emigration of coolies, which had become a crying scandal; at the same time a small piece of the continent of the empire, lying opposite to Hong-kong, was ceded to that colony. Thus it was that the attempt of China to keep itself aloof from the rest of the world came to an end, and a new era in the history of the empire was initiated.

Hien-feng died at Jeh-ho in August 1861, leaving the empire to his young son, only six years old. A cabal at Jeh-ho tried to keep the boy in their possession; but his uncle, Prince Kung, succeeded in getting him away to Peking. He then, along with the young emperor's mother and the empress-dowager, by whom Hien-feng had had no child, loyally and successfully administered a regency in accordance with the new conditions of the government. The

style of the reign was T'ung-chi, or 'Government in Union'; and so on till February 23, 1873, when the emperor announced publicly, and specially to the foreign ministers, that he had taken the government into his own hands. This brought up the question of an audience; but, after a good deal of protocolling and negotiation, it was finally settled on June 29 by the emperor receiving all the ministers then in Peking without the ceremony of prostration. His reign did not last long, for he died in January 1875. As he left no son, and had designated no successor, the members of the imperial house, according to the rules in such a case, appointed as his successor Tsai-t'ien, the son of Prince Ch'un, a younger brother of Prince Kung. The new sovereign was a child of four years old, and began to reign under the style of Kwang-su, or 'The Illustrious Succession.' He assumed personal government in March 1887.

It was during the 'generation,' or third part of a century, occupied by this unfortunate young emperor's reign (1875-1908) that the once all-powerful Manchu empire had its border territories lopped off one by one, and, in spite of one or two temporarily successful efforts to reassert itself, gradually succumbed to internal dry-rot and fell to pieces. Kwang-su's accession was irregular according to 'Confucian' canons, and indeed a censor prophesied therefrom the imminent collapse of the dynasty, committing suicide, in order to justify the seriousness of his view, on the occasion of the deceased emperor T'ung-chi's formal funeral in 1878. The first untoward political event in the new reign affecting foreign relations was the assassination of the British consular officer Margary, a treacherous incident that led up to the Chefoo Convention and the opening of several new treaty ports, coast and riverine. Then followed the peevish incident of the Wusung-Shanghai railway, which the irritated viceregal government purchased, tore up, and flung aside to rot away. In 1880 General Gordon threw up his appointment in India and came to China in order to advise the Manchu court as to the proper policy to pursue in the dispute with Russia about the contested territory of Kulja in Turkestan. The final issue of this business was on the whole a diplomatic success for China, whose consequently growing confidence, however, led to a serious quarrel with France upon certain conflicting claims to the suzerainty over Tong-king and Annam. Diplomatic as well as military honours were about easy in the final result, although France remained at the end in uncontested possession and China had had her navy partly destroyed during the fighting. Meanwhile the Korean question became acute, a false position between China and her vassal was created, bad blood was generated with Russia over the seizure of Port Hamilton by the British, who lent Captain Lang to reorganise the shattered Chinese fleet, and thus encouraged China to show her naval flag for the first time on the high seas, and to demonstrate politically to the Dutch in the south. Unfortunately French activities in Indo-China and British difficulties with King Theebaw of Burma led to Franco-British naggings, and to China's losing whatever shadowy claims she may have had to suzerainty in the valley of the Irrawaddy. This question again became complicated by British-Indian claims to Tibetan trade being dragged into the dispute. Meanwhile the Russians had decided to carry the new Siberian railway to the Pacific; the Tsarevitch (later the unfortunate Nicholas II.) visited China, and narrowly escaped assassination in Japan. Thus Manchuria found herself seriously threatened; whilst Japan, in view of Korean, Russian, and Manchurian complications, found it advisable to *s'aviser*, and to prepare seriously for future assaults from any

quarter. War between Japan and China broke out in 1894, purely in connection with the Korean question, which had meanwhile been simmering ominously for ten years. China was ignominiously and utterly defeated both by land and sea, and lost the valuable island of Formosa. The 'melon-slicing' of the venerable empire was now openly discussed between the rival powers, who by this time had formed a complete circle of potential threats both by land and sea. For the moment, however, they contented themselves with marking out imaginary 'spheres of interest.' China reached lowest water-mark in 1897, when the German 'mailed fist' set a quite new example of violence by assaulting the mainland and taking possession of Kiao-chow and its anchorage, hinterland, and islands. Russia, France, and Great Britain immediately discovered that a balance of power necessitated corresponding concessions of territory, leasehold or otherwise, in Liao-tung (north) and Kwang-tung (south); whilst even Italy 'demonstrated'—but unsuccessfully—off Che-kiang (centre). The 'Boxer' madness of 1900 was the not unnatural outcome of all these pin-prick attacks upon Manchu dignity; small wonder, therefore, that native Chinese republican sentiments came actively to the fore. The war between Russia and Japan in 1904-5, though waged on Chinese soil, gave the Manchus a certain amount of breathing-time, not to say satisfaction and renewal of confidence. But meanwhile Tibetan trade questions had come to a head; Great Britain, to China's amazement, succeeded in occupying the sacred capital of Lhasa, and Manchu influence lost in this direction what it had temporarily recovered along the coast. It must not be forgotten that in 1898-99 the Americans had fallen out with Spain and taken possession of Manila. Though scarcely a Chinese question, still the incident brought the United States more prominently upon the Far Eastern scenes. American influence in favour of China and Korea might have been greater had her treatment of Chinese under American rule, in the Philippines as in the States, been a little more generous. Moreover, though President Roosevelt had done good service in the interests of peace between Russia and Japan, and had shown in Panamá that America also could be 'decisive' when her own great interests were being thwarted by political shufflers, yet the United States, except during the 'Boxer' scare and the allied march on Peking, had never exhibited (even in the background) serious military or naval force in the China seas since the 1871 attack on Korea, and thus both Russia and Japan were able quietly to ignore American attempts to ease things off for China in Manchuria and Korea, which last Japan annexed. After the death of the empress-dowager and the helpless emperor in 1908, the powers generally showed a tendency to be kind to the new regency, and things might have gone well for the Manchu rulers, now genuinely disposed to grant constitutional privileges, had not intrigues at the Peking court led to the dismissal of the powerful and enlightened premier, Yüan Shi-k'ai, and to a dangerous dispute with the provinces regarding the 'nationalisation' of all railways. Republican ambitions had meanwhile widely developed, whilst improvement in army conditions had unexpectedly raised the political status of military men, depressing that of civilians. Thus the military revolution of 1911, after a short struggle, put an end to the Manchu dynasty, which, during one short reign (1875-1908) had lost Formosa, Annam, Tong-king, Upper Burma, Tibet (not yet quite gone), Korea, part of Manchuria, and various ports (with hinterlands) along the coast.

We now return to our main subject. Soon after

the ratification of the treaties of T'ien-tsin, the promised ports on the Great River, except Nanking, were opened—namely, Hankow (in Hu-pei), Kewkiang (in Kiang-si), and Chinkiang (in Kiang-su). I-ch'ang (in Hu-pei), Wuhu (in Anhui), Wên-chou (in Che-kiang), and Pakhoi (in Kwang-tung) were opened by the Chefoo convention (1876), which also made concessions to China in connection with the opium traffic. The treaty of Shimonoseki (1895), after the war with Japan, opened four additional ports—Chungking, Hangchow, Soochow, and Shashi. The foreign debt of China, contracted almost wholly in connection with the Japanese war (1894-95), and the indemnity for the 'Boxer' outrages (£84,000,000), was in 1904 estimated at about £120,000,000, all, except £2,300,000 of railway loan, secured on the customs. Since then China has paid off large sums; but, on the other hand, she has incurred further heavy liabilities, notably during the year 1911. It was impossible to place her total indebtedness to foreign banks and syndicates in 1911 at less than £150,000,000. A semi-official U.S. estimate, quoting the *Statesman's Year-book*, placed China's total indebtedness on the 31st December 1916 at £171,906,000. (See above.)

In 1910 the vessels entered and cleared at the various ports were 219,000 (of nearly 89,000,000 tons), being an increase (chiefly under Russian and Chinese flags) of 11,294 vessels and about 2,000,000 tons over the figures for 1909, when the British tonnage was over 34,000,000 tons in nearly 28,000 vessels, against half that Chinese tonnage in five times the number of small vessels; the Amur-Sungari navigation accounts for the Russian increase. The 'record' year was 1914 with 98,000,000 tons; this was before the effects of the Great War had been felt. In 1917 213,473 vessels of nearly 87,000,000 tons entered and cleared, the British share being 34,902 vessels, of over 33,500,000 tons. Russian shipping was maintained, as the Bolsheviks had not yet touched Amur-Sungari navigation. Between 1910 and 1917 Japanese shipping gradually overhauled Chinese percentages, which, however, were well maintained. The total value of the net imports from abroad had increased from 328,740,000 *hankwan* (i.e. customs) taels in 1903 and 418,158,067 in 1909 to 462,964,894 in 1910 and 549,518,774 in 1917; the exports rose from over 214,000,000 in 1903 and nearly 338,000,000 in 1909 to 380,833,328 in 1910 and 462,931,630 in 1917. The import of opium in quantity declined from 48,917 piculs in 1909 to 35,358 in 1910 and 1072 in 1917, of course owing to the recent anti-opium movement; even the native opium passing through the foreign customs showed a large decrease; in any case, the semi-independent *tuchins* take care to feather their own nests betimes. In February 1919 the remaining stock of foreign opium (1207 chests) was methodically destroyed at Shanghai, at a great financial sacrifice, by order of the president; but, dramatic though this may be, it would have been much better for China if he could have insisted on the insubordinate *tuchins* doing their duty in preventing the cultivation of the poppy in the western and south-western provinces. The export trade in soya beans received a huge impetus in 1909, jumping from about 5,000,000 piculs in 1908, worth 9,000,000 taels, to about 15,000,000 piculs, worth 33,000,000 taels, in 1909. In 1910, however, the high prices, coupled with a shortage of food in China, caused a falling off of 3,500,000 piculs in the export abroad; accordingly the figures for 1917 are about 15,500,000 piculs, value barely 24,000,000 taels. The rat plague of 1911 must have further disorganised this promising trade. The imports from Great Britain are mostly cottons and cotton yarn, metals and machinery, woollens,

and coal, including coke. The *haikwan* tael in 1903 had a value of 2s. 7<sup>3</sup>/<sub>4</sub>d., and it was about a penny higher during 1910; in 1919-20 it soared up to very nearly 8s., an unheard-of ratio during the post-treaty times—i.e. 1860-1920.

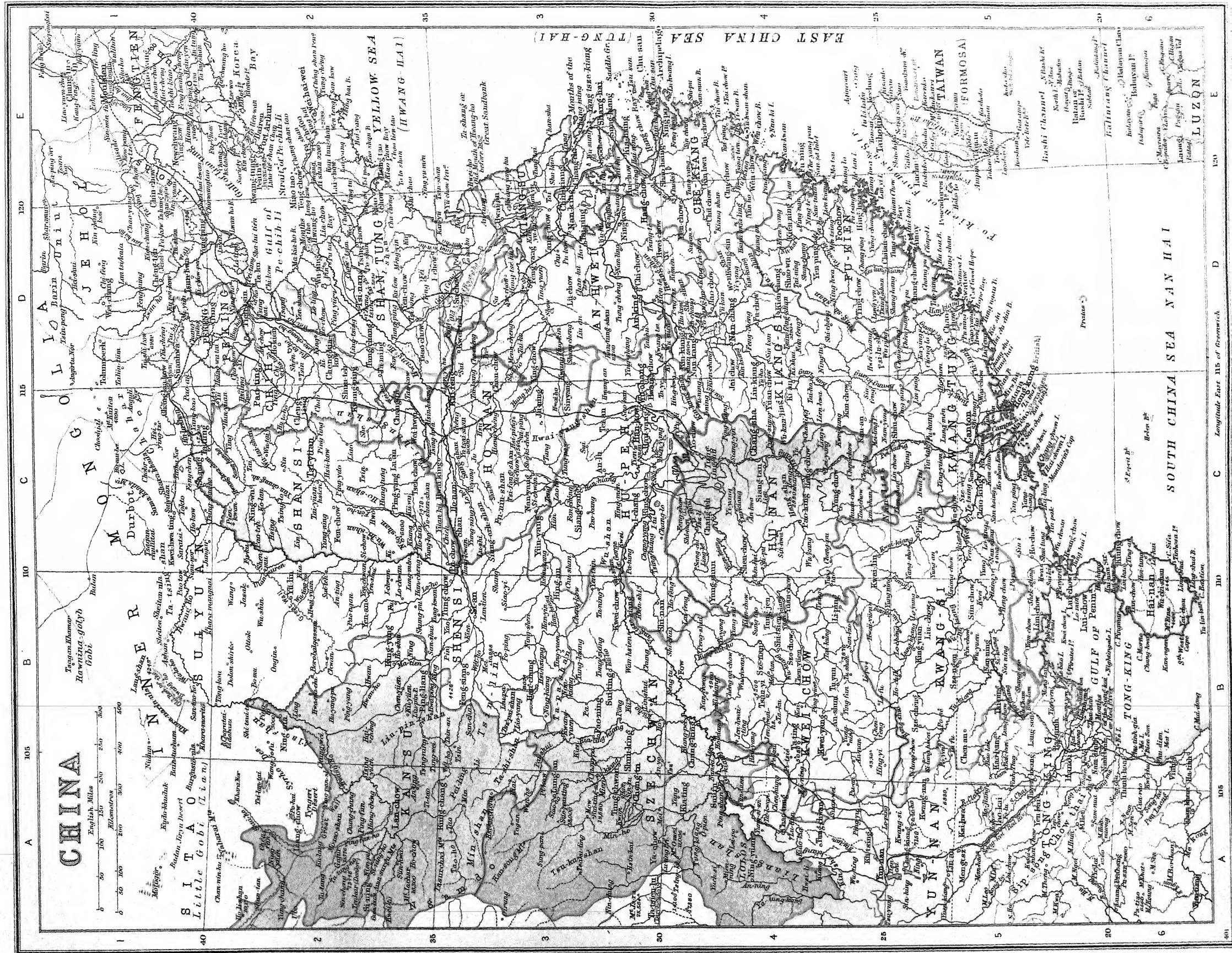
China has in the past been mainly a self-contained nation, but since treaty days the Chinese have shown an increasing tendency to seek a livelihood abroad, especially in California, British Columbia, the Straits Settlements and Eastern Archipelago, and Australia. More than half the population of Singapore is Chinese, and in 1900 there were 540,000 Chinese in Java; the latest official estimates are 1,800,000. In Australia there have never been more than 60,000, now (officially) reduced to 35,000. From 1855 to 1867 the immigration of Chinese into the United States varied from 3000 to 7000; from 1868 to 1881 it was usually between 10,000 and 20,000; in 1882 it was 33,614. But the imposition of prohibitory taxes on Chinese immigrants reduced this to 17 in 1886; and in 1888 the immigration of Chinese workmen was absolutely forbidden for twenty-one years. British Columbia and some of the Australian states have also sought to restrict Chinese immigration by imposing a heavy poll-tax on immigrant Chinese. In the year 1919 the *China Year-book* published the following estimate of Chinese in foreign countries: Japan, 17,700; Siberia, 37,000; Hong-kong, 314,390; Siam, 1,500,000; Burma, 134,600; Java, 1,825,700; Australia, 35,000; Europe, 1760; Korea, 11,300; Philippines, 84,060; Annam, 197,300; Africa, 5000; Formosa, 2,258,650; East India, 1,023,500; Singapore, 1,000,000; Macao, 74,560; U.S.A., 150,000; Canada, 12,000; Mexico, 3000; Brazil, 20,000; Honolulu, 27,000; Peru, 45,000; Cuba, 90,000—nearly 9,000,000 in all; but though 'official,' the official source or sources are not specified, nor is Malaysia (estimated at about 197,000) included; nor Russia, where thousands of Chinese miners (from the Amur, &c.) have been enlisted by the Bolsheviks. A French authority in 1910 showed that there were not 400,000 Chinese in Siam; and the number in Java, besides being doubtful, depends upon what view is taken of hybrids. Consequently the true figures must be characterised for the present as a matter of conjecture only.

The empire (now republic) has to some considerable extent taken real advantage of Western civilisation—telegraphs have been established (42,500 miles, excluding 1000 miles of cable); a decided beginning made with railways (6835 miles, with 2000 miles under construction); and various foreigners employed in training the army, in the arsenals, and in the custom-houses, salt gabelle, post-office administration, &c. A large navy of iron-clads was acquired in 1884-94, but what remains of former navies is now beneath notice. When the Great War broke out there were supposed to be 1000 officers and 4830 men, whose only 'service' was mischievous political interference, now with one side, now with the other. The rottenness of the military and naval systems was shown by the Japanese war of 1894-95, arising out of international rivalries in Korea (q.v.). A Japanese invading force, after a battle at P'ing-yang and a naval battle on the Yalu (17th September 1894), drove the Chinese out of Korea, and, entering Manchuria, took the strong naval station of Port Arthur (November 1894). The corresponding station and arsenal south of the Gulf of Peichih-li, that of Wei-hai Wei, subsequently yielded to the Japanese (January 1895); and the colossal Chinese empire was, after a few months' ineffectual fighting, reduced to sue for peace. The Japanese terms included the cession of Formosa and the Liao-tung Peninsula, including Port Arthur, as well as the payment of a war indemnity of thirty-

three millions sterling. But Russia, France, and Germany constrained the Japanese to refrain from insisting on the cession of Liao-tung, in consideration of an increase of the war indemnity by sixteen millions. Russia afterwards arranged that its Siberian railway was to pass through Kirin and Mukden to Port Arthur and Peking; by help of garrisons and Cossack settlers she secured military and commercial control of Manchuria (q.v.); and on an extensible lease obtained possession of Port Arthur and Talien-wan. Germany occupied, on a lease of ninety-nine years, the port of Kiao-chow in Shan-tung, and regarded the valley of the lower Hoang-ho as her special sphere of interest. Great Britain, insisting on full freedom of trade with China ('the open door'), obtained a definite promise that no part of the Yang-tsz basin (to be thenceforth considered a British 'sphere of influence') should be alienated by China; secured the opening of additional treaty ports and the free navigation of part of some of the great rivers; and occupied Wei-hai Wei (on its evacuation by the Japanese) on the same terms as Russia held Port Arthur. European diplomacy was next entangled in rival schemes for giving China loans and securing (for subjects of Russia, Britain, Germany, France, Belgium, and the United States) the right of making railways in China. France secured some rectification of the Tong-king frontier. Li Hung-chang, believed to be supporting Russian interests, fell from power, and the emperor in 1898 started a brief and violent system of reforms on Western ideas, but was summarily checked in this career by the dowager-empress. The innovating advisers of the emperor fled or were slain or imprisoned; the emperor was kept under strict surveillance; and, with much internal discontent, there were local rebellions and rumours of intrigues and of further *coups d'état*. In April 1900 riots took place at Peking and in many parts of the empire; missionaries, their wives and children, were massacred, and large numbers of native Christians were slaughtered—it was computed at the time that 700,000 native Roman Catholics had perished; but, as the Catholics themselves only claim 1,100,000 native Christians for all their missions in China, this figure must be an over-estimate. The German Minister was murdered by soldiers in the streets of Peking; and in June the other foreign representatives were closely besieged in their legations, having a joint garrison of under five hundred officers and men of all nations. The government threw all the blame on the organisation of the 'Boxers,' an anti-foreign association claiming to exercise supernatural powers; but it soon became manifest that a part at least of the government was acting through them, and that many of the worst atrocities had been authorised by princes and high officials. Armed forces were despatched by the European nations, the United States, and the Japanese, the British contingent including many native Indian troops; a joint expedition to relieve the legations, under Admiral Seymour, in June 1900, was forced to return; T'ien-tsin was taken after some hard fighting in July, but it was not till the middle of August that the legations were relieved, having maintained a resolute defence for eight weeks. After negotiation between the powers, a joint note was presented to China in December 1900 demanding punishment of the officials responsible for misconduct, besides an indemnity (ultimately fixed at 450 million taels) for the murders and other outrages; prohibiting the importation of war material into China; and stipulating for the protection of the legations by European guards. The protocol was officially signed on 7th September 1901. Meanwhile Russia had tried to force on China a convention involving her permanent occupation of Manchuria; but owing to the







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opposition of the powers, and particularly of Japan, China refused to accede. The Japanese four years later took on themselves the burden of dealing with Russia, and the war of 1904-5 followed; see JAPAN. The Emperor Kwang-su died on November 14, 1908, and the empress-dowager on the following day. The infant P'u-i, reigning under the style Suan-t'ung, succeeded under the regency of his father, Prince Ch'un (the younger). The new constitutional policy may be said to have begun to bear fruit in 1910, when for the first time a National Assembly (partly elective) met at Peking; in each province also a local parliamentary assembly discussed affairs in unison with their colleagues at Peking. But 'the best-laid schemes o' mice an' men gang aft agley.' A revolution broke out at Hankow on the 10th October 1911, and the ex-premier Yuan Shi-k'ai, who had in 1909, as already stated, fallen a victim to palace intrigue, was hastily summoned from his retirement to restore the situation. It was too late; province after province joined in the cry, 'Away with the Manchus!' The arch-revolutionary Sun Yat-sen hastened over from America, and, in spite of all efforts to save the dynasty, a republic was proclaimed at Nanking on the 1st January 1912, with Sun Yat-sen as president. On the 11th February the empress-dowager and the emperor formally abdicated, and on the 13th Yuan Shi-k'ai issued his first 'mandate' as emergency president at Peking. The rival Nanking president self-sacrificingly telegraphed his personal congratulations, and considerably gave way as an official, arranging, however, that the soldiers' popular Hankow hero Li Yuan-hung, his vice-president, should also be vice-president under Yuan Shi-k'ai. The next four years were passed in a maze of political squabbles, revolts, parliamentary disputes, &c., but on the whole Yuan managed to consolidate his authority and secure a certain amount of obedience from the (mostly self-constituted) military and civil governors of the provinces; so much so that both foreigners and natives began to raise the cry, 'Republicanism is unsuitable to China; let us have personal rule over a constitutional empire.' Meanwhile the great European war broke out in the autumn of 1914, and Japan's influence in the Far East naturally became predominant after the forcible ejection by a Japanese-English force of the Germans from Kiao-chow. It was in 1915, when things looked black, that Japan thought fit to present to China the notorious twenty-one demands, evidently intended to consolidate and cement her already strong position in the East, no matter what the final result of the war in the West. China herself was perpetually wobbling, and thus both Germans and Japanese had opportunities of forming, now Peking, now Canton, parties in support of this or that opportunist policy. Finally the unhappy Yuan, deceived as to Japan's support, gave way to temptation, and boldly proclaimed himself emperor of a new dynasty but constitutional monarchy. All south and west China was now perturbed; Yuan speedily perceived that his *coup d'état* had misfired. He died of vexation at the failure of all his remedial devices in June 1916, and was succeeded by his vice-president, Li Yuan-hung, a perfectly honest and very popular man, but one quite innocent alike of historical and empirical knowledge and government scheming. After a year of 'creditable inaction,' he unfortunately, in his bewilderment, invited one of the most hot-headed military 'pronouncers' to Peking to aid him in defeating the suspicious political schemes of the others. To every one's intense surprise (including that of the child-emperor himself), Chang Hün (the pig-tailed pronouncer) in July 1917 suddenly re-established the Manchu dynasty, with himself as premier and factotum. This farcical action reunited

for the moment the saner elements among even the northern cabal of the marshals, governors, ministers, and all and sundry who had intermittently been intriguing either with or against the Japanese and the Germans respectively. A Gilbertian battle was fought round the palace precincts; Chang Hün fled to the Dutch legation; Li Yuan-hung (who had sought other legation protection) resigned in disgust, washing his hands for ever of 'government'; and his vice-president, Fêng Kwoh-chang (military governor at Nanking), was induced to accept the post of temporary president. China declared war against Germany and Austria in August; but the new president was unable to reconcile the northern and southern factions, to assert Peking supremacy over the provinces, to convince the Entente powers of China's will and capacity to afford genuine assistance, or to come to a trusty and satisfactory understanding with Japan about the defence of the Siberian frontier. He resigned in October 1918, when Sü Shi-ch'ang was inaugurated president, a man of scholarship and high character, viceroy of Manchuria under the empire, and premier under Yuan Shi-k'ai. His prudent and conciliatory policy at least did no harm; but these negative virtues did not avail him to the end, and on the 2d June 1922 he had to resign. On the 11th June Li Yuan-hung arrived to finish his uncompleted term of 1917; meanwhile political confusion reigned supreme.

LANGUAGE, WRITING, AND LITERATURE.—The speech and the written language of the Chinese differ from each other more widely than those of other literary peoples. The latter speaks through the eye, not as words, but as symbols of ideas. All Chinese literature might be understood and translated though the student of it could not name a single character by any Chinese sound; and proof of this lies in the fact that speakers of Chinese dialects which are totally unintelligible to other Chinese still read the same characters with precisely equal facility, though with different sounds. The words and the names of the written characters are all monosyllabic, and are inconjugable and indeclinable, without inflection or change of any kind except in *tone*, and at the same time so versatile that there are few of them which may not perform the rôle indifferently, according to their position in a sentence, of most of what we call Parts of Speech. Chinese has never advanced to anything like agglutination even (see PHILOLOGY); but its written characters existed probably in crude and less developed form between 3000 and 4000 years ago. These characters have been in later times divided into six classes: (1) Pictorial characters, originally rude pictures of objects; (2) Indicative characters, intended by their form and the relation of their parts to suggest to the reader the idea in the mind of their makers; (3) Composite characters, made up of two or more integral characters; (4) Inverted characters, formed from others by inversion; (5) Borrowed characters, used in other than their proper signification; and (6) Phonetical characters, of which one part has a phonetic use, and indicates, exactly or approximately, the name of the compound, and the other part the category of meaning which it conveys. The sixth class is beyond comparison the most numerous, and embraces well on to 40,000 of the 43,000 characters found in the *K'ang-hsi* dictionary of 1704. A number of characters, which has varied from 554 to 214, were set apart in comparatively modern times as 'ideograms' or 'mothers of meaning'; and a larger and more indefinite number were chosen, to express in connection with them the name or sound of the compounds; these were called 'mothers of sound.' Dr Chalmers, of Hong-kong, published in 1878 a 'Concise Chinese Dictionary'

in which the phonetic constituents are reduced to 884. These, with the 214 ideograms, having been learned, 1098 characters in all, the student has mastered the elements of all the Chinese characters. Pronunciation is constantly varying, and Chalmers's 'average' reading will often be far from giving 'the present truth' of the names of many characters in specific individual dialects; but a knowledge of these phonetic constituents, though not essential, does much to lighten the strain upon the memory in learning Chinese. That great scholar and statesman Li Hung-chang was pleased to accept a copy of Dr Chalmers's 'Concise Dictionary,' and to express his approval.

The locally variable monosyllabic utterances, however, available thus to name the 43,000 characters, are few indeed. In Pekingese they are only 426. Even if there were as many as 1000 different syllables in the language, equally divided among the characters, an average of more than forty meanings would belong to each. In the 'Syllabic Dictionary' of the late Dr Williams, containing only 12,527 characters, placed under 552 'standard' syllables, there are about 150 characters placed under the monosyllable *i* (= *ee* in 'see'). To the eye there is no difficulty in distinguishing all these *i*'s; but to the ear such discrimination, unassisted otherwise, is impossible. To assist it, there is, as just stated, a system of *tones*, the number of which varies in different dialects. According to the tone in which the monosyllable is pronounced, its meaning is different; and this renders what we call a 'good ear' desirable in learning the speech of China. There are other devices by which the difficulty occasioned by the slender syllabary of Chinese speech is overcome, such as the combination of synonyms, and the multiplication of colloquial and local particles hardly to be found in serious literature or in the dictionaries. As a consequence, while conciseness is a characteristic of good Chinese composition, the spoken language is verbose—e.g. the fable of 'The Fox and the Grapes,' told in 131 English words, is rendered in good Chinese by 85 characters, while a version of it in Cantonese colloquial contains 163 words. Still, the colloquial speech is not difficult of acquisition. Residents have often had occasion to remark that the children of English families resident in China who were not restricted from intercourse with the Chinese spoke the colloquial more fluently and readily than their parents, and also than the English which they spoke with their parents.

After the Buddhist missionaries came to China, and scholars got some acquaintance with the use of the Sanskrit alphabet, they began to devise a method of spelling (so to speak) their symbolic characters, dividing each monosyllable into an initial and a final sound, and then joining two other characters together, one to give the initial (aspirated or unaspirated, surd or sonant); and the other, always in the same tone as the character thus spelled, to give its final sound. This method, though cumbersome, might have been of more steady use to the student if the same characters had always been employed for the same initial and the same final sounds, as is done so far as is practicable in Chalmers's 'Concise Dictionary.' But every lexicographer adopted his own characters at his pleasure—e.g. the character 理 (*li*=*l+i*) is spelled in one dictionary by 良 (*li*-iang) and 止 (*ch+i*) (in some dialects still *i*); in a second by 兩 (*li*-iang) and 耳 (*er*) (in some dialects still *i*); and in a third by 良 (*li*-iang) and 以 (*i*). The K'ang-hi lexicon, after reciting these three spellings, adds

that the sound is the same as 里, which is the phonetic element, 里. This irregular spelling only distracts the student; the Chinese scholars failed to apprehend the true nature of the alphabetic signs or letters, very much as Westerners have often entirely failed to understand the true nature of the *tones*, which, though varying in each dialect, are perfectly 'orderly,' though no native can 'determine' the order.

From the analysis of the characters which has been given, their inconjugable and indeclinable character, and from a versatility such that one of them may perform the rôle of most of our 'parts of speech,' it is evident that any attempt to apply to them the categories and rules of grammar on the model of our Aryan languages must be very much 'love's labour lost,' yet dignified composition with them has its own tacit rules, which are not very difficult to practise, though hard to define. As Dr Marshman perhaps somewhat axiomatically expressed it in his grammar of 1814, 'the whole of Chinese grammar depends on position.' Under the skilful application of this principle, the Chinese characters weave the web of thought with the rapidity of engine-driven shuttles; and there has grown up an immense Chinese literature, not inferior, date for date, to that of Rome. Composition, like oratory, demands practice and adherence to the tacitly accepted canons of good taste, as evinced by the best models, whether of antiquity or the present day.

Before entering on a brief description of Chinese literature, a paragraph may be allowed to what is called 'pidgin English,' a sort of *lingua franca* which grew up between Chinese on the seaboard and foreigners, for the purpose of intercommunication, while neither party had the means or the wish to acquire an accurate knowledge of the language of the other. 'Pidgin' is a Chinese attempt to pronounce our word 'business'; and the materials of the lingo are nearly all English words similarly represented or misrepresented, and called 'broken English.' The idiom, on the other hand, is almost entirely that of colloquial Chinese. Foreigners and natives alike get to master it in a short time, so as to carry on long conversations by means of it, and to transact the most important affairs of business with the slenderest possible stock of individual words. Dr Williams (vol. i. p. 832) gives the following example of it, taken from the *Chinese Repository*, vol. x.: A gentleman meets a Chinese acquaintance accompanying a coffin which is being conveyed along the street, and asks him who is dead ('what man hab die?'). 'No man hab catchee die,' is the answer. 'Dis one piecy coffin I just now give my old fader. He likee too much counta my numba one plover; s'pose he sometime catchee die, can usee he.'—'So fashion, eh? How muchee plice (price) can catchee one alla same same?'—'I tinky can get one alla same so fashion one tonsan dolla, so; dis blong first chop hansom, lo!' There is often a charming raciness about such conversations, and one occasionally sees in his Chinese interlocutor that working of the mind which has been described in the formation of the third or composite class of characters. For instance, a Chinese boy (all male servants are called *boys*) once came to ask the writer to intercede for him with his master, who was treating him, he thought, unjustly. 'He numba one sassy (saucy = bad) man,' he said; 'he no hab topside pidgin;' meaning that his master had no *religion*, no dealing with the powers above. This jargon is, however, passing away, except in the coolie and casual workman class. Chinese who know English well—and English who know Chinese passably—are increasing from year to year.

How vast and varied the Chinese literature is may be seen from a very brief and imperfect analysis of the contents of the catalogue *raisonné* of the works collected, by an order of the K'ien-lung reign in 1722, to be printed or reprinted as a great national library. The catalogue is arranged in four divisions under the name of *K'u*, 'Arsenals,' 'Treasures,' or 'Magazines'; the first, in 44 chapters, containing works on the classics and dictionaries necessary in the study of them; the second, in 46 chapters, works of history; the third, in 57 chapters, works on philosophy and the arts; and the fourth, in 53 chapters, works of poetry and belles-lettres.

The *classics* are the Confucian books, and a few others, on which an amount of commentary has been expended certainly not inferior either in voluminousness or in patient care to what has been put forth on our own sacred Scriptures; and it still goes on without abatement. A collection of books on them by a multitude of scholars of the Manchu dynasty was published at Canton in 1829 in 1400 chapters.

The *histories* are those of China itself, and are divided into four classes according to the different methods of the authors. The first place is given to the 'Correct' and 'Authoritative,' or the 'Dynastic,' which now form a collection of twenty-four different works. A good copy of the set, bound in English fashion, amounts to sixty-four thick volumes, imperial 8vo size. In general, each dynastic history contains an account (almost journalistic) of the several reigns, followed by treatises on chronology, rites, music, jurisprudence, 'food and goods' or political economy, state sacrifices, astronomy, the five elements, geography (and especially topography), and the literature. After these treatises we have a host of biographies of the most remarkable individuals of the dynasty, including virtuous women; and the history usually concludes with an account of the foreign peoples with which there has been any intercourse.

The *philosophy and arts* division deals with the works of the class of the literati, both orthodox and heterodox; of writers on military affairs; on legislation; on agriculture, horticulture, and the mulberry-tree; on medicine; on astronomy and mathematics; on divination; on painting, music, engraving, and other arts; on ink and inkstones; on tea and the tea-plant; on articles of diet; on the works of several of the Roman Catholic missionaries; and concludes with works of Taoism and Buddhism. Five chapters are devoted to works on mythology and lighter subjects, not including, however, as we shall presently see, novels and romances.

The *belles-lettres* division has the general name of *Tsi*, 'Collections' or 'Compilations.' It comprehends the various classes of polite literature, poetry, and analytical or critical works. Chinese poetry has no epic; but it is rich in ballads, lyrical and descriptive pieces, rhythmical effusions and songs, eulogies and elegies, and monumental inscriptions. Its poets have been without number, and its poetesses not a few. One of the Confucian classics is 'The Book of Poetry;' and poetry was one of the standing subjects in the competitive examinations, so far, at least, as the quite recent introduction of European education permitted of its survival in the official scheme.

Novels and romances, dramas, and books written in the colloquial style are not admitted into such grand catalogues as the above; but the literature is not without them. There is no more pleasant reading than some of their historical romances, such as the *Expanded Narrative of the Period of the Three Kingdoms* (168-245 A.D.), by a *raconteur* of extraordinarily graphic power, written in our 13th century. Some of the best novels have been

translated into European languages: *The Fortunate Union*, by Sir John Francis Davis; *The Rambles of the Ching-Teh Emperor* (1506-21) in *Kiangnan*, under the superintendence of Dr Legge; *Les Deux Cousines* and *Les Deux Jeunes Filles Lettres*, by the late Stanislas Julien; and others, as well as some of the dramas.

Great as the Chinese literature is, it would have been greater, especially in the earlier portions of it, but for the burning of the Confucian books by the founder of the Ts'in dynasty, and for the subsequent 'bibliothecal catastrophes' which overtook one imperial library after another down to the middle of our 6th century. Paper was made and employed for writing very early in our second century, and printing by means of wooden blocks, according to the fashion still prevailing, was practised off and on at irregular intervals and undefined localities not very long afterwards. An edition of all the classical books was so published in 922 A.D.; but it is probable that printing from whole pages of carved wood was practised long before that, on the analogy of negative paper rubbings taken from stone inscriptions. The invention of movable types, or, perhaps more correctly, movable matrices, belongs to a blacksmith called Pi Sheng more than a century afterwards, though such types have only within the present generation begun to supersede the wooden blocks. Some of the inventions claimed for China have been called in question, but about this—perhaps the most important of all inventions after that of the Western alphabets—there can be no dispute.

**China Bark.** See CINCHONA, QUININE.—For China Clay, see KAOLIN; for China Grass, BEHMERIA; for China Ink, INK; for the China Seas, ASIA, PACIFIC; for China-ware, POTTERY.

**Chinampas**, Mexican floating gardens. See FLOATING ISLANDS.

**Chinandega**, the capital of a department of Nicaragua, 13 miles by rail from the Pacific coast; pop. 14,000.

**China Root**, the fleshy rootstock of *Smilax China*, Bastard China Root being *S. pseudo-China*; see SMILACEE. The West Indian China Root is *Vitis*, or *Cissus*, *sicyoides*, a plant closely allied to the Vine (q.v.).

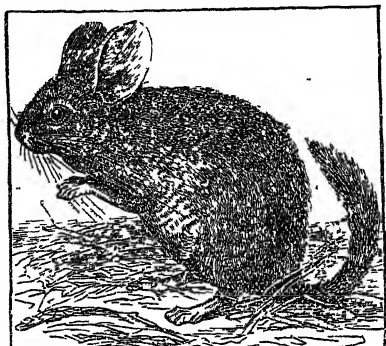
**Chincha Islands**, three bare, rocky islets, with a joint area of 6½ square miles, rising 200 feet out of the sea off the coast of Peru, opposite the Bay of Pisco. From 1841 till 1874 they yielded millions of tons of Guano (q.v.); but the beds, originally some 100 feet thick, became exhausted.

**Chinchay-cocha**, a lake of Peru, in the department of Junin, 13,330 feet above the sea, is 36 miles long and 7 broad, with an area of about 300 sq. m. It is the source of the river Jauga, and abounds in fish and wild-fowl.

**Chinchilla**, a town of Spain, 12 miles SE. of Albacete by rail, situated on an abrupt rocky hill, in which are numerous caves that serve as dwelling-places. It has gypsum and marble quarries and manufactures of earthenware. Pop. 7000.

**Chinchilla** (*C. lanigera*), a South American rodent, well known by its soft gray fur. Two related animals (*Lagidium peruanum* and *Lagotomus trichodactylus*, the Viscacha) form along with the true chinchilla the small family Chinchillidae in the porcupine section of the Rodent order. All the three are somewhat squirrel-like animals, but have long hind-legs, bushy tail, very soft fur, and complete collar-bones. The chinchilla and the lagidium occur on the higher Andes of Peru and Chile at a high elevation; the viscacha is found on the Pámpas. The three genera differ distinctly, but not widely. The chinchilla proper has

a body about a foot long, and the tail measures fully 6 inches. They are extremely active animals, and climb among the rocks with the greatest agility. They are killed in thousands for the sake of their fur,



Chinchilla.

and, prolific as they are, seem to be diminishing in abundance. The fur is used for various articles of attire, and the Peruvians are said to have formerly woven the hair into fine fabrics. See VISCACHA.

**Chinchón**, a town of Spain, 25 miles SE. of Madrid; pop. 5000. After a Countess of Chinchón, wife of the governor of Peru in 1638, Peruvian bark was named *Chinchona*, now habitually misspelled and mispronounced *Cinchona* (q.v.).

**Chindwa'ra**, chief town of a district in the Central Provinces of India, on a plateau 2200 feet above the sea, 70 miles N. by W. of Nagpur. It is the seat of a Swedish Lutheran mission. Pop. 13,000.—The district has an area of 4631 sq. m., and a pop. of 517,000.

**Chinese Hemp**, a kind of *Conchorus* (q.v.).

**Chinese White**, a permanent white pigment used in the arts, consists of the white oxide of zinc, ZnO. Its manufacture was first attempted in 1780, and in 1796 Atkinson patented its use as a substitute for white-lead, which had previously been the only available white pigment, and was a most unsatisfactory one on account of its turning brown on continued exposure to the atmosphere. Only, however, in 1844 was a good and cheap method of preparing the pigment discovered by M. Leclaire.

**Chingalpat** (*Chengalpat*), a town of India, 36 miles SW. of Madras by rail, with district court and hospital, a public bungalow, and an old fort, now abandoned, but formerly of great strength and importance as a key of Madras. Clive captured it in 1752. Pop. 12,000.—The district to which the town gives name has an area of 3000 sq. m., and a pop. of 1,400,000, mostly Hindus. It is a flat country, cut up by canals. The soil is poor. With 115 miles of coast, it has not a single harbour or anything like shelter from the surf.

**Chingford**, an Essex urban district, 9½ miles NE. of London, with a golf-course close by in Epping Forest, and a great reservoir; pop. 10,000.

**Ching-tu**. See CHENG-TU.

**Chini'**, a village of the Punjab, 1 mile from the Sutlej's right bank, on the southern slope of a lofty mountain, 9085 feet above sea-level. It was a favourite hill residence of Lord Dalhousie.

**Chinkeringching**, **Chinkerinchee**, a white-flowered bulbous plant (*Ornithogalum thyrsoides*), so called in South Africa from the noise made by rubbing the stalks together. The flowers are poisonous to horses. For the genus, see STAR OF BETHLEHEM.

**Chin-kiang**, a Chinese port on the Yang-tze-kiang, in the province of Keang-su, 40 miles ENE. of Nanking. Formerly, as the southern key of the neighbouring Grand Canal, it was both an important stronghold and a centre of traffic; but it was bombarded by the British in 1842, and nearly destroyed by the T'ai-pings in 1853. It was opened to foreign trade in 1861. Pop. 200,000.

**Chinon**, an antique town in the French department of Indre-et-Loire, beautifully situated on the Vienne, 31 miles SW. of Tours by rail. Crowning a lofty rock are the ruins of its vast old castle, the 'French Windsor' of the Plantagenets, the death-place of Henry II., and later the residence of several French sovereigns, where, in 1429, Joan of Arc revealed her mission to the Dauphin. A farmhouse across the Vienne is pointed out as Rabelais's birthplace. Pop. 4000.

**Chinooks**, a tribe of Indians, now nearly extinct, on the Columbia River on the west coast of North America. Their language was very difficult to learn and to pronounce, and this led to the formation of the *Chinook jargon*, a traders' *lingua Franca*, consisting of words from French, English, and Hawaiian, as well as Chinook and other Indian tongues. See the dictionary by Gill (1891) and the monographs by H. Hale (1890) and Shaw (1809).

**Chins**. See BURMA.

**Chin'sura**, now a part of Húgli (q.v.), originally a Dutch town, ceded in 1825.

**Chintz**, a highly glazed printed calico, with a pattern generally in several colours on a white or light-coloured ground. It was chiefly used for bed-hangings, for covering furniture, and other purposes where there is much exposure to dust, which does not adhere to its highly calendered surface. In Great Britain chintz is now mostly employed for babies' bassinets. It has been long the practice in Persia to have the pattern on some chintzes partly in gold. Glue or other size is printed on the cloth, to which the gold dust or leaf adheres. See CRETONNE.

**Chiococca**, a genus of Cinchonoidae, of which two species in particular, *C. angustifolia* and *C. densifolia*, the former a trailing herb, the latter a bushy shrub, enjoy a high reputation in Brazil as cures for snake-bites and in the treatment of dropsy. An infusion of the root is one of the most violent emetic and drastic medicines known, but it is happily no longer used in Europe.

**Chioggia**, or CHIOZZA, an important seaport town of northern Italy, 15 miles SSW. of Venice, on an island at the southern end of the Venetian Lagoon, connected with the mainland by a stone bridge of 43 arches. It is founded on piles, and has a cathedral; its harbour, the deepest in the Lagoon, is guarded by forts and batteries. Pop., inclusive of Sottomarina, 40,000, most of them engaged in the coasting trade, lace-making, weaving, shipbuilding, and fishing.

**Chionodoxa**, a Cretan and Anatolian genus of LILIACEÆ. *C. luciliae* (Glory of the Snow) is a well-known border-plant with brilliant blue flowers appearing in early spring.

**Chios** (now called by the natives *Chio*, Italianised into *Scao*), one of the most beautiful and fertile islands in the Aegean, 7 miles off the coast of Asia Minor, at the entrance to the Gulf of Smyrna, was taken by the Greeks from the Turks in 1912-13, and annexed 1914. About 30 miles long from north to south, by 8 to 15, it has an area of 320 sq. m., and a pop. of about 100,000, almost all Greeks. The larger northern part is more mountainous than the southern. The climate is delightful and salubrious. Earthquakes are, however, not rare, and one in 1881 caused the death of 3553 persons,

and the destruction of property to the value of three to four millions sterling. The wine produced on the north-west coast, the *Vinum Arvensium* of ancient times, is still esteemed. Other products are figs (also noted in classical days), mastic, almonds, silk, lemons, oranges, and olives. Ships are built. Hides are exported. The capital, Chios, near the middle of the east coast, contains about 30,000 inhabitants, and has a haven touched by various services of steamers, and doing a good trade. On the west coast is a rich monastery, Nea-Moni, founded in the 11th century. In ancient times excellent marble and potters' clay were quarried in the mountains, and recently pits of antimony, calamine, lignite, and ochre have been worked.

Chios is one of the places which contended for the honour of giving birth to Homer. It formed in early times one of the most flourishing of the Ionian states, and contributed 100 ships to the Greek force defeated by the Persians in the sea-fight off Miletus (494 B.C.). After the Persian victory the town and temples of Chios were burnt and many of the people enslaved. In more recent times the island was taken by the Genoese (1346), and by the Turks (1566), in whose hands, except for a short interval, it remained for three and a half centuries. It was conferred as private property on the sultana. After a long period of prosperity, Chios suffered a terrible blow during the war of Greek independence. A number of the Chioties having in 1821 joined the revolted Samians, a Turkish fleet and army in 1822 inflicted dreadful vengeance; 25,000 Chioties fell by the sword, 47,000 were sold into slavery, and only some 5000 escaped. A second rising in 1827 was likewise unsuccessful. See the History of the island by Vlasto (trans. 1913).

**Chip Hats.** See BRAZILIAN GRASS.

**Chipmunk** (*Tamias striatus*), a kind of squirrel, common in North America. The genus includes only a few species, often called Ground Squirrels, and distinguished from the common *Sciurus* by the possession of capacious cheek-pouches, by the longer snout but shorter tail and ears, by the constant absence of the first upper molars. They are pretty little animals, of active



Chipmunk (*Tamias striatus*).

disposition, living in underground burrows, where they indulge to apparent excess their mania for storing food. The food consists of nuts, seeds, and grain; and the chipmunks plunder to no inconsiderable extent the fields of wheat and maize. They are, like many other rodents, very prolific. See SQUIRREL.

**Chippendale**, THOMAS, came to London from Worcestershire before 1750, and was a successful cabinet-maker and upholsterer. The style of furniture named from him was less heavy and severe than

that of his successors, and was rather elaborate, delicate, and baroque, with classical tendencies. He wrote a *Cabinet-maker's Director* (1752). All 18th-century furniture is often miscalled 'Chippendale.' See Clouston, *Chippendale Period* (1897), Blake, *Chippendale and his School* (1912). O. Brackett, *Thomas Chippendale* (1924).

**Chippenharn**, an ancient municipal borough (mainly one well-built street) in Wiltshire, on the Avon, here crossed by a bridge of twenty-two arches, 13 miles N.E. of Bath. It lost its last parliamentary member in 1885. Pop. 8000.

**Chippeway Indians**, a tribe of American Indians of the Athabaskan stock, now settled in northern Minnesota and round Lake Athabaska.

**Chipping Norton**, a municipal borough in north Oxfordshire, 85 miles N.W. of London, manufactures woollens, tweeds, and gloves; pop. 3500.

**Chipping Wycombe.** See WYCOMBE.

**Chiquichiqui Palm** (*Leopoldinia Piassaba*), the Piassaba of the north of Brazil, and one of the palms which yield the Piassaba fibre used for making brushes. See FIBROUS SUBSTANCES, PALM.

**Chiquimula**, a small town (pop. 4000) in the east of Guatemala, which gives name to a province, and to the ISTHMUS OF CHIQUIMULA, with a breadth from the Gulf of Honduras to the Pacific of about 150 miles.

**Chiquinquirá**, a town in the interior of the republic of Colombia, near the Suarez, 30 miles W. of Tunja, was an Indian place of pilgrimage before the conquest; and the Spaniards having found here a miraculous image of the Virgin, the church where this is preserved is now visited by some 60,000 pilgrims annually. Pop. 18,000.

**Chiquito**, a substance used as butter by African natives, is got from the fruit of *Combretum butyrosorum* (family Combretaceae).

**Chiquitos**, or NAQUINONEIS ('men'), an Indian stem of Bolivia, dwelling between the Paraguay and the Madeira. Bronze-coloured and well built, with large round heads, low foreheads, and small bright eyes, they are cheerful, hospitable, fond of music and dancing, but of a low morality, and live (about 20,000 in all) in villages founded by the Jesuits.

**Chira'ta**, or CHIRETTA (*Swerdia Chirata*), an official plant belonging to the order Gentianaceae. It is a native of the mountains of the north of India. The whole plant is intensely bitter, and has been long used in its native country as a tonic and stomachic, as also by European practitioners in India as a febrifuge.

**Chirimoya.** See CHERIMOYA.

**Chiriquí**, a division of Panamá, adjoining Costa Rica; area, 6500 sq. m.; pop. 70,000. It is notable for its antiquities, is well wooded, and has rich pasture, especially on the Atlantic coast, where the climate is very moist. The Cordilleras that occupy the interior reach their highest point in the volcano of Chiriquí (11,265 feet). Chief town, David.—On the north coast is a spacious lagoon of the same name, with a depth of water for the largest ships, which receives an unimportant Río Chiriquí.

**Chiromancy.** See PALMISTRY.

**Chiron**, or CHEIRON, the most famous of the Centaurs (q.v.), son of Kronos and Philyra, and husband of Nais or Chariclo. He lived on Mount Pelion, and was famous for his skill in healing, hunting, music, and prophecy. The great Achilles and other heroes were his pupils. He died by being accidentally wounded by one of the poisoned arrows of his friend Herakles.

**Chiropody.** See CORNS.

**Chiroptera.** See BAT.

**Chiru**, or *PANTHALOPS* (*Antelope hodgsoni*), a species of antelope, inhabiting the pine-forests and elevated open plains of Tibet, in regions bordering on the snow-line. It is much larger than the chamois, being about five feet in length, and three feet high at the shoulder. The colour is reddish-fawn with some black. The chiru lives in great herds, and seems to exceed almost all the other gregarious ruminants in watchfulness against the approach of danger. They often lie concealed in holes which they make among the stones.

**Chişinău**, the Rumanian name of Kishinev (q.v.).

**Chislehurst**, an urban district in Kent, 11 miles SE. of London. Sir Nicholas Bacon and Sir Francis Walsingham were natives. William Camden lived at Camden Park. Napoleon III. died at Camden Place in 1873; his remains, with the Prince Imperial's, were removed to Farnborough in 1888. There are an Orphanage, a Governesses' Benevolent Institution, dene holes, and a golf-course. Pop. 9000. See *History* by Webb, Miller, and Beckwith (1900).

**Chisocheton**, a genus of Meliaceæ, natives of the Eastern Archipelago. The cuto nut (*C. cumingianus*) yields a brown, purgative, non-drying oil.

**Chiswick**, an urban district of Middlesex, on the north bank of the Thames,  $7\frac{1}{2}$  miles W. by S. of St Paul's. Here are some charming old riverside houses (including William Morris's); here too are extensive market-gardens. In the churchyard is Hogarth's grave, and at Chiswick House died Fox and Canning. Pop. 41,000. See Lloyd Sanders, *Old Kew, Chiswick, and Kensington* (1910).

**Chita**, or TCHITA, an important trading-town of Eastern Siberia, on the Ingoda River and the Trans-Siberian Railway, 530 miles (by rail) E. of Irkutsk. Capital of Transbaikalia province, it became the capital of the Far Eastern Republic Pop. 60,000.

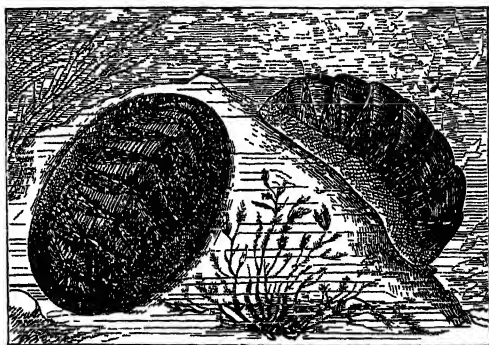
**Chitaldrûg**, the chief town of Chitaldrûg district, Mysore, India, 126 miles NW. of Bangalore, with manufactures of coarse blankets and cotton cloth.—The district is the least populous in the Mysore state, in which it is distinguished for its low rainfall and acid, stony soil. The area is about 4000 sq. m.; the population, over half a million.

**Chitin**, the substance which forms most of the hard parts of jointed-footed animals (arthropods), such as crustaceans, insects, and spiders. It was discovered by Odier in 1823, but regarded erroneously as free from nitrogen; rediscovered by Lassaigue in 1843; and since then recognised in all the four chief classes of arthropods and in some other types. Chitin has been demonstrated in the pen of cuttle-fishes (Mollusca), and in the stalk and shell of *Lingula anatina*, a brachiopod. Its presence is at least probable in many other cases. In arthropods it is not confined to forming the firm and often very hard exoskeleton, but occurs internally in supporting plates, &c. among the tissues. In the crayfish it seems even to form the sheath of the strong ventral nerves. In arthropods the greater portion of the gut is formed as an intucking of the outer skin (ectoderm) from in front and behind, and the resulting portions known as fore- and hind-gut are also lined by this chitin, which frequently exhibit special internal thickenings for food-grinding purposes. The chitinous coating or cuticle is formed from underlying skin cells. In some cases the epidermic cells probably sweat it off after the manner of other secretions; but Huxley showed in regard to the crayfish that the superficial portion

of the cells undergoes a chitinous modification, being literally turned into chitin. The outer coat of crustacea is hardened by the addition of calcium carbonate or phosphate, especially the former; such calcareous hardening is very rare in insects, but copper has been demonstrated in some beetle cuticles.

Chitin is an amorphous white substance. It contains nitrogen, but is free from sulphur. Its resistance to acids and alkalis is very great; it is unaffected by digestive ferments, by water, hot or cold, by alcohol or ether. It may be dissolved by strong mineral acids (hydrochloric or sulphuric), and prepared from the cleaned exoskeleton of a lobster, or better still from the pen of a squid. Chemically it is regarded as a derivative of carbohydrates, and may be split up into sugar and glycosamin. According to Ledderhose, its formula is  $C_{12}H_{20}N_2O_{10}$ ; according to Sundwik,  $C_{60}H_{100}N_8O_{38} + nH_2O$ . See Krukenberg, *Vergleichend-physiologische Vorträge* (1886).

**Chiton**, a genus of marine molluscs, type of an important sub-class which may be regarded as introductory to gasteropods. Unlike the lop-sided snails, the chitons are bilaterally symmetrical. The head is at the anterior end, the anus posterior; the 'foot' occupies the whole of the ventral surface; the heart, the gills, the excretory tubes, the genital ducts, all exhibit the same symmetry. This marked contrast to the gasteropods proper is further supported by the disposition of the two important nerve cords (pedal and visceral) which run parallel to one another along the body. In some forms there are numerous eyes, which occur, however, not on the head, but on the body. Another striking feature is the presence of a series of eight shell-plates along the back. On these and other grounds the chitons are separated from gasteropods proper, and established as a separate order, on which the



*Chiton elegans.*

name *Polyplocophora*, alluding to the multiple shell-plates, has been bestowed. Nor is the order a small one. Of the genus *Chiton* alone over 400 species have been recorded, and other smaller genera are also distinguished. The British species are small; those from warmer climates sometimes measure 3 to 4 inches in length. They are undoubtedly representatives of a primitive type, and include numerous fossil forms from the Silurian onwards. They are not, however, the simplest gasteropods, for a few other forms, known it is true with less fullness, exhibit the same essential features in even simpler expression. These are (a) the Neomeniæ, including the genera *Neomenia* and *Proneomenia*, and (b) the single genus *Chæto-derma*. The systematic import of these last forms has been emphasised by Professor Hubrecht (*Quart. Jour. Micr. Sci.* 1882). Along with the chitons they

are usually gathered together into a special subclass or class styled *Isopleura* or *Amphineura*, names referring to the equal-sided symmetry and to the double parallel nerve-cords. See GASTEROPODS; Haddon, *Challenger Report*, xv. (1886).

**Chitral**, a small mountain state in the upper basin of the Kashkar or Kunar, a tributary of the Kabul River, and bordering on Kashmir and Kafiristan, is 5200 feet above sea-level. Major Biddulph, the first European to enter it, described it in *Tribes of the Hindoo Koosh* (1880). The people are Moslems, but mostly speak a language closely akin to that of their pagan neighbours in Kafiristan. Upper Chitral, with its capital Mastuj, is closely connected with Gilgit. Lower Chitral enjoyed till lately undisturbed independence. But in 1894 an English resident and small body of troops were besieged in Chitral, so in March 1895 an expedition was sent (the main body by the Swat valley, the other from Gilgit), which after sharp fighting advanced triumphantly through very difficult country, relieved the besieged, and annihilated all opposition. See Sir G. S. Robertson's *Chitral: the Story of a Minor Siege* (1898).

**Chittagong**, or ISLAMABAD, a port of Bengal, 220 miles E. of Calcutta, on the eastern side of the Bay of Bengal, and on the Karnaphuli River, about 12 miles from its mouth. The town is very scattered, built entirely on a number of small, steep hills, and is notorious for the prevalence of malaria. A great centre of trade under the Portuguese, it has regained much of the commerce it has lost with the rise of Calcutta, and continues to progress. It imports salt and European goods; exports rice, tea, and jute. Pop. 28,766.—The district is a long strip of country lying between the Bay of Bengal and the hill tracts of Chittagong and Arakan; area, 2500 sq. m.; pop. 1,500,000, two-thirds Mohammedans.—Chittagong also gives name to a *division*—area, 12,000 sq. m.; pop. 5,400,000—and to the hill district to the east—area, 5138 sq. m.; pop. 150,000, two-thirds Buddhists—from whose forests comes a large proportion of the government elephants.

**Chittagong Wood**, a name somewhat vaguely used by cabinet-makers, is usually the wood of *Chaetocrassia tabularis*, a tree of the order Meliaceæ, a native of the mountainous countries to the east of Bengal. In some parts of India it is called *White* or *Bastard Cedar*.

**Chittor**, a town of India, headquarters of Chittor district, 100 miles W. of Madras; pop. 15,000.

**Chitty**, SIR JOSEPH WILLIAM (1828–99), was the son of Thomas Chitty (1802–78) and grandson of Joseph Chitty (1776–1841), both of them eminent as special pleaders and writers of legal text-books, and was himself bred at Eton, Balliol, and Lincoln's Inn. Made Q.C. in 1874, he entered parliament in 1880 as Liberal member for Oxford. But in 1881 he became a judge, and in 1897 a judge of appeal. In his youth he was famous as cricketer and oarsman.

**Chiuri**, a town of Central Italy, 102 miles NNW. of Rome by rail, with a population of 2000, stands on an olive-clad eminence in the Val di Chiana, not far from the small Lago di Chiuri. In ancient times, under the name of *Clusium*, it was one of the twelve republics of Etruria, and the residence of Porsena (q.v.). When Italy was overrun by the barbarians, it fell into decay, the whole valley was depopulated, and became the pestilential pool described by Dante. Since the improvement of the course of the Chiana (q.v.), Chiuri has begun to flourish again along with the whole district. But it is in connection with the discovery of

Etruscan antiquities that the place is chiefly heard of. Within this century immense quantities of these remains have been found in the neighbourhood in the grottoes that served the ancient Etruscans as tombs. They consist chiefly of sun-dried black earthenware vases, ornaments, reliefs, and carved stonework, and are preserved in the museums at Chiuri and Florence. See Liverani, *Le Catacombe di Chiusi* (1872).

**Chivalry** (Fr. *chevalerie*, from *chevalier*, 'a horse-man'), a social arrangement of mediæval life in Christian Europe, of which knighthood formed a central feature. It included everything relating to martial accomplishments, and the relation between vassal and lord, then the chief bond of society. With regard to the position of the female sex and domestic life, it developed sentiments and manners which had a powerful and salutary effect on modern society, although it is true that the high ideal standard of purity of morals which it cultivated was not always fully exemplified in the lives of those who were trained under its influence. Though closely connected with feudalism, its germ has by some writers been traced to a much earlier age; and analogies have been pointed out between the doctrines of Boethius's *Consolations of Philosophy* and the ideas contained in the *Testament of Love*. See FEUDALISM, KNIGHTHOOD; also BUSHIDO.

In English Law, Chivalry is used to mean the tenure of lands by Knight's Service, which might be general or special, according as the tenant was bound to perform to the king or superior military service generally, or some particular service.

The COURT OF CHIVALRY was a military court established by Edward III., of which the Earl Marshal and the Lord High Constable were judges. It tried military offences, and decided questions of personal honour, questions as to coat-armour and the like; and sat for the last time in 1737.

**Chivasso**, a town of Northern Italy, on the Po, 18 miles NE. of Turin by rail, with trade in cattle and corn. Its fortifications were destroyed in 1804 by the French. Pop. 4000.

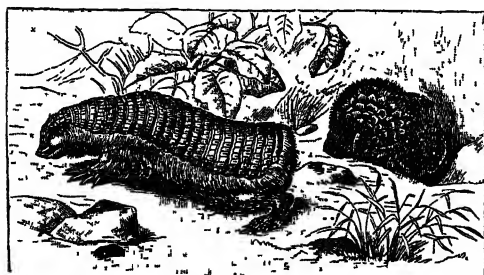
**Chive**, or CIVE (*Allium schoenoprasum*), a plant of the same genus with the leek and onion (see ALLIUM), a perennial,  $\frac{1}{2}$  to 1 foot in height, with very small, flat, clustered bulbs, increasing by its bulbs so as to form dense tufts. The leaves are tubular, cylindrical-tapering, radical, nearly as long as the almost leafless flowering-stem, which is terminated by a hemispherical, many-flowered, not bulbiferous umbel of bluish red, or, more rarely, flesh-coloured flowers. The stamens are included within the perianth. This rather pretty little plant grows wild on the banks of rivers, in marshy or occasionally flooded places, and in rocky pastures in the middle latitudes of Europe and Asia, as also in the far north of North America. It is a rare native of Britain, being only recorded with certainty from some localities in Cornwall and Northumberland. In some of the mountainous districts of Europe a variety is found, larger and stronger in all its parts, and with flowering-stems more leafy. Chives—the name is generally used in the plural—are commonly cultivated in kitchen-gardens, often as an edging for plots, and are used for flavouring soups and dishes, and in salads. Their properties are very similar to those of the onion. The part used is the young leaves, which bear repeated cuttings in the season. The bulbs also are by some used in preference to onions for pickling, their flavour being considered more delicate. For this purpose the clumps of bulbs are broken up in autumn or early winter, and planted in well-manured ground, in lines four or five inches apart, but standing almost close in line. In this way they become larger and more succulent by the following autumn,

when they are lifted for use, the largest only being taken, and the smaller replanted for a future crop.

**Chizerots and Burins** form one of those peculiar races in France that live isolated in the midst of the rest of the population, and are despised and hated by their neighbours. They are found in the arrondissement of Bourgen-Bresse, in the department of Ain; and the communes of Sermoyer, Arbigney, Boz, and Ozan belong to them. According to tradition, they are descended from the Saracens. Although industrious and prosperous, they are held in the utmost contempt and detestation by their peasant neighbours, often themselves indolent and destitute. They are looked upon as covetous and malicious, and scarcely would the daughter of a small farmer or well-to-do day-labourer become the wife of one of them, so that they mostly marry among themselves. From time immemorial, they have been field-labourers, cattle-dealers, butchers, and the like. Many of them are very good-looking, the young women in particular being handsome and clear-complexioned, with large black eyes. See Michel, *Histoire des Races Maudites de la France et de l'Espagne* (2 vols. Paris, 1847).

**Chladni**, ERNST FLORENS FRIEDRICH, founder of the science of acoustics, was born at Wittenberg, November 30, 1756. He studied law in his native place, and also in Leipzig, where, in 1782, he was made Doctor of Laws. Chladni ultimately abandoned juridical studies altogether, devoted his mind to natural science, and being acquainted with music, was led to observe that the laws of sound were by no means so well established as those of other branches of physics. He therefore began to apply his knowledge of mathematics and physics to acoustics, and travelled for ten years (after 1802) through Germany, Holland, France, Italy, Russia, and Denmark, giving lectures on the subject, which were very successful. He died in Breslau, April 4, 1827. Chladni's writings include works on the theory of sound (1787), and on acoustics (1802 and 1817), on meteors (1820), and on the improving of musical instruments. There is a *Life* by Melde (1866; 2d ed. 1888). See SOUND.

**Chlamydo'phorus**, a rare and peculiar mammal of the sloth and ant-eater order (Edentata); in its general features resembling the Armadillos, but unique in the character of its skin armour.



Pichichiago (*Chlamydo'phorus truncatus*).

The head and trunk are covered by about twenty movable cross bands of quadrangular horny (slightly bony) plates. These form an overhanging dorsal shield, attached to the body only along the middle line of the back. The hind parts are protected by the abrupt occurrence of a strong upright bony shield attached to the hip-girdle. The short tail, which is broadened out into a trowel shape, and tucked in between the legs, is protected by horny plates, as are also the dorsal portions of the short, clawed limbs. The rest of the body is covered with

long silky hair. There are 8 teeth on each side above, and 8-9 below. The eyes and ears are inconspicuous. *C. truncatus* (the Pichichiago) is a burrowing animal, living 'in the sandy plains of the western part of the Argentine Republic.' During the day it keeps to its burrow, and is little known. It is 5 or 6 inches in length, with white hair and pinkish scales. *C. retusa*, from Bolivia, is larger, and the dorsal shield has a wider attachment to the body. See ANT-EATER, ARMADILLO, EDENTATA, SLOTH.

**Chlamydosaurus**, the Frilled Lizard of Australia, is a lizard with an extraordinary frilled membrane attached to the hinder part of the head, neck, and chest, and covering its shoulders. This lies in plaits when at rest, but is expanded when the animal, which may be three feet long, is irritated or frightened. The creature, which is allied to the Iguanidae, can run for forty feet with its fore-feet and tail in the air, and seems in this respect to resemble some of the extinct gigantic lizards. See a long article, with illustrations, in *Nature* for February 1896.

**Chlamys**, a short light mantle, worn as an outer garment by ancient Greek youths, and sometimes adopted, even at an early period, by some Romans, as by Scipio and Sulla.

**Chlopicki**, JOSEPH, a Polish soldier and patriot, was born in Galicia in 1771. Entering the army early, he took part in the first insurrection of the Poles, next entered the French service, and served with great credit under Napoleon in Italy, at Eylau and Friedland, in Spain, and next at Smolensk and Moskwa. After the taking of Paris by the allies in 1814, he led back to Poland the remains of the Polish troops who had fought under Bonaparte, and was well received by the Emperor Alexander, who made him a general of division. When the second insurrection of the Poles broke out in 1830, Chlopicki, who foresaw the hopeless nature of the attempt, was forced against his will to be dictator, but after six weeks of contentious opposition from the hot-headed and rashly extreme patriotic party, he resigned his office. But with a heroism all the more heroic that he knew too well the cause was hopeless, he re-entered the Polish army as a simple soldier, and fought with reckless bravery at Wawre and Grochow. Severely wounded in one engagement, he retired to Cracow, where he died 30th September 1854. (The name is pronounced *Chlopitzki*.)

**Chloral** (*trichloraldehyde*) is a limpid, colourless, oily liquid, with a peculiar penetrating odour, and is formed when anhydrous alcohol is acted on by dry chlorine gas. It dissolves sulphur, phosphorus, bromine, and iodine, and is closely allied to Aldehyde (q.v.). Chloral combined with one equivalent of water forms chloral hydrate, a white crystalline substance, with a pungent odour and a bitter taste, to which the name chloral is commonly though incorrectly applied. Chloral was discovered by Liebig in 1831, and investigated by Dumas; the chloral hydrate was first used as an anæsthetic and hypnotic by Liebreich in 1869. The chief effect of the administration of a moderate dose of chloral is the production of sleep, closely resembling natural sleep, and usually sound and refreshing. It has also a marked effect in quieting excitement, as in insanity or delirium; and in relaxing spasm, and checking convulsions and allied conditions. Its action as an anæsthetic is very capricious and uncertain; medicinal doses sometimes relieve pain completely, but much more often fail to do so. It lessens the force of the heart's action, and in large doses greatly reduces the temperature of the body; and to these effects the fatal results that sometimes follow its administration are chiefly due. As a

hypnotic it is most valuable in cases where opium or morphia is dangerous or undesirable (in children, in disease of the kidneys), and where sleeplessness is combined with excitement (delirium of fevers, delirium tremens, insanity); but it may be employed in many other cases with advantage. In tetanus (lockjaw), and other diseases attended by convulsions, it is often of great value. It acts as an antidote in poisoning by strychnia and Calabar bean. It must be employed with the greatest caution, or not at all where there is any reason to suspect weakness of the heart, or embarrassment of the circulation from any other cause; in such cases dangerous symptoms are very readily produced by it. When habitually employed to procure sleep, it is generally less hurtful than opium; but sometimes 'profound melancholy and enfeeblement of the will, muscular lassitude, inability to sleep without the drug,' and other untoward symptoms (called collectively *chloralism*) result, and only disappear when its use is discontinued. Moreover, fatal accidents from its indiscriminate use are far from uncommon. Poisoning by chloral should be treated by keeping the patient warm, attempting to rouse him, administering coffee and small doses of strychnia or atropia.

When chloral hydrate is treated with caustic potash, pure chloroform is obtained; but owing to the expense, this process has not come into use in Great Britain. It has been supposed that its anæsthetic property is the result of a similar formation of chloroform in the blood, but it circulates in the blood unchanged.

**Chlorantha'ceæ**, a small group, chiefly tropical, allied to the peppers, aromatic and stimulant. *Chloranthus inconspicuus* is the Chu-lan of the Chinese, who use it for perfuming teas.

**Chloric Acid**,  $\text{HClO}_3$ , is the acid corresponding to the hypothetical oxide of chlorine, represented by the formula  $\text{Cl}_2\text{O}_5$ . It is a syrupy liquid, with faint chlorine odour and acid reaction. A piece of paper dipped into it becomes charred and takes fire, and it is instantly decomposed by contact with organic matter. In itself it is not of much importance, but it forms a class of salts called *chlorates*, one of which at least is well known. *Chlorate of potash*,  $\text{KClO}_3$ , is an article of commercial value, and may be prepared by passing chlorine into a solution of caustic potash, heating the liquid, and crystallising out the salt. It forms pearly plates, which, when heated, melt and give off oxygen in abundance. So also when thrown on red-hot charcoal, oxygen is given off, and violent deflagration ensues. On account of this property it is used in the preparation of coloured fires, but its use is not unattended with danger, owing to their tendency to spontaneous combustion and its explosive properties when triturated with sulphur. It is prepared commercially by electrolysis of a solution of sodium chloride, and decomposing the sodium chlorate formed, by the addition of potassium chloride. Potassium chlorate is produced by double decomposition. It is employed in the manufacture of some kinds of matches, which give a slight explosion when struck. It is a cure for ulceration of the mouth and tongue, and for tonsillitis and pharyngitis. It is given in solution or as a tablet.

**Chlorides**. See HYDROCHLORIC ACID, CHLORINE; for calcium chloride, LIME; for chloride of lime (so called), BLEACHING, BLEACHING-POWDER.

**Chlorimetry** is the process of estimating the proportion of 'available chlorine' in Bleaching Powder (q.v.), which may vary from 20 to 40 per cent. The term *available* applies only to that portion of the chlorine which is easily liberated, and which takes part in the bleaching process.

Chlorine, which is present as chloride, as in chloride of calcium,  $\text{CaCl}_2$ , has no bleaching power, and is not estimated by chlorimetry.

The process is one of volumetric analysis, and the apparatus used is similar to that described in the article on Analysis (q.v.). There are several practical methods of chlorimetry, all based on the principle of measuring the oxidising power of the bleaching powder. This is arrived at by making a solution containing a definite amount of pure sulphate of iron, arsenious acid, or other substance capable of being oxidised, running in the solution of bleaching powder very slowly, and then by suitable tests determining the exact point when oxidation has taken place. By calculation the amount of 'available chlorine' is at once obtained. For substances other than bleaching-powder slight modifications of the process may be necessary.

**Chlorine** ( $\text{Cl}$ ; at. wt. 35.4; Gr. *chlōros*, 'pale green') is a non-metallic element, a member of the halogen group (see BROMINE, IODINE), discovered by Scheele in 1774, and named by him *dephlogisticated marine air*. Afterwards, in 1810, Davy proved it to be an elementary body, and named it chlorine. In nature it is always found in a state of combination. United with sodium, Na, it occurs very largely as the chloride of sodium,  $\text{NaCl}$ —common salt—in the ocean; in large beds, as rock-salt; in carnallite at Stassfurt; in all natural waters, even rain-water; in clays, soils, limestone; in volcanic incrustations; and in the vegetable and animal kingdoms. The preparation of gaseous chlorine by its liberation from common salt, is described under HYDROCHLORIC ACID, SODA. See also BLEACHING POWDER, which is the form in which chlorine is prepared commercially. For experimental purposes the gas may be received in jars filled with warm water at the pneumatic trough, when the chlorine rises into the jar, and displaces the water. When thus obtained it is a yellowish-green gas with a peculiar and suffocating odour, is not combustible, and is a very feeble supporter of ordinary combustion. A lighted candle placed in it burns with a very smoky flame, owing to the hydrogen of the oil alone burning, while the carbon is liberated. Several of the metals, such as antimony, copper, and arsenic, in a fine state of division, or in the condition of thin leaves, at once become red hot, and burn when introduced into the gas. A piece of thin paper soaked in turpentine likewise bursts into flame. Chlorine is a very heavy gas, nearly  $\frac{1}{2}$  times heavier than air, its specific gravity being 2.488 (air = 1.000); it is soluble in cold water to the extent of two volumes of chlorine in one of water, and yields a solution resembling the gas in colour, odour, and other properties. The principal properties of chlorine are those of a bleacher of cotton and linen (see BLEACHING) and a most powerful Disinfectant (q.v.). The gas can be condensed by pressure and cold into a transparent dark greenish-yellow limpid liquid, with a specific gravity of 1.330 (water = 1.000), which also possesses bleaching properties and a most powerful odour. On the animal system chlorine acts, in very minute quantity, by producing a sensation of warmth in the respiratory passages, and increasing the expectoration; in large quantity, by causing spasm of the glottis (as in poison-gas warfare), violent cough, and a feeling of suffocation. The workmen in chemical manufactories, who get accustomed to the chlorine in small quantities, lay on fat, but complain of acidity in the stomach, which they correct by taking chalk, and also suffer from the corrosion of their teeth, which are eaten away to stumps. The antidotes to the evil effects of the introduction of chlorine into the lungs are the inhalation of the vapour of water, alcohol, ether, or chloroform; but

the latter two should never be resorted to except under medical supervision.

Chlorine forms with other substances a very large number of chemical compounds. Mixed with hydrogen in equal volumes, and exposed to sunlight or flame, union takes place with explosive energy, and hydrochloric acid,  $\text{HCl}$ , is produced. This acid forms an extensive class of salts called *chlorides* (see HYDROCHLORIC ACID), but many of these may be produced by the direct combination of chlorine with the metals, as in the experiments described above, and in the 'chlorination' of Gold (q.v.). Chlorine replaces other elements, or groups of atoms, in organic compounds, forming chloro-derivatives. In combination with carbon and hydrogen it forms many substances, among which Chloroform (q.v.) is perhaps chief. Chlorine forms with oxygen a series of oxygen acids—viz. Hypochlorous,  $\text{HClO}$ ; Chlorous,  $\text{HClO}_2$ ; Chloric,  $\text{HClO}_3$ ; and Perchloric Acid,  $\text{HClO}_4$ .

**Chlorite** (Gr. *chlōros*, 'green'), a group of minerals consisting of hydrated silicates of magnesia, iron, and alumina. Chlorite is of a dark-green colour, and occurs now and again crystallised in minute hexagonal plates, or in aggregates of small leaflets, either singly or disposed in radial groups, which are scattered over the joint-surfaces of certain rocks, or may occur in a thin incrustation upon other minerals. It is rather soft, and is easily broken or scratched with a knife. Before the blowpipe it is with difficulty fused on thin edges. It is readily distinguished from talc by yielding water in a closed tube. Three varieties of the chlorite-group are generally recognised—pennine, clinocllore, and ripidolite—but they are with difficulty distinguished from each other. Chlorite enters largely into the formation of certain schistose rocks (e.g. Chlorite-schist, q.v.), and is common as a decomposition-product after such minerals as mica, augite, hornblende, and garnet.

**Chlorites**, salts of chlorous acid. See CHLORINE.

**Chlorite-schist**, a green schistose rock, in which chlorite is abundant in foliated plates, usually blended with minute grains of quartz, and often with felspar, mica, talc, or magnetite.

**Chloritic Marl**, a thin bed of white or pale-yellow marl, sometimes indurated, containing dark-green glauconitic grains, phosphatic nodules, and iron pyrites. It belongs to the Cretaceous system, coming between the Upper Greensand and Chalk Marl. It is characterised by the abundance of *Schlenbachia varians*, a species of ammonites. It is confined to the southern districts of England occupied by the Cretaceous rocks.

**Chlorodyne** is a patent medicine of considerable popularity, invented by Dr James Collis Browne (1819-84), but largely imitated by various chemists. It contains opium, chloroform, prussic acid, and probably Indian hemp, and is flavoured with sugar and peppermint. As it is apt to separate into two liquids on standing, it should never be taken unless it has previously been well shaken; and as, in taking a dose of chlorodyne, the patient swallows an unknown quantity of three or four of the deadliest poisons with which we are acquainted, it is always advisable to begin with small doses. It is unquestionably a compound which sometimes succeeds in allaying pain and inducing sleep when opiates have failed; but whether a physician is justified in recommending a remedy with the composition of which he is unacquainted is a doubtful question. To meet this difficulty the British Pharmacopoeia now has compound tincture of chloroform and morphia. This is similar to the proprietary article, but different in appearance. It contains in a 10-minim dose  $\frac{3}{4}$  minim of chloroform,  $\frac{1}{2}$  minim dilute hydrocyanic

acid, and  $\frac{1}{4}$  grain of morphia hydrochloride. Five to fifteen drops is the average dose.

**Chloroform**,  $\text{CHCl}_3$ , was discovered as a chemical curiosity about the same time (1831) by Liebig in Germany and Soubeiran in France. Soon its properties as a stimulant when taken internally attracted attention, and when in 1847 its anæsthetic value on being inhaled was discovered and utilised by Sir J. Y. Simpson of Edinburgh, it was recognised as one of the most valuable contributions of chemical science to suffering humanity. See ANÆSTHESIA.

It is manufactured commercially from bleaching-powder and acetone or alcohol. In the latter case the bleaching-powder and water are mixed together to form a thin cream, the alcohol added, and the whole placed in a capacious still. On the application of heat the contents rapidly froth up, and even though the external application of heat be stopped, the chemical action is so violent that the chloroform distils over rapidly along with water and any excess of alcohol. As so obtained it is very impure, and requires to be carefully treated with sulphuric acid, and then redistilled before it is fit for anæsthetic purposes. The quality and price of chloroform depend on whether ethylic alcohol, methylated spirit, or acetone is used. For anæsthetic purposes the first is preferred owing to its purity. Pure chloroform is a limpid mobile, colourless, volatile liquid, with a characteristic odour, and a powerful sweetish taste. When diluted with alcohol it enters into the composition of artificial fruit-essences, to which it gives a flavour akin to that of ripe apples. It is a very heavy liquid, its specific gravity being about 1.500 (water = 1.000), and as it does not readily mix with or dissolve in water, it falls to the bottom when poured into a vessel of that liquid, forming a distinct layer. Chloroform is readily miscible with alcohol and ether, and it dissolves camphor, amber, gutta-percha, wax, black and red sealing-wax, iodine, and bromine, as well as strychnine and other alkaloids. It dissolves a small proportion of water, being also slightly soluble in that liquid. Chloroform is not combustible in the ordinary sense of the term, but when its vapour is brought in contact with flame it burns, imparting a green tint to it, and irritating fumes are produced. Pure chloroform is not met with in commerce owing to the readiness with which it decomposes when exposed to light. In order to prevent this a small proportion of alcohol is added, the specific gravity being thus reduced from 1.500 to 1.497. When evaporated on the hand no disagreeable odour should be noticeable, and when shaken with sulphuric acid only a very slight discoloration of the acid (due to the small proportion of alcohol) should result. Besides its anæsthetic properties, which are elsewhere discussed (see ANÆSTHESIA), chloroform is used in medicine both externally and internally. When applied to the skin or any of the mucous membranes it acts as a powerful irritant, producing a burning sensation, and on this account it is of value as an application in rheumatism, lumbago, and neuralgia. As an application to a decayed tooth its action is twofold, as a stimulant and counter-irritant locally, and also to a partial extent as an anæsthetic. Taken internally, diluted with alcohol, it is a powerful stimulant, and readily produces a species of intoxication. It is by some habitually taken as a narcotic luxury. As chloric ether, a product distilled from bleaching powder, and containing chloroform, it enters into the composition of cough mixtures, pick-me-ups, &c.

**Chlorophyll**, as its name implies, is leaf-green, the ordinary colouring matter of vegetation. Microscopic examination of plant tissues shows it some-

times to tinge the whole protoplasm of the cell (though never the cell sap). Much more generally, however, it is collected into definite bodies, the so-called chlorophyll granules, or less frequently, as in some of the lower algæ, arranged in starlike masses (Zygnema) or spiral bands (Spirogyra). A brief immersion of the specimen in alcohol suffices to dissolve out the chlorophyll, and leave the form of the chlorophyll bodies unaltered; and the solution may then be conveniently studied in a fresh state, as it gradually fades on keeping. It is of a deep rich green by transmitted, but of characteristic deep red colour by reflected light; in a word, is highly fluorescent. The absorption-spectrum is quite characteristic; yet the complex nature of the substance is strongly argued for on the ground of the following experiment. Shake up the alcoholic solution with benzol, and when the two fluids have had time to separate, we find the green to have disappeared. The lighter benzol above is now of a bluish-green hue, while the subjacent alcohol is of a distinctly yellow colour. To these colouring matters the names *Xanthophyll* and *Cyanophyll* are commonly given. While their separate spectra are quite characteristic, their combined spectrum seems to restore that of chlorophyll. The former substance resembles the blue-green colouring matter of some of the lowest algæ (*Oscillatoria*, &c.), while the yellow substance recalls that of many buds and flowers. Others, however, maintain that these substances are really the result of a destructive decomposition of true chlorophyll; while Gautier has even prepared green needle-like crystals which he regards as chlorophyll in a pure state. The chemical composition of chlorophyll is also a matter of considerable difficulty, both on account of its own easy decomposability, and its being necessarily accompanied by other extractive substances; thus the question of the presence or absence of iron has been much debated, a matter which seems to indicate variability of composition. This is further borne out by the labours of spectroscopists. Thus in addition to the familiar well-defined analogous colouring matters which characterise respectively the blue-green algæ, the brown and the red (see SEAWEEDES), researches such as those of Sorby and others seem to indicate a number of varieties too numerous even for enumeration. This varietal range, however, may best be approached after considering the conditions in which chlorophyll is formed. Of the chemical factors little can be said save that the presence of iron in the soil seems to be quite indispensable; the physical conditions are, however, simpler.

A sufficient temperature is necessary to the formation of chlorophyll; for seedlings from 4° to 8° C. being a minimum, while the process is said to take place most rapidly, on the average, at about 35° C. The most important condition is, however, the presence of light; with rare exceptions, plants cannot form any chlorophyll in darkness. The blanching of celery or leeks is a familiar instance of this, or conversely, the green coating acquired by a potato-tuber where it happens to have been denuded of its covering of earth. Shoots formed in darkness form colouring matter indeed, but only of a pale-yellow hue, the so-called *etioline*; after a very brief exposure to light, especially if direct sunshine, chlorophyll appears, apparently by direct transformation of the former. The other colouring matters of plants are sometimes in protoplasm granules (chromoplasts), but more frequently also in solution in the sap; and these frequently are present in such abundance, especially in the epidermis, &c., as to mask the chlorophyll altogether, as happens especially in so many of our hothouse plants with decorative leaves. The general tendency of research is to indicate that all the phenomena of plant colour

seem intimately connected with what we may term the general life-history of chlorophyll. Thus the yellows and reds of young shoots and leaves in spring may be interpreted as having some relation to the development of chlorophyll, if not absolutely stages of the process; while the same suggestion arises with regard to the colouring matters of flowers, which are similarly to be regarded as imperfectly vegetative shoots, although in this case through the onset of the reproductive function, instead of merely by reason of immaturity. Finally also with regard to the autumnal hues, in which the chlorophyll pigment seems to be disintegrating through colour-stages analogous to those of its evolution in spring, or of its arrestment in the flower. In favour of such a view evidence is forthcoming from either end of the vegetable kingdom. Thus Cienkowski has shown that in the case of certain unicellular algæ, which like the common *Protococcus* of rain-water, possess red pigment as well as green when passing into the resting stage, the quantity of red may be increased in proportion as autumnal conditions are reproduced by artificially lowering the temperature, and *vice versa*. The same experiment may be made with the common *Sempervivum*, *Sedums*, &c., whose leaves become more or less red in autumn or winter; those of *Thuja* (*Arbor Vitæ*) similarly become brownish, but recover themselves in spring. Among almost all cultivated plants, *variegated* varieties tend to arise, that is to say, we have certain cell-areas of the leaf-parenchyma destitute of chlorophyll. The conditions of this are obscure (see *VARIEGATED PLANTS*); but it is noteworthy that this loss of chlorophyll may also take place in lower plants, so that there is considerable ground for regarding at least many apparent fungi as simply algæ which have degenerated in this respect through parasitism. Phanerogamous parasites like Toothwort (q.v.) or Dodder (q.v.) similarly become almost completely blanched.

Chlorophyll apparently identical with that of green parts of plants, can be experimentally demonstrated in the tissues of certain animals; and although this has in many cases been shown to be due to the presence of symbiotic algæ (see *SYMBIOSIS*), there remain cases—e.g. *Hydra viridis*, &c., and at the very least *Paramoecium viride*, in which we have undeniably intrinsic chlorophyll, and this of truly vegetable function.

The development of our knowledge with respect to the functions of chlorophyll is still far from complete, and may in any case be more conveniently treated under *LEAF* and *PHYSIOLOGY (VEGETABLE)*; suffice it therefore to state here the elementary and essential fact that its presence is in every case constantly associated with the process of *assimilation*, or elaboration of new products by help of the energy of sunlight, upon which the continued nutrition of the green plant depends; and of which the formation of starch with decomposition of carbonic anhydride and disengagement of oxygen are the most obvious chemical results. See the articles referred to; also *The New Phytologist* (1915–17), papers on 'Carbon Assimilation' by Jørgensen and Stiles.

**Chlorops.** See *CORN INSECTS*.

**Chlorosis** (Gr. *chlōros*, 'green'), or green-sickness, is a disease affecting young women, most commonly between the ages of fifteen and twenty-five. The peculiar complexion is distinctive. While sex and age are the most important etiological factors, exciting causes can usually be traced. Indiscreet dieting, mental worry, home-sickness, and overwork are the most common. The most frequent symptom is breathlessness on exertion. The appetite is poor and capricious, and constipa-

tion is a very common accompaniment. Patients may be morose and apathetic, and often receive but scant sympathy from relatives who do not realise that they are ill. Drowsiness, headache, and neuralgia are common. The chief feature of the blood is a reduction in hæmoglobin, while the number of red corpuscles is not necessarily much diminished. In other words, the corpuscles are poor in hæmoglobin, and the blood is said to have a low colour index. The outlook is favourable, but relapses are common. Iron is the outstanding remedy. For Chlorosis in plants, see PLANTS (DISEASES OF).

**Chlorous Acid.** See CHLORINE.

**Chlorovaperisation.** See PHYSIOLOGY (VEGETABLE).

**Chmielnicki,** BOGDAN (c. 1593–1657), a Cossack hetman who revolted against the Poles and made Ukraine independent. He became a vassal of Russia in 1654.

**Choate,** RUFUS, a scholarly American lawyer, born in Essex, Massachusetts, 1st October 1799, graduated at Dartmouth in 1819, and was admitted to the bar in 1823. He sat in congress from 1830 to 1834, when he settled in Boston. Here his singular eloquence rapidly advanced him to the place of leader of the Massachusetts bar; indeed, it has been claimed for him that he was the most eminent advocate New England, or even America, has produced. After a term in the United States senate, 1841–45, he returned to his profession; in 1859, his health giving way, he sailed for Europe, but stopped at Halifax, Nova Scotia, where he died 13th July. His writings, with a memoir, were published at Boston in 1862. See Neilson's *Memories of Rufus Choate* (Boston, 1884).—His nephew, JOSEPH HODGES CHOATE, born at Salem, Mass., 24th January 1832, studied at Harvard, graduated in law (1854), and was admitted to the bar of Massachusetts and of New York. Partner of William M. Evarts, he soon came to be regarded as head of his profession. As an after-dinner orator, too, he gained a world-wide reputation. Against Tammany, Boss Tweed, and municipal abuses he made deadly thrusts; and he supported the cause of the republican party. As American ambassador (1899–1906) he enjoyed great popularity in Britain, where his work was the confirmation of the friendship of the two nations. He advocated America's participation in the Great War. His publications include *The Choate Story Book* (1903), *Abraham Lincoln* (1910), *American Addresses* (1911). He died 14th May 1917. See *Life* by E. S. Martin (1921).

**Chocolate** is a preparation of the seeds of *Theobroma Cacao* (see COCOA), made by grinding them to a very fine paste. The mill, heated by gas, is constructed of heavy metal rollers turning in a circular course upon a flat metal plate. A curved knife or scoop is attached to the rollers in such-wise that it shall return the paste continually to be crushed and recrushed by the rollers until it becomes almost impalpable. The object of this is to render the nut, otherwise difficult of solution, readily diffusible in water or milk when used as a beverage. The paste when unmixed is called Cocoa; but when sugar and flour or other farinaceous material with flavouring matters such as vanilla, cinnamon, &c. are added, it bears the name of Chocolate. The two names are much confounded commercially. Chocolate is moulded into cakes or sold in powder or flakes formed by simply cooling the paste as it comes from the mill. The seeds or nuts contain a large proportion (30 to 50 per cent.) of oily matter (cocoa butter). This may be partially removed or all retained in the chocolate.

In the latter case much of it is mechanically adherent to the sugar or farinaceous matter. Chocolate is a favourite beverage in Spain, Italy, and other southern countries, especially for breakfast; the cake or powder is heated and diffused in water or milk with much stirring. The Italian rarely uses butter, but cuts his bread into sippets and dips them in his chocolate, the oily matter of which performs the nutritive functions of butter. It is sometimes mixed with coffee in Italy, and there known as *mischiata*. It is also used as a flavouring for ices. The name appears to be Mexican, *Chocolatl* (*choco*, 'cocoa,' and *latl*, 'water'). It was introduced from America to Europe by the Spaniards. It is highly nutritious, containing a large proportion of nitrogenous flesh-forming material. On this account it is used as portable food by many mountaineers. The first English chocolate-house was established in 1657. Lady Denham's death in 1666–67 was popularly attributed to a cup of poisoned chocolate. Cocoa mixed with much sugar and starchy matter is largely used in the manufacture of sweets. Much milk chocolate is manufactured in Switzerland.

**Chocolate Root.** See GEUM.

**Choctaws,** a tribe of American Indians, belonging to the Appalachian stock, and formerly inhabiting the central portions of Mississippi, but now settled in the south-east of Oklahoma, where they were regarded as one of the four civilised nations. They have benefited greatly by the labours of missionaries, and have become good farmers and mechanics. They numbered some 27,000 in 1909.

**Chodowiecki,** DANIEL NIKOLAUS, German painter and copperplate engraver, was born in 1726 at Danzig, and died director of the Academy of Sciences at Berlin, 7th February 1801. He produced some 3000 plates, mostly small. See *Life* by Meyer (1887), and Austin Dobson's *Eighteenth Century Vignettes* (2d series, 1894).

**Choir.** See CHURCH and CHANCEL.

**Choirs and Choral Singing.** Choir properly denotes the body of singers who perform the musical part of a church service, but has lately been applied also to independent choral societies, such as the Bach Choir in London. The composition of a choir is so variable that only a few general principles can be indicated. The commonest and typical form is that of the four-part choir of mixed voices—i.e. both male and female; the soprano part, however, is often taken by boys, and the next by male alto voices. While it is desirable that the individual voices should themselves be good and well trained, there are requisites over and above those looked for in solo singing. These are briefly: (1) an equal balance of voice-power in each part; (2) adaptation of the number of voices to the size of the building where they sing; (3) an exact sense of time and rhythm in the singers, and the power of maintaining each part independent, while still in agreement with the others; (4) facility in singing at sight; and (5) frequent practice together. Though many choirs are guided by the organist alone, or have merely a leader, a conductor is always of the greatest advantage, much of the expression and effect depending on him, and the more so in proportion as the choir and the works sung are large. It is a much debated point whether a church choir should sing alone, or guide the singing of the congregation. In not a few American churches the former principle is developed in a singular form, the quartet choir consisting merely of four solo singers, by whom alone the whole music of the service is sung.

In the Eastern Church the music is unaccompanied, and is sung by the priest and choir alone.

The choir of the Imperial Chapel in St Petersburg consisted of about 120 voices, men and boys, who had no other occupation. In the Church of Rome the most notable is the Sistine or papal choir in Rome. Its genealogy is traceable to the singing schools established by very early popes, but extensively developed by Gregory the Great. It has for a long while consisted of thirty-two choral chaplains, occasionally supplemented, and has generally possessed specimens of the rare natural adult male soprano voice. They sing unaccompanied, but the organ is generally used in other Roman Catholic services. The effect of their singing during the Passion-week has been well described in Mendelssohn's letters. A body of some thirty-five of them were brought by the pope to the coronation of Napoleon in Notre Dame, Paris, and entirely eclipsed a large chorus accompanied by eighty harps which was expected to produce an unprecedented effect. Since 1870 this choir has been very seldom heard at all. In the Lutheran churches in Germany, when there is a choir, as a rule it sings alone, and the congregation alone. The choir sings (unaccompanied) polyphonic motets, or less familiar hymns, the congregation singing the chorals in unison, with organ accompaniment. The most celebrated German choirs are those of the cathedral in Berlin and of the Thomas Church at Leipzig. Among noted English choirs are those of the Temple Church in London and Magdalen and New College Chapels, Oxford. The English cathedral choirs are more or less richly endowed. See CHORUS, INTONING, SERVICE (MUSICAL).

**Choiseul-Amboise**, ÉTIENNE FRANÇOIS, DUC DE, minister of Louis XV., was born in 1719. He served with credit in the Austrian Wars of Succession, and through the favour of the king's mistress, Madame de Pompadour, became lieutenant-general in 1748, and Duc de Choiseul in 1758. He was sent to Rome and next to Vienna in 1756 to arrange the alliance between France and Austria against Frederick the Great, and it was his policy that brought about later the family league of the Bourbon monarchs in Europe. He made himself very popular by the fairly favourable terms he obtained in 1763 at the close of a disastrous war, and further by his opposition to the Jesuits. He conceived, and almost carried out, a plan for the formal emancipation of the Gallican Church from papal influence, improved the army and navy, developed the trade and industry both of the nation and of the colonies, and opened up anew an intercourse with India, whose native princes were assisted by French officers in their endeavours to expel the British from the peninsula. He had spies in every European court, and so ruled all diplomatic and political cabals as to deserve the title the Empress of Russia gave him, *Le Cocher de l'Europe*. His power had survived the death of his patroness in 1764, but the rise of Madame Dubarry, who succeeded Madame de Pompadour in the king's affections, gradually alienated Louis from his able minister, who retired in 1770 to his magnificent estate of Chanteloup, where he lived in princely splendour. After the accession of Louis XVI. he received permission to return to Paris, and was often consulted, but never recovered his official position. He died May 7, 1785.

**Choke-cherry**, a name given to certain nearly allied species of Cherry (q.v.), natives of North America, having small fruit in racemes, like the Bird-cherry or Cherry-laurel (q.v.), from which latter, however, they are easily distinguished by their deciduous leaves. The fruit is at first rather agreeable, but afterwards astringent in the mouth. The species and varieties are not easily definable,

but *Prunus* (*Cerasus*) *virginiana*, *serotina*, and *borealis* may be especially mentioned. The bark is used as a febrifuge and tonic, under the name of *Wild Cherry Bark*; and by distilling it with water, a volatile oil is obtained from it, associated with hydrocyanic acid, called *Oil of Wild Cherry*.

**Choke-damp**, also called *after-damp* or *foul-damp*, is the carbonic acid gas given off by coal which accumulates in coal-mines, and may suffocate those exposed to it. It is distinguished from *fire-damp*, the marsh-gas or light carburetted hydrogen which causes the explosions. See COAL, MINING.

**Choking**, in its slighter forms, is a very familiar occurrence, and results from a morsel of food or other solid, or even a drop of liquid, passing into the Larynx (q.v.) or upper opening of the windpipe, instead of the gullet, or in popular parlance 'going down the wrong way.' It is generally caused by a breath being suddenly drawn in coughing, laughing, &c. while food or fluid is in the mouth; and a violent fit of coughing follows till the offending substance is expelled from the windpipe. Sometimes, however, a larger mass—e.g. a half-chewed piece of meat—is drawn into the opening of the larynx, completely blocking it, and arresting respiration altogether. This condition is one of extreme danger; the sufferer becomes purple in the face, and if not at once relieved will certainly and quickly die of suffocation. The obstructing substance is usually within reach, and may often be dislodged if a bystander promptly pushes his forefinger to the back of the throat and attempts to draw it forward. A child may sometimes be saved by holding it up by the heels and shaking it, or slapping its back. If these measures fail, a sharp-pointed knife, a penknife for instance, must be promptly pushed into the windpipe to admit air to it below the obstruction. See TRACHEOTOMY, ŒSOPHAGUS, PHARYNX.

In *cattle* this is not an uncommon accident, especially when in the house on winter food, and is usually due to a piece of turnip, mangold, or a potato, or a piece of cake. More rarely it is due to failure to swallow properly too dry food, such as dry bran, when the gullet may get practically filled with it. And sometimes it is due to attempts to swallow foreign bodies, especially in cows, as pieces of wood, bone, or of an old boot.

The symptoms vary, but there is usually manifest uneasiness. The animal may blow his nose powerfully, or give a strong explosive cough, some movement of the jaws, and an increased flow of saliva. But the most distressing symptoms are usually due to tympany or hoven, which is a common result of choking.

If the animal is *in extremis* the trocar and canula should be used at once to relieve the hoven. If there is no immediate danger and the obstruction is in the neck and known to be due to a piece of root or cake, an attempt should be made, with a hand on each side of the neck, to force it up towards the mouth. If it is in the thoracic portion of the œsophagus and its removal is necessary, a probang may be used to force it downwards. The animal should be securely held with the head and neck as straight as possible, the probang well oiled and passed carefully into the mouth and down the œsophagus without using undue force, as rupture of the gullet in the thoracic region is certain death to the animal. It is well to remember that apart from the tympany there is no risk from the choking for at least a couple of days, and any esculent substance may soften and pass away. If the choking is due to dry food filling the gullet, do not use the probang, as it will only consolidate the obstruction. Nor

should it ever be used on a foreign body. This latter may have to be removed by œsophagotomy—a surgical operation from the outside. After removal of the obstruction the animal should be carefully fed for some time. Choking in the horse is not nearly so common, but is usually more serious, although there is not the same liability to tympany. He will often pull in his lower jaw towards his breast and give a suppressed scream in his efforts to dislodge the obstruction. It must be dealt with on the same principles as in the ox.

**Cholecystotomy**, the opening of the gall-bladder. See CALCULUS.

**Cholera.** The word *cholera* (connected with Greek *cholē*, 'bile') was used by both Hippocrates and Celsus to describe sporadic cholera. The term is now rather loosely employed to denote various forms of disease (such as chicken cholera, for which see POULTRY). In this article it is used as the designation for Asiatic, Oriental, or Epidemic Cholera, otherwise called Cholera Morbus or Pestilential Cholera. This disease has been popularly believed to be a new disease which made its first appearance in Bundelkhand in 1817, when 5000 men died in five days; but there is no doubt that it has a far more ancient origin, and has visited Europe since 1500 A.D. Cholera has been endemic for centuries in certain parts of India, especially in the Ganges valley. In 1817-23 cholera spread rapidly throughout India, Ceylon, Burma, and China, slaying thousands. It reoccurred from 1826-37, and spread *via* Central Asia and Russia with frightful virulence throughout Europe and America. From Riga it passed to Sunderland (1831); from Hamburg to London (1832); and on to Paris, Quebec, Chicago, New Orleans, &c. In 1846-63 a third epidemic occurred, and Europe and America were again visited, 53,293 persons dying in England and Wales in 1848-49, and 20,097 in 1854. A very extensive outbreak took place in 1865-75; and in 1884-85 cholera reached France (especially Toulon and Marseilles), Italy (especially Naples), and Spain. The epidemic of 1892 was especially severe in the previously famine-stricken districts of Russia, where it carried off 220,000 victims, and in Hamburg, where of 17,000 stricken 10,901 died. In 1914 it broke out in Austria. The outbursts of cholera are generally sudden in their advent.

Places of high altitude are prone to escape its ravages, whereas low-lying ground favours its spread. In 1817-19 the Indian hill-forts remained exempt, while the disease was prevalent in the plains around. Cholera follows the rivers; and the more copious the saturation of the ground, and the greater the amount of organic matter undergoing decomposition it contains, the more extensive will be its spread. The drying of the soil after it has been soaked is very favourable for the development of cholera epidemics; and they are also favoured by certain physical characteristics of the soil, such as permeability to water and air, also by rocks that have a capacity for retaining moisture, and by organic detritus. Climatic influences also affect its epidemic spread. Heat aids its production; a marked fall in the temperature and heavy rain stay its ravages, but rain after a prolonged drought often gives it impetus.

The cause of cholera is a germ, the *Vibrio cholerae*, found in 1883 by Koch in the dejecta of cholera patients in Egypt, Calcutta, and Toulon, and named by him the 'Comma' bacillus. His observations were confirmed among others by Klein and Gibbs in Calcutta and Bombay, and Dr Macleod and Mr Miller at Shanghai in 1885. Bacilli similar to these do occur in healthy persons; they do not, however, give rise to the same appearance when cultivated by Koch's method as do the bacilli found

in cholera stools. Koch's *vibrio* is undoubtedly the cause of cholera, but it will not alone produce the disease, and it is still unknown what exact factors are required to induce lowered vitality in the alimentary canal, and so permit the *vibrio*, which may often be found in the intestines without giving rise to any symptoms, to invade the epithelial cells and mucosa, where possibly alone it may be toxic. It probably produces an endocellular toxin, which being set free causes the symptoms. The dejecta of cholera patients when perfectly fresh are innocuous, but very soon they develop the morbid agent, and water, food, or clothing contaminated by them will communicate the disease to healthy persons. The wind is capable of conveying the poison from dried cholera stools. Troops or pilgrims may carry the infection and propagate it along their line of march. If cholera breaks out in mid-ocean, it will be coincident with the exposure of cargo from an affected place.

**Causes.**—(a) *Predisposing*.—Fear or shock, exposure to sudden changes of temperature, intemperance in labour, pleasure, or drink, and want of proper clothing, as well as everything which tends to derange the stomach, or the use of strong purgatives. Fresh arrival into an infected area renders a person extremely liable to an attack. (b) *Exciting*.—The poison may be introduced into the system either by drinking-water, or by food contaminated with the discharge of a cholera patient. It may also be inhaled as dust, and enter the body through the lungs. Polluted drinking-water is by far the most common source of infection; and improvement in the water-supply greatly diminishes the prevalence of cholera.

**Symptoms.**—After some premonitory symptoms characterised by malaise, depression, and slight diarrhoea, cholera commences by purging, to be soon followed by vomiting and painful cramps in the stomach and limbs. These symptoms form the first or evacuation stage. The discharges downwards are extremely copious, and they soon become colourless and turbid, resembling water in which rice has been boiled; hence the expression, 'rice-water' evacuations. In the second or 'algid' stage there is profound collapse; the patient lies motionless and apathetic, except when tormented by frequent cramps. The surface temperature of the body falls to 95° F. or lower. The pulse becomes almost imperceptible, and the respirations are shallow and rapid, the air expired being cold, and the voice a hollow, husky whisper. The nervous system suffers severely, and muscular prostration is well marked. The features assume a leaden or livid hue. The nose becomes sharp and pointed, the cheeks hollow, and the eyeballs, which are often bloodshot, sink in their sockets and are nearly hidden by the half-closed lids. The surface of the body, especially the extremities, is bluish, wrinkled and shrivelled, and bathed in cold clammy sweat. For a time the mind is clear but inactive; in fatal cases, however, stupor sets in, followed by coma; thirst is intense. In this stage assimilation and secretion are in abeyance; all the vital processes, in fact, are brought almost to a standstill. This stage may last from twelve to thirty-six hours, when the third stage, that of reaction, gradually commences. Heat returns to the surface of the body, the breathing becomes regular and calm, the secretions are re-established, the pulse improves, and the patient will fall into a calm sleep. This stage may terminate in speedy convalescence, but such is not always the case, as a relapse may take place and dangerous complications and sequelæ follow—e.g. suppression of urine, uremia, and fever, often resembling typhoid. Disease of the kidneys, inflammation of the lungs, ulceration of the cornea, abscesses all over the body, and hemorrhage from the bowels may also occur.

The mortality varies very much; it may be from one in four of those attacked to three in four. In some epidemics in India it is 15 per cent., in others 90. One attack of cholera does not confer protection against another.

**Diagnosis.**—If cholera is suspected a bacteriological examination of the feces should be made immediately for the organisms, as they are so numerous that a smear from the rice-like flakes found in the evacuations looks almost like a pure culture. The films should be stained with Ziehl's fuchsin (1 to 50) for ten, or Löffler's blue for five, minutes, and if a number of curved rods are seen cholera is almost certainly present, and a complete bacteriological investigation must be made.

**Treatment.**—Medicines are almost powerless, and many vaunted remedies do far more harm than good. It is, however, necessary to try to check the premonitory diarrhoea, as by so doing in many cases the disease may be cut short. The slightest symptoms of diarrhoea should be attended to; the patient should be put to bed, a mustard-plaster should be applied to his abdomen, and opium in some form or other should be administered. A favourite prescription is four grains of acetate of lead with one of opium, which may be given after each loose stool until three doses have been taken; or else thirty drops of laudanum in half a glass of brandy in hot water. When, however, the disease is fully established, some method to combat it is needed. This must be to destroy and remove the *vibrios*, to neutralise the toxins produced by them, and prevent any secondary infection by the damaged intestinal mucosa, the healing of which must be assisted, and then symptoms must be dealt with as they arise. Rogers has probably devised the best treatment as follows: Of a solution (one to six grains to the pint) of calcium permanganate water the patient may drink as much as he likes. He should also be given a pill of two grains potassium permanganate made up with kaolin or vaseline and coated with keratin, every quarter of an hour for two hours (any pill rejected being replaced), and then one pill every half-hour till the evacuations become less green and copious. This may be expected in from twelve to twenty-four hours. The patient should be kept warm; he may sip water in any quantity, and turpentine stupes should be placed on his abdomen. If collapsed, apply hot bottles. If the pulse fails, an injection of hypertonic saline solution should be made into the median cephalic vein until the blood-pressure returns as tested by the pulse, or, better still, by Riva-Rocci's instrument. This should be done if the blood-pressure is under 70 mm. Also, if the specific gravity of the blood is over 1060, injections should be given, or if on pricking the finger the blood looks black. Rogers also thinks saline injections indicated if cramps, restlessness, or cyanosis obtain. Watch the bladder, and if urine is suppressed dry-cup over each loin. In the stage of reaction give salicylate of bismuth, 15 gr.; bicarbonate of soda, 5 gr.; tincture of opium, 5 m.; mucilage, q.s.; and chloroform-water, 1 oz. as required. Later on alkalis and digitalis may be required. Special symptoms: Treat cramps by massage, with powdered ginger or morphia injections, or even chloroform and oxygen inhalations may be required; delirium may need bromide and hyoscyamus; vomiting, ice to suck, small doses of cocaine,  $\frac{1}{2}$  gr. in a dram of water, a drop or so of tincture of iodine or pepsine and bismuth. Meat extracts should not be given.

The true remedy against cholera is undoubtedly prevention. The greatest care should be taken to secure pure drinking-water, which should be boiled before use, and uncontaminated food. Personal cleanliness, free ventilation, and thorough disinfection of the drains should be enjoined. Quarantine

is worse than useless in checking the spread of cholera; but all coming from an infected area who have the slightest tendency to diarrhoea should be isolated and carefully watched. The importation of all rags and old clothes should be strictly prohibited. The destruction of the discharges from cholera patients, and of the linen soiled by them, is of the utmost importance. The dead should be buried immediately, with due precautions. A Spanish physician, Dr Ferran, employed preventive inoculation in 1885; his methods, however, were discredited. But in 1893-95 Dr Haffkine, a Russian scientist, had performed in Bengal alone 42,445 inoculations against cholera without mishap, and with great preventive efficiency. Haffkine's prophylactic inoculations reduce the liability to contract the disease, and greatly increase the chance of recovery. Powell, e.g., gives the following figures: amongst 6500 non-inoculated persons 198 cases of cholera arose, with 124 deaths; whereas in 5778 inoculated persons there were only 27 cases and 14 deaths. The inoculation gives partial immunity, which continues for about fourteen months; thereafter its protection diminishes and at last disappears, so that reinoculation is advisable. Failing this preventive treatment, ten drops of eucalyptus oil twice a day is very useful.

**Cholera Sicca** is a rare form; collapse occurs, with great coldness and blueness of the surface, and death takes place in a few hours, without any purging.

**Cholera Nostras** is also called Simple Cholera, Summer Cholera, British Cholera, Sporadic Cholera, Choleraic Diarrhoea. This is an acute catarrhal affection of the mucous membrane of the stomach and small intestines, which usually occurs in late summer or early autumn. It is attended by vomiting and purging of bile, cramps and pain in the bowels, the whole system being implicated on account of the rapid loss of water from the body. This disease, although severe, is usually only fatal to young infants or to old or debilitated persons. Simple cholera is treated like Diarrhoea (q.v.).

See Pettenkofer, *Cholera: How to Prevent and Resist It* (Eng. trans. 1884); Stillé, *Cholera* (Phila. 1885); Bellevue, *History of the Cholera in India* (1884); Macnamara's *Asiatic Cholera* (1892); Rogers, *Cholera and its Treatment* (1911); Castellani and Chalmers, *Manual of Tropical Medicine* (1913).

**Cholesterin**, a fatty substance found in gallstones, yoke of egg, blood-corpuscles, milk, bile, peas, barley, &c. See ANIMAL CHEMISTRY.

**Cholet**, a French manufacturing town, dep. of Maine-et-Loire, on the Maine; pop. 20,000.

**Cholon**. See SAIGON.

**Cholula**, a decayed town of the Mexican state of Puebla, stands nearly 7000 feet above sea-level, on the tableland of Anahuac, 55 miles ESE. of the city of Mexico. Cortes found in it 40,000 houses and 400 temples, including the great Teocalli (q.v.). Now the place only contains 9000 inhabitants. It was a great centre of the Aztec religion.

**Chondrin**, the substance of cartilage, is akin to the Proteins (q.v.). See ANIMAL CHEMISTRY.

**Chondropterygii**, one of the technical names by which Catilaginous Fishes (q.v.) are known.

**Chonos**, a bare and sparsely peopled Chilean archipelago off the west coast of Patagonia.

**Chopin** (Fr.), an old English liquid measure equal to half a pint. The Scots *chopin* or *chappin* was nearly an English quart.

**Chopin**, FRÉDÉRIC, virtuoso and musical composer, was born March 1, 1809, at Zelazowa Wola, a village near Warsaw, in Poland, where his father, a native of Lorraine, had settled and married. Under the tuition of two professors at Warsaw, notably Elsner, the director of the Conservatoire,

Chopin made such rapid progress that at the age of nine he played with success in public. As a boy and, indeed, until his health broke down beneath the strain of Parisian life, he possessed a great fund of high spirits, and excelled in mimicry and caricature. In 1825 he published his first work, and by the time he was eighteen his parents acquiesced in his choice of music as a career. In the autumn of 1829 he visited Vienna, gave a successful public concert, and was in much request in the *salons* of that city. In the following year he left Warsaw for good, and travelling *via* Breslau, Dresden, and Prague, again visited Vienna, where he sojourned for several months, and he started for Paris in July 1831. Here, after sundry vicissitudes, he took root, found fame, and lost his health; here he became the idol of the *salons* of the Faubourg Saint Germain, giving lessons to a select *clientele* of pupils, and employing his leisure in composition. Chopin rarely performed in public, for, as his biographer remarks, 'he could only play *con amore* when in the best society and among connoisseurs who knew how to appreciate all the niceties of his performance.' But in his element Chopin, by the admission of so competent a judge as Mendelssohn, was 'a truly perfect virtuoso' as well as a thorough musician, with a faculty for improvisation such as perhaps no other pianist ever possessed. In 1836 he was introduced to George Sand (Madame Dudevant) by his friend Liszt. The intimacy which thus began lasted for seven years, when George Sand, to quote Liszt, 'gave her butterfly the *congé*, vivisected and stuffed it, and added it to her collection of heroes for novels.' For George Sand's version of this episode, readers may be referred to the fourth volume of her *Histoire de ma Vie*, as well as to the portrait of Prince Carol in her novel *Lucrezia Floriana*. Chopin visited England on two occasions—once in 1837, and again in 1848. In the latter year he played at two *matinées* and at a Polish ball in London; twice in Manchester, once in Edinburgh, and once in Glasgow. His health, long enfeebled by consumption, gave way rapidly on his return to Paris, where on the 17th of October 1849 he passed away tranquilly, surrounded by a few devoted friends.

Of all *virtuosi* Chopin has achieved the greatest fame as a creative artist. Taking Slavonic airs and rhythms, notably that of the Mazur or Mazurek (Mazurka), for his groundwork, he raised upon this basis superstructures of the most fantastic and original beauty. His style is so strongly marked as to amount to a mannerism, and yet he has only been successfully imitated by men of genius like Schumann, who was amongst the first of the German critics to recognise in his early compositions gifts of the rarest order. Chopin had seldom recourse to the orchestra to express himself, and on these rare occasions treated it in perfunctory fashion, and as a mere foil to the solo instrument. But for the piano alone he wrote a great deal of music superlatively artistic in form, impregnated with subtle romance, and full of exuberant fancy—music which, though it must always primarily appeal to refined and fastidious natures like his own, bears on it the unmistakable stamp of spontaneous inspiration. Personally Chopin was of a reserved but amiable nature, singularly modest as to his merits, but unsparing in his efforts to realise the high and clearly defined aims he had set before him. His compositions extend to 74 works with, and 7 without, *opus* numbers, and comprise upwards of 50 mazurkas, 27 *études*, 25 *préludes*, 19 nocturnes, 13 waltzes, 12 polonaises, 4 ballades, 4 impromptus, 3 sonatas, 2 concertos for piano and orchestra, and a funeral march. Besides rendering his friend the doubtful service mentioned above, Liszt is also responsible for having given currency

in his picturesque apotheosis of Chopin to a good many inaccurate statements as to his education and temperament. See LIVES by Karasowski (Eng. trans. 1879), Niecks (a standard work, 2 vols. 1889), and Willeby (1892); and books by Finck (1889), Hadow (1895), Kleczynski (1896), Huneker (1901), Hadden (1904), Ashton (1905), Ganche (1913), Scharlitt (1919), and Weissmann (1919).

**Chopine** (Span. *chapin*), a 'high patten,' introduced into England from Venice during the reign of Elizabeth. Some were half a yard high.

**Chopinel**, or CLOPINEL. See MEUNG, JEAN DE.

**Choragus**. See CHORUS; and for the Choragic monuments, see ATHENS.

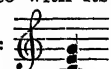
**Choral**. Though the name is occasionally applied to the psalm and hymn tunes of similar character used in the Protestant churches of France and Britain, it most properly belongs to the melodies sung to the metrical hymns of the German Reformed Church, and introduced by Luther, by whom and his friend Walther the first collection of importance was produced in 1524, and entitled the *Enchiridion*. The settings were in four, five, or six parts, the melody, as with all the old choral hymns and psalms, being given to the tenor. Numerous other collections appeared down to the later part of the 17th century, the most prolific composer of chorals being Johann Crüger. Many of them were harmonised in the most masterly way by Bach, and were also used by him as the *canto fermo*, or subject, of some of his great contrapuntal works. Some of them were adapted from the old hymn tunes of the Roman Church, others were taken from popular airs of the time, others again were original compositions; among the latter the most notable is Luther's 'Ein feste Burg.' Whatever their source, they all possess in common a solemn, dignified, and devotional character. In Germany they are now usually sung very slowly and heavily in unison, with organ accompaniment. A few of them are well known in this country from their introduction in various collections of hymn tunes, and also in the choral works of Bach and Mendelssohn.

**Choral Service**, the musical Service (q.v.) celebrated by a full complement of clergymen, lay clerks, and choirists, and sung or intoned as ordered in the rubrics. See CHOIRS.

**Chorasmians**. See KHIVA, PALESTINE.

**Chord**. The chord of an arc is a straight line joining its two extremities; or, a chord, in a circle, ellipse, parabola, &c. is a straight line joining any two points in the curve. If we draw a series of parallel chords in any conic, the line through their middle points is called a diameter, and a line parallel to the chords which passes through the extremity of the diameter is a tangent to the curve. Hence in the circle (1) a diameter is perpendicular to the chords which it bisects, and also (2) to the tangent at its extremity; (3) the three chords of intersection of any three circles meet in a point. In any conic the tangents at the ends of any chord meet in the diameter which bisects the chord. A SCALE OF CHORDS on Mathematical Instruments is sometimes used for setting off angles, but has been mostly superseded by the Protractor (q.v.).

**Chord**, in Music, is the simultaneous and harmonious union of sounds of different pitch. The common chord is a note with its third and fifth

reckoned upwards, thus: ; or in the tonic sol-fa notation,  $\overset{s}{m}$ : this is the basis of all Harmony  $\overset{d}{d}$

(q.v.). See MUSIC.

**Chordata**. See VERTEBRATA.

**Chore'a** (Gr. *choreia*, 'a dancing or 'jumping'), a disease popularly called St Vitus's Dance, and consisting of a tendency to involuntary and irregular muscular contractions of the limbs and face, the mind and the functions of the brain generally being quite unaffected. The spasms of chorea differ from those of most other convulsive affections in being unaccompanied either by pain or by rigidity; being, in fact, momentary jerking movements, indicating rather a want of control of the will over the muscles than any real excess of their contractions. In some cases the disease resembles merely an exaggeration of the restlessness and 'fidgetiness' common among children; in others it goes so far as to be a very serious malady, and may even threaten life. Fatal cases, however, are fortunately very rare, and in the large majority of instances the disease yields readily to treatment carefully pursued, or disappears spontaneously in a few weeks or months. Chorea is a disease much more common among children of six years old and upwards than at any other period of life; it is also more common among female children than among males. Not infrequently it follows a fright or other mental shock, or the strain of overwork. In a large proportion of cases it is associated with acute rheumatism (rheumatic fever), or with heart-disease (endocarditis). The treatment generally pursued is the use of metallic tonics, such as zinc, copper, iron, and arsenic (the last, perhaps, the best), sometimes preceded or accompanied by purgatives. Anti-rheumatic remedies are in some cases very valuable. Exercise in the open air is also to be recommended; and gymnastics afford material aid in the cure. It is to be observed that the name St Vitus's Dance (see **VITUS**) was applied originally in Germany to a different form of disease from that above referred to—one closely approaching in its characters the epidemic 'dancing mania,' which, in Italy, was called Tarantism. See **TARANTULA**.

**Chorion.** See **PLACENTA**.

**Chorley**, a busy town in North Lancashire, 9 miles S.E. of Preston by rail. It has thriving manufactures of cotton-yarn, muslins, fancy goods, calicoes, ginghams, and railway wagons; and near it are bleach-fields, print-works, coal-mines, and stone-quarries. It was made a municipal borough in 1881. Pop. 30,600.

**Chorley**, HENRY FOTHERGILL (1808-72), musical critic, was born at Blackley Hurst, in Lancashire, and was educated in Liverpool. He became a member of the staff of the *Athenæum* in 1833, and soon had entire charge of the musical department, from which he retired in 1868; he contributed also very many literary reviews. He published some half-dozen artificial and unsuccessful romances, three acted dramas, and some graceful verse; but it is by his *Music and Manners in France and Germany* (1841) and his charming *Thirty Years' Musical Recollections* (1862) that his name is best known to the reading public. He held very decided opinions in music (hostile to Berlioz and Wagner), and expressed them uncompromisingly. See the *Autobiography, Memoir, and Letters*, edited by H. G. Hewlett (1873).

**Choroid.** See **EYE**.

**Chorum**, a town of Asia Minor, 28 miles SW. of Osmanjik; pop. 13,000.

**Chorus**, among the ancients, meant a band of singers and dancers employed on festive occasions of great pomp, and also in the performance of tragedy and comedy on the stage. The choral dances in honour of Bacchus, which superseded the earlier ones to Apollo, were by their combination with the rhythmic recitations of the Rhapsodes, the origin of the Greek tragedy. In the plays as

known to us the chorus consisted of a group of persons—boys, girls, or men—who remained in front of the stage during the whole performance as spectators, or rather as witnesses. When a pause took place in the acting, the chorus either sang or spoke verses having reference to the subject represented, which served to increase the impression or sensation produced by the performers. At times the chorus seemed to take part with or against the persons in the drama, by advice, comfort, exhortation, or dissuasion. In the comedy the chorus also addressed the audience. In the time of Æschylus the chorus was very large, sometimes consisting of upwards of fifty persons, but the chorus of Sophocles numbered only fifteen. Its leader was termed the *Coryphæus*. The charge of organising it was considered a great honour among the citizens of Athens. The person appointed for this purpose was called the *choragus*. The honour was very expensive, as the choragus had to pay all the expenses incurred in training the members of the chorus to perform their parts efficiently. They were, besides, fed and lodged by him during training-time, and he had also to provide for them masks and dresses. At times the chorus was divided, and spoke or sang antiphonally. These divisions moved from side to side of the stage, from which movement originated the naming of the single songs or stanzas, such as *Strophe*, *Antistrophe*, and *Epode*. How the musical element of the ancient chorus was constituted or composed is not known with any certainty. It was pre-eminently founded on rhythm, the employment of which was very varied; and it was doubtless very simple. It was accompanied by flutes. With the decline of the ancient tragedy, the chorus also fell into disuse; and only lately has there been an attempt to produce the same on the stage in the manner of the ancients, as, for example, in Schiller's *Bride of Messina*. The music which has been set in modern times to some of the Greek tragedies does not give the least idea of the original music, which to our ears would probably sound very bare and rude. Three fragments of a Greek hymn of a late Roman period (from a Neapolitan manuscript, and the Florentine work of Galilei), the earliest discovered remains of Greek music, have been transcribed in modern notation in Rowbotham's *History of Music*, vol. ii., and also in Chappell's *History of Music*, vol. i. They are of interest as being connected with the origin of the modern opera. In his later operas Wagner professes to assign to the orchestra the functions of the Greek chorus.

In modern music the word is applied to vocal pieces in which each part is intended to be sung by a considerable number of voices; and also to the body of singers who perform choral music. The number of parts may vary from unison to as many as forty or fifty; the normal number is four, but five and eight parts are also frequent. When the voices are divided into two choirs, it is called a double chorus. A chorus for both male and female voices is termed a mixed chorus. The forms of chorus are more varied than those of solo music, and the most characteristic are imitative, or contrapuntal, of which the fugue is the most regular type. They may also be in simple harmony, or a combination of the two. Choral recitative is sometimes introduced; a solo voice, or even a solo instrument, may be accompanied by chorus, or solo and chorus may answer antiphonally. A chorus sung without accompaniment is called a *capella*. The earliest extant form is the unisonal Plainsong (q.v.) of the Roman Church. In oratorio music, Bach's great Passion Music may be cited as containing nearly every form of chorus, from those constructed with figured parts upon a *canto fermo*,

to the dramatic *turba*, the shouts of the enraged people. The double choruses in Handel's *Israel in Egypt* are also celebrated for their masterly construction and grand massive effect; and for dramatic expression those of Mendelssohn's *Elijah* stand in the highest rank.

In the opera as originally conceived by Peri and Caccini at the close of the 16th century, the chorus was intended to imitate that of the Greek play; and down to the time of Gluck it was arranged in two rows, without taking part in the action of the piece. Since his reforms the members of the chorus are also *dramatis personae*, and sometimes, as in Auber's *Masanello*, play a most important part. A definite rhythm seems essential as a means of keeping the parts together in a chorus of any length; even when Wagner, who considered rhythm 'an intruder in music,' introduces choruses, which he does but sparingly, in his operas, they are at once noticeable for this feature.

Choral singing has obtained a widely popular development in Britain and America, greatly owing to the publication of cheap editions of classical music. The chorus singers of Yorkshire are recognised as excelling; but it need scarcely be said that a very great deal of the effect depends on the conductor. See CHORUS, MUSIC.

Chorus was also the name of an obsolete mediæval bagpipe.

**Chose in Action** (Fr. *chose*, 'a thing') is one of the two great classes of what the English law calls chattels personal. The one class is 'choses in possession,' such as goods, household furniture, cattle, &c.; the other class is 'choses in action,' such as a patent right, a copyright, or the right to a debt. The old common-law rule was that, except in the case of negotiable instruments, contracts could not be assigned so that the assignee might sue in his own name. This resulted from the primitive view of contract as creating a strictly personal relation between the debtor and creditor. The Equity Courts, however, permitted the assignment of debts and equitable rights, notice being given to the debtor to render it effectual against him and in a question with subsequent assignees; and in particular cases—e.g. policies of insurance under a statute of 1867—the full right of assignment was permitted. Now, under the Judicature Act, 1873, every legal chose in action is absolutely assignable if express notice in writing be given to the debtor. The effect is to give the assignee a complete legal right to sue in his own name. The assignee takes subject to all equities subsisting against the assignor.

In the United States that quality of a chose in action rendering it unassignable at common law is fast disappearing. In some states a chose in action may not only be assigned, but the assignee may bring a suit for possession in his own name; while in others the name of the assignor is used as plaintiff in the action, to the use of the assignee. Courts of law generally follow the rules of equity in this respect.

**Chösen, Chosön.** See KOREA.

**Chosroes** is the Byzantine spelling of the Persian KHOSRŪ or KHŪSRŪ. Chosroes I. (531-579 A.D.) was the greatest monarch of the Sassanian dynasty, and was called Anōsharvān, 'the blessed.' He carried on war with the Roman emperor for twenty years, and at home promoted agriculture, commerce, and science. Chosroes II., his grandson (590-628), during fifteen years inflicted on the Byzantine empire disasters such as they had never experienced, Syria, Palestine, Egypt, and even Chalcedon being conquered.

**Chota Nagpore** (*Chutiā Nāgpur*), a south-west division or commissionership of Bihar and

Orissa, embracing five British districts (27,000 sq. m.; pop. 5,650,000) and two native states (600 sq. m.; pop. 150,000), with a surface for the most part wild and lully. Some states formerly included have been transferred to the Central Provinces and to the Orissa Tributary States.

**Chouans**, royalist insurgents who, during the French Revolution, organised a reactionary movement in Brittany. The instigator was Jean Cottereau, a smuggler of noted sagacity and courage. In 1792 they began to wage a small guerilla warfare with some success, but the *Chouannerie* at first disgraced itself by drunken licence and cruelty. After Cottereau's death in 1794 in a scuffle near the wood of Misdon, the theatre of his first efforts, the brave adventurer Désoteux, surnamed Cormatin, took the lead; but after his capture there arose new leaders who extended the insurrection and lifted its aims into the region of the heroic. Georges Cadoudal and Charette soon had under their command a force of 10,000 fearless men, and their energy and daring actually imperilled for a time the security of the republican government in France. But stubborn and strong as was the old unquestioning loyalty of Brittany, it could not withstand the fiery enthusiasm that impelled the conquering legions of the giant young republic across almost the whole continent of Europe. The insurrection was stamped out by La Hoche; its leaders Viennville and Sérent fell, Scépeaux and Cadoudal were forced to lay down their arms, Frotté fled to England and Puisaye to America. A new attempt in 1799 was soon mercilessly crushed, and henceforward Chouannerie could only smoulder on in secrecy. In 1814-15 it again made its appearance on both banks of the Loire; and after the July revolution (1830) was once more excited by the Duchess of Berri on behalf of the Duke of Bordeaux, but crushed by the energetic measures taken by Thiers.

**Chough** (*Fregilus*), a genus of birds of the crow family (*Corvidæ*). The beak is longer than the head, strong, arched, and pointed. The tail is slightly rounded. The common European species,



Chough.

sometimes called the Cornish Chough, or Red-legged Crow (*F. graculus*), is a widely distributed but very local bird, inhabiting the Alps and other mountainous parts of the palearctic region. In Cornish folklore King Arthur did not die, but was changed into a chough, and it is interesting to find this English belief alluded to in *Don Quixote* (ii. 5), though here the bird is erroneously made

a raven. Shakespeare uses the term loosely in *King Lear* and *Midsummer Night's Dream*. The chough occurs on some parts of the British sea-coasts, but almost exclusively where there are high cliffs. Its long hooked claws enable it to cling easily to a rough rock, but it seems unwilling even to set its feet on turf. It lives in societies like the rook, and feeds on insects, berries, grubs, and grain. It is easily tamed, and exhibits the usual characteristics of the crow family. The name is sometimes extended to allied forms, such as *Pyrrhocorax alpinus* (Alpine Chough).

**Chow**, a Chinese dog resembling a Pomeranian, with thick hair, a ruff, and a black tongue. The usual colours are black and red. They are eaten in China. They were introduced into Europe and America at the end of the 19th century, and became popular.

**Choya**. See CHAY ROOT.

**Chrétien de Troyes**, an old French poet of whose life nothing more is known than that he lived in the second half of the 12th century and was a favourite poet at the court of Mary, daughter of Louis VII. and wife in succession to the Counts of Champagne and of Flanders. He worked up the legends of the Round Table into numerous spirited and yet refined poems in octosyllabic verse, which had a wide literary influence, diffused the Arthurian sentiment through Europe, and were translated by the German minnesingers, Wolfram von Eschenbach, Gottfried of Strasburg, and others. The most important of these poems was *Perceval le Gallois*, or *Li Contes del Graal* (containing 50,000 verses); *Li Romans dou Chevalier au Lyon*; *Li Contes d'Erec*; and *Lancelot du Lac*, or *Le Chevalier de la Charrete*. A collection of his works was begun by Wend. Förster (Halle, 1884-99). See Paulin Paris, *Les Romans de la Table-Ronde* (5 vols. 1863-77), and Myrrha Borodine, *La Femme et l'Amour au 12me Siècle* (1909).

**Chrism** (Gr. *chrisma*, 'ointment') is the name given to the oil consecrated on Holy Thursday, in the Roman Catholic and Greek Churches, by the bishop, and used in baptism, confirmation, ordination, extreme unction, &c. There are two kinds of chrism—the one, a mixture of oil and balsam, is used in baptism, confirmation, and orders; the other, which is merely plain oil, is used in extreme unction.

**Chrisome**, the white linen cloth laid by the priest on the child in Roman Catholic baptism to signify its innocence.

**Christ** (Gr. *Christos*) is the word used in the New Testament and in the Septuagint as the equivalent of the Hebrew word *Mashiach*, 'anointed,' the Messiah (q.v.); the expected Deliverer, who was to restore God's people. Jesus was by his disciples accepted as the Christ; later, as in Paul's epistles and 1 Peter, the adjective has passed practically into a proper name, and Christ and Jesus are equivalent and interchangeable in use.

Neither Jesus nor his apostles left any definition of what came to be called Christology, a systematic doctrine of the Person of Christ and his relation to the Father, to the world, to his people. Paul's doctrine of the exalted Saviour, fuller than that of the twelve, seems to be reflected in the Synoptic Gospels. In the fourth gospel the Alexandine doctrine of the Logos is dominant. But the prolonged and acrimonious controversies that rent the church prove how far the post-apostolic age was from having formulated its faith, earnestly as it contended unto the death for the divine Sonship, the sinless humanity of Christ, his pre-existence, resurrection, and exaltation, and the supreme authority of him in whom all the Old Testament prophecies were fulfilled. For the early Christians

the Old Testament was the only Bible, the only sacred scriptures. In what order of succession the gospels, Paul's epistles, and the other books of the New Testament took rank alongside of the Old Testament books is not known. The New Testament canon was not closed (see BIBLE) till after the Councils of Nice (325) and Constantinople (381) had seen the main stages of the Christological controversy definitively formulated for the Catholic Church. Other gospels than the four ultimately accepted, and epistles other than those in our canon (e.g. those of Clemens and Barnabas), helped to mould the Christology of the early church. We should remember that the generations who came through the great tribulations of the 'ten persecutions' (64-303 A.D.), though they accepted the Johannine 'I and the Father are one,' did not understand this to mean that Christ was co-eternal and co-equal with the Father. Before 150 A.D. the Roman Church had already as its confession a form of the Apostles' Creed, which became the foundation of all subsequent creeds. Christ was the Son of God, the exalted Lord, the Redeemer, and the Judge of mankind; but very various doctrines as to his nature were maintained by various theologians and schools of thought. Two main types must be distinguished—the adoptionist and the pneumatic. For the first Christ was the man in whom the spirit of God (God himself) had dwelt, who had been raised to power and glory in heaven; for the second he was a heavenly being, the loftiest heavenly being next after God, who had assumed flesh, and after the completion of his work on earth had returned to heaven. The two types of doctrine were often confused or combined. The doctrine that Christ was mere man was always rejected by the church generally, though there were early heretics who held this view (see EBIONITES). Various Gnostic schools (see GNOSTICISM) differed widely in their doctrine of Christ. The Docetæ (q.v.) held that the humanity of Christ was a mere phantom; and there were 'modalists' and 'monarchians' who practically identified the person of Christ with the Godhead. The history of modalism and monarchianism is sketched at SABELLIANISM. When Paul of Samosata (q.v.) was sentenced to be deposed at Antioch in 268 A.D., the word *homoousios*, afterwards to be the *vox signata* of Catholicism, was condemned as savouring of monarchianism or Sabellianism.

An element in the development of Christology too long ignored was the influence of the mystery religions then widespread through the Roman empire, religions mainly of Eastern origin, whose deities were not those of the classical Greek poetry or the Roman state, religions based on the worship of Mithras, Isis, and Cybele. These religions offered happiness in this world and salvation in the next to those who, by initiation into their sacraments, joined in the risen life of a Redeemer-God. Amongst Greeks, Romans, and all others than Jews, the teaching of Paul as to the meaning of the death of Jesus would lead the hearer to equate Jesus with the Redeemer-God of the mystery religions; while the story of the gospels gave to the mysteries of the Christian faith a more historic and solid basis than could be claimed for those of Attis or Mithras.

By far the most critical Christological controversy was that which began when in 318 A.D. the presbyter Arius energetically confuted the doctrine of his bishop, Alexander, at Alexandria, a doctrine substantially agreeing with that of which Athanasius was to be the lifelong, and ultimately victorious, champion, accepted by the church at the Council of Nice, or Nicaea, in 325, the first œcumenical council, summoned by the Emperor Constantine, who two years before had become emperor of

the whole Roman empire, and hoped, vainly, to bring to an end the dissensions amongst Christians, which had become a scandal even in the eyes of the heathen. The beginning, progress, and end of the controversy, and the definitions accepted at the council, are briefly set forth in the article CREED; and the fluctuating fates of the opposing champions are sketched in the articles ARIUS and ATHANASIUS.

Thus far the question had been discussed mainly in the Eastern division of the Church Catholic, and at the Council of Nice only some eight out of the 318 bishops who were members represented the Western Church. Of these eight more than one—notably the most important, Hosius of Cordova—were themselves Orientals by birth. Hence the fundamental doctrines of the Christology to which Eastern and Western Catholics, and even the Protestant offshoots of the Western Church, have all alike adhered, were established and sanctioned almost exclusively by Orientals. The language of the council and its decrees was Greek, and for some of the definitions it was difficult to find equivalent terms in Latin. Several of the most conspicuous champions were clerics from Alexandria, then the main centre of Greek philosophy and speculation. Many of the bishops, on the other hand, were apparently quite illiterate; some of them knew very little Greek. The discussions were not conducted without vituperation, violent invective, and even, it would appear, some physical violence.

The arguments that established the co-equality of the Son with the Father turned partly on the exegesis and harmonising of all relevant passages from the Old and New Testament books (the accepted New Testament books being, like those of the Old, treated as infallible), but were partly based on speculative deductions from the nature of God and the metaphysical relations of a son to a father, and, especially in the case of Athanasius, on 'soteriological' reasons, such as that, since Christ is the Redeemer, he must necessarily be God, and have nothing of the nature of the creature about him.

But after Nice the position still remained undecided how the union between the divine and the human in his person was to be expressed. Apollinaris, Bishop of Laodicea, advanced the theory that Christ's manhood was constituted solely of an animal soul and body, while the Logos took the place of the mind, or spirit, in him. His true humanity was thus denied. Nestorius, Bishop of Constantinople, started a rival theory. While granting the true divinity and humanity of Christ, he denied their union in a single, self-conscious personality. According to him the union was only moral or sympathetic. The Nestorian theory thus involved the breaking up of the personality into a duality. Eutyches of Constantinople wrote against Nestorianism, but his zeal carried him to the other extreme. His contention was that in the incarnation the human was transmuted into the divine. He thus obliterated the humanity.

At the Council of Chalcedon (451 A.D.) all these views were condemned, and the Christological formula which is still regarded as orthodox was framed. The orthodox doctrine, briefly stated, holds that in the unity of the person of Jesus Christ there are two natures, a divine and a human, each nature being complete and entire, and that these are so intimately and indissolubly united as to constitute not a third nature, but a person. It warns us against either dividing the person or confounding the natures.

Notwithstanding the adoption of this creed, controversy was not by any means brought to an end. For more than three centuries questions of extreme subtlety continued to agitate the theological world

—questions pertaining to the relation of *nature* to *personality*, and of both to *will*. The Monophysite, the Monothelite, and the Adoptianist controversies were concerned with these abstruse points. At the Council of Constantinople (681 A.D.) it was decided that in the one person of Christ there are two natures, two intelligences, two energies, and two wills. The condemned Monothelites were consequently persecuted, and they betook themselves to the mountains of Lebanon and Anti-Lebanon, where they continued to exist as a distinct sect under the name of Maronites. During the middle ages the church as a whole acquiesced in the decisions of the above-named councils, though individuals occasionally ventured to give expression to views more or less at variance with the creeds. In our day Dyothelitism, or the doctrine that there are two wills in Christ, is not regarded as essential to orthodoxy. In fact, it is largely denied among theologians of high repute.

At the time of the Reformation Christology once more became a subject of keen controversy. The occasion was a difference of opinion between Luther and Zwingli regarding the presence of Christ in the elements of the ordinance of the Supper. Eventually the Lutherans accepted the doctrine of the *communicatio idiomatum*—i.e. the communication of the properties of the divine nature of Christ to his humanity. By this doctrine they sought to establish the ubiquity of Christ's body. The Lutheran dogma was rejected by the Reformed theologians.

The doctrine of *Kenosis* (*ekenōse*, Phil. ii. 7; Revised trans. 'he emptied himself'), mainly a Lutheran development, has been held in greater or less degree by theologians in various evangelical churches, including those of Britain and America. The problem is the union of the divine and human natures in the one consciousness of the God-man. The Kenotics conceive the personality as residing in the divine element, the Logos. The Logos at incarnation limited or emptied himself in a very true and wide-reaching manner; he laid aside not only his divine attributes but his divine consciousness, gradually regaining them during the course of his earthly career, so that at his ascension he had again fully resumed them. But by his self-limitation the God-man (not merely the human nature) was for a time ignorant of many things, dependent, and tempted.

The main argument levelled against them is the question, Can God change or limit himself without abandoning the essential element of Godhead? Ritschl, in many respects a follower of Schleiermacher (q.v.), developed a Christology which has had a wide influence on modern theology, and is accepted by many in all the churches; see RITSCHL.

To the orthodox doctrine of the Person of Christ four elements are necessary: true and proper deity; true and proper humanity; the union of deity and humanity in one person; the distinction of deity from humanity in the one person, so that there be no mixture of natures. The Socinian doctrine came in many ways nearer the Christology of the church than that of modern Unitarians; for their agreement and difference, see the article UNITARIANS. Deism (q.v.) and many types of Rationalism (q.v.) treat Jesus Christ as a man more or less honoured and exalted by a divine—perhaps unique—commission; but such views hardly come within the scope of an article on Christology. Nor do those, for example, of Strauss (q.v.) and Renan (q.v.). But it should be remembered that many modern teachers, widely accepted as spiritual guides, representing much that is best in Christianity, have expressly rejected the view that Christ is or was God. Carlyle was a Theist, but he denied all sym-

pathy with that doctrine; Tolstoi, taking a much higher view than many Christians of the binding authority of Christ's teaching, repudiated the belief in his godhead as mere blasphemy.

See Dörner's *Doctrine of the Person of Christ*; Mackintosh's *Doctrine of the Person of Christ*; Harnack's *History of Dogma*; Schaff's *Creeds of Christendom*; Bruce's *Humiliation of Christ*; and the articles CHRISTIANITY, CHURCH HISTORY, and JESUS, as well as those on the great Christian thinkers and the heretics.

**Christ, DISCIPLES OF.** See CAMPBELL (ALEX.).

**Christadelphians**, or 'Brethren of Christ,' a small religious body claiming to represent the true faith and practice of apostolic times, as revived by Dr John Thomas, of Brooklyn, who was born in 1805 and died in 1871, and was the leading advocate of their views. (After him they are sometimes called Thomasites.) They deny the existence of a personal devil and the immortality of the soul, believing in 'Conditional Immortality' (q.v.), to be bestowed upon the faithful of all ages when Christ returns. They insist on the plenary inspiration of the Bible, the real death of Christ as a sacrifice for sin, his resurrection and ascension, and look for his return to the earth to reign on the throne of David over the converted and restored twelve tribes of Israel and all nations. They believe that death is a state of entire unconsciousness, terminated by a corporeal resurrection for those who have become related to Christ through faith and obedience, or are responsible for his rejection. Those accepted after the judgment reign for ever with Christ over the nations; those rejected die the second death. See their leading organ, *The Christadelphian*, founded by Robert Roberts, his *Christendom Astray*, along with *Elpis Israel* and *Eureka* by John Thomas.

**Christchurch**, a municipal borough of Hampshire, at the head of the estuary formed by the Avon and Stour, 24 miles SW. of Southampton by road, 20 as the crow flies. The noble church of an Augustinian priory, founded here in 1150, is 303 feet long by 101 across the transept, and includes every style from Norman to Perpendicular. Special features of interest are the splendid Early English porch, a monument to Shelley, a beautiful rood-screen, and the chapel built by Henry VIII.'s victim, Margaret, Countess of Salisbury. Little remains of the domestic buildings of the monastery or of the Norman castle. Christchurch possessed till lately one notable specialty, the making of watch and clock fusee-chains. The harbour has high-water twice every tide. The parliamentary borough, abolished in 1918, comprised Bournemouth (now itself a parliamentary borough). The municipal borough received a charter of incorporation in 1836. Pop. (1881) 3260; (1921) 6991.

**Christchurch**, capital of the provincial district of Canterbury, in New Zealand, situated on the river Avon, about 8 miles from Port Lyttelton, with which it is connected by rail, the tunnel through the Port Hills being 1½ mile long; it has also railway communication with Dunedin and with the north. Canterbury College, with its branches, is part of the University of New Zealand. The chief public buildings are the government offices, museum (with many specimens of the Moa, q.v.), cathedral (a reproduction of that of Caen), and hospital. There are numerous banks and insurance offices; and among the public schools are Christ's College (Church of England), and high schools for boys and girls. The water-supply is derived from artesian wells. Two parks and the Government Domain afford ample pleasure-grounds. It is the centre of a great grazing district, and has also flourishing manufactories. Boot manufacturing is one of the chief industries. The founders of Canterbury, an association connected with the Church of

England, named each of the streets of its capital after an English diocese. An earthquake in 1888 damaged the cathedral and other buildings. Pop. 67,000, or with suburbs, 106,000. Some of the suburbs were amalgamated with the city in 1903 to form Greater Christchurch.

**Christian II.**, king of Denmark, Norway, and Sweden, was born at Nyborg, in the island of Fünen, in 1481, and mounted the throne of Norway and Denmark in 1513. His marriage in 1515 to a sister of the Emperor Charles V. did not extinguish his love for his mistress Dyveke (q.v.), whose sudden death he avenged with his native savagery. In 1520 he overthrew at Bogesund the brave regent of Sweden, Sten Sture the younger, and thereafter was crowned king. But his ferocious passions, and especially his treacherous massacre in the Stockholm 'blood bath' of the foremost men in Sweden (November 8-10, 1520), roused such a spirit of opposition in that country that he was speedily driven out by the young national leader, Gustavus Vasa, himself the son of one of his victims. In Denmark also a popular revolt drove Christian for refuge to the Netherlands, and placed his uncle Frederick I. upon the throne. Encouraged, however, by the Catholic party in the Netherlands, and assisted by Charles V., Christian landed in Norway in 1531, but next year was totally defeated, and was imprisoned till his death in 1559.

**Christian IV.**, king of Denmark and Norway, and Duke of Sleswick-Holstein, the son of Frederick II., born at Frederiksborg, in Zealand, 12th April 1577, and elected successor to the throne in 1588. He assumed the government of the duchy in 1593, of the kingdom in 1596. His first war with Sweden (1611-13) ended in an advantageous peace; his second (1643-45) cost him much of the territory across the Sound. Christian's share in the Thirty Years' War was brief and inglorious. In 1625 he became chief of the Protestant league, but his disasters so damped his ardour that he was fain to retire from the struggle in 1629 under cover of the peace of Lübeck to make room for the great Gustavus Adolphus. His indefatigable labours for the improvement of his country were more successful. He strengthened its maritime power; extended its commerce as far as the East Indies, where he obtained the first possessions; and by restrictions upon the Hanse towns, greatly increased the inland trade of the country. His legislative and financial reforms, together with his love and patronage of the arts and sciences, gained for him the affection of his people. He died 28th February 1648.

**Christian Brothers**, INSTITUTE OF IRISH, was founded at Waterford in 1802 by Edmund Ignatius Rice, merchant. Branches of the order were soon established in Dublin, Cork, and other towns, especially in the south of Ireland. The institute was formally approved as a congregation by Pius VII. in 1820, and since then has received many favours from succeeding pontiffs. For a time the Brothers accepted a government grant, but soon withdrew from this connection on account of the separation of religious and secular teaching insisted on by the National Board; and since then the Brothers' primary schools have been supported by the voluntary contributions of the people. There are several foreign branches under the superior-general in Dublin. See also CHRISTIAN SCHOOLS (BROTHERS OF).

**Christian Catholic Church**, an organisation founded by John Alexander Dowie (1847-1907), who, born in Edinburgh, practised faith-healing in Australia and the United States, established a community at Zion City, 42 miles N. of Chicago, and was deposed in 1906.

**Christian Connection**, an American denomination founded early in the 19th century on the basis of the Bible as the sole authoritative rule of faith and practice, with open fellowship to all pious Christians of whatever creed.

**Christian Endeavour Societies**, for the promotion of Christian life amongst young people, and for making their members useful in the service of God, were first formed by Dr F. E. Clark of the Congregational church at Portland, Maine, in 1881. The organisation is supported by almost all the sections of Protestantism.

**Christiania** (*Kristiania*; officially *Oslo* since 1925), the modern capital of Norway (the kings are still crowned at Trondhjem, q.v.), is built at the northern end of Christiania Fiord. Its population in 1891 was 151,239, and in 1920 it had increased to 258,483; when the 19th century began it was but 10,000. Christiania is named after Christian IV., who commenced building it in 1624 after the destruction by fire of the ancient city of Oslo, which had begun to supersede Trondhjem as capital from the 14th century. Christiania is the seat of the national parliament (the *Storting*), of the High Court of Judicature, and of the National University (founded 1811). Connected with this are the students' garden, a library of about 650,000 volumes, a very well-arranged botanical garden, museums, laboratories, observatory, and other institutions. Of the two palaces here, one is near the university, and one, Oscarshall, is beautifully situated 2 miles from the city on an eminence overlooking the fiord, and containing Tiedmand's celebrated pictures of Norwegian peasant-life. There is a national picture-gallery, and a very interesting museum of northern antiquities, including two vikings' ships. The *Dom*, or Cathedral, and the Trefoldigheds Kirke ('Church of the Trinity'), are the principal ecclesiastical buildings. The *Dampkjøken* ('steam-kitchen') is an interesting institution for providing cheap and substantial dinners to working-people. The old fortress *Akershus Fæstning* still remains, and is used as a promenade, but has little military value. Among other public buildings are the Houses of Parliament, the civil and military hospitals and infirmary, lunatic asylum, penitentiary, theatres, the Freemasons' Hall, conservatory of music, and several banks. The staple industry of Christiania is its shipping trade; it is the leading seaport and military centre and principal commercial and industrial town of Norway. In trade, as in population, Christiania has risen remarkably in recent times. Its chief imports are coal, machinery, grain; timber, ice, &c. are exported. Among local industries are the brewing of *Christiania ol*, a sort of lager beer, with resinous flavour, largely consumed throughout Norway, and exported to England and other parts of the world; shipbuilding, iron-foundries, engine-works, nail-works, and paper-mills; the manufacture of cotton, canvas, rope, wool, chocolate, margarine, matches, carriages; printing and publishing. There are many good hotels and shops, and considerable business is done with British and other tourists.

**Christianity** is the religion which was founded by Jesus Christ, and of which Jesus Christ is not only the supreme exponent, but also the central object of faith. It claims to be the final and authoritative revelation of God, and its chief aim and goal is the salvation of the world. This revelation is expounded in the pages of the New Testament, which is the main source whence we derive our knowledge of 'the faith once delivered to the saints.'

*Different Interpretations of Christianity.*—But though it is easy to give a general definition of Christianity, when we attempt to become more

specific, and enter into greater detail, the door is opened at once for divergence of opinion. Christianity is represented to-day by the most diverse forms of ecclesiastical polity and theological creed. There is an almost infinite gulf between Roman Catholicism and the Society of Friends, which we may take as the two opposite poles, and within these extremes there is a vast array of other systems and sects, each with its own organisation and its own form of belief. It is little wonder that the modern world sometimes asks, like 'jesting Pilate,' 'What is truth?' 'Where is real Christianity to be found?'

*The Sources of the Divergence.*—The reasons for the diversity of opinion and faith are manifold. (a) Some of them are historical and traditional. In the course of history churches have been affected by their environment and the circumstances of the times. National and political influences have given a bias to their forms of thought and polity. Social cleavages have been reflected in ecclesiastical organisations. (b) Some are due to differences of emphasis. Nearly every new religious movement is formed to recover some forgotten truth. Montanism arose, for instance, in the early centuries because the doctrine of the Spirit was in danger of becoming otiose. Methodism came into existence to restore to the Church the evangelical doctrine of conversion. (c) Some represent different intellectual standpoints. There are problems on the metaphysical side of theology which have always baffled the human mind. The question, for instance, 'How are we to reconcile divine omnipotence and human freedom?' admits of many answers, and two of these were incorporated in the great systems known as Calvinism and Arminianism. (d) Many of these differences arise on the side of organisation and polity. Next to theological controversy, the keenest dispute among churches has always been concerned with the question of church organisation. The problem has been raised time after time, 'Is any particular form of polity essential to Christianity?' and if it be, what is the particular form? Is it Episcopal? Is it Presbyterian? Is it Congregational? (e) Another very prominent source of division is the question concerning the authority and function of the Christian ministry. When we ask the question, 'Is true Christianity dependent upon a particular form of ministry and a particular doctrine as to the functions of these ministers?' we receive answers which seem absolutely irreconcilable. (f) The question of ritual is responsible for a very severe cleavage in religious opinion. Some of our most important English Nonconformist churches were founded as a protest against the theory that worship must be uniform, and could not be regarded as valid apart from the prescribed ritual of the Prayer Book.

*Christianity and the Churches.*—Christianity is greater than the churches, and in spite of the claims that are made, no single church can be said to express in any adequate, much less in any exclusive, way the religion of Jesus Christ. Differences there must be—and that for several reasons: (1) Christ is infinitely too great to be described in any formulæ or expressed in any system. 'We know in part,' says Paul—and what Paul says of himself is true also of churches. Each church has its own vision of the Christ, and its task is to make that vision known to men—not 'to squint through its tiny loophole and think broad heaven is but the patch it sees.' (2) Upon the intellectual side room must be left for difference of opinion. There are theological problems which have not yet been solved, and which probably will never reach final solution. (3) There is a need for diversity which is grounded in the psychological and temperamental differences in human nature. While men vary in

outlook, in quality of soul, and in education, the forms in which they find expression for their faith must necessarily vary too.

*Modern Expositions of Christianity*.—But apart from the traditional interpretations of Christianity which we find incorporated in the churches, we find a wide divergence of opinion among theologians and thinkers of the present day as to the character and meaning of the religion founded by Jesus Christ. Harnack, for instance, in his famous brochure, *What is Christianity?* lays the main stress on the religious and ethical teaching of Jesus. The gospel is to him 'the knowledge and recognition of God as the Father, the certainty of redemption, humility and joy in God, energy and brotherly love.' 'Jesus directed men's attention to great questions: he promised them God's grace and mercy: he required them to decide whether they would have God or Mammon, an eternal or an earthly life, the soul or the body, humility or self-righteousness, love or selfishness, the truth or a lie. These questions embrace the whole sphere of existence: the individual is called upon to listen to the glad message of mercy, and to make up his mind whether it will be on God's side and the Eternal's, or on the side of the world and of time.' It is on the negative side of Harnack's teaching that his theory comes into conflict with what is generally regarded as the essential truth of Christianity. He says, for instance, that 'the gospel, as Jesus proclaimed it, has to do with the Father only, and not with the Son.' In striking antagonism to Harnack stands the interpretation of P. T. Forsyth. To Forsyth Christianity is primarily an act of redemption. The death of Christ upon the Cross is its centre and soul. While Harnack regards the Lord's Prayer as the best summary of the gospel, Forsyth would find the definition of the gospel in such words as 'God so loved the world that he gave his only begotten son,' or 'God was in Christ Jesus reconciling the world unto himself.' Both Harnack and Forsyth speak of Jesus as the Redeemer, but the essential difference between them is this: according to Harnack, Christ redeemed the world by his revelation of God's love and mercy; according to Forsyth, the act of redemption is to be found in the sacrifice upon the Cross. A third school of theologians regards Christianity as the religion of the Incarnation. The Incarnation is the great centre around which everything else revolves. In the act of Incarnation God was made manifest in human form: the Divine expressed itself in terms of human life. What had previously been mere doctrine and belief was now translated into human character. The significance of this theory cannot be better expressed than in the well-known words of Tennyson:

Tho' truths in manhood darkly join,  
Deep-seated in our mystic frame  
We yield all blessing to the name  
Of Him who made them current coin.

And so the word had breath and wrought  
With human hands the creed of creeds,  
In loveliness of perfect deeds,  
More strong than all poetic thought.

A fourth school of thinkers regards Christianity as the revelation and embodiment of a new moral and social ideal. Tolstoi, for instance, takes the Sermon on the Mount as the truest expression of the Christian spirit, and maintains that real Christianity consists in obedience to the literal words of the teaching of Jesus. Though Tolstoi is the most extreme representative of this type of thought, the same idea permeates the writings of Lamennais, Richard Wagner, Mazzini, Kingsley, and Ruskin. A good exposition of these and other interpretations of Christianity will be found in Weinle's *Jesus in the 19th Century*.

*The Faith of the Early Church*.—It will be necessary to trace the genesis of these divergent interpretations of Christianity by an appeal to history. The first question to be asked is, 'How was Christianity interpreted by the primitive church?' and our answer is derived from the data presented in the New Testament. Now it used to be taken for granted that the New Testament contained a single, simple, and uniform exposition of Christianity, and that all the writers maintained exactly the same theological positions, and laid all the emphasis upon exactly the same points. Modern research has taught us that this view is wrong. The New Testament contains several types of theology. The most important of these are: (a) the Pauline type, represented in the Epistles of St Paul; (b) the type represented by James and the Synoptic Gospels; (c) the Johannine type found in the fourth Gospel and the Epistles of St John; (d) the type represented by Hebrews; (e) the apocalyptic type found in the book of Revelation.

There are certain points of belief which are common to all these types, and these common elements represent the universal faith of the Christian Church. (1) All the types of theology in the New Testament agree in assigning the most exalted rank to Jesus. We can be quite certain that the fundamental article of faith in the primitive church was summed up in the phrase 'Jesus is Lord.' (2) They all agree in regarding Jesus as the Saviour and Redeemer of the World. (3) They all lay stress on the fact of the Resurrection of Jesus. (4) They all look forward to his return to the world in glory. (5) They all recognise his teaching as authoritative. These five points may be said to summarise the catholic faith of the first generation of Christians.

But when we come to study the documents carefully we note certain divergences—at any rate of emphasis—in the documents. The Epistle of James, for instance, lays the main stress on the ethical teaching of Jesus. If James stood alone, it would be possible to argue that the peculiar character of the epistle was due to the circumstances under which it was written. But supported as it is by the document known as Q, which was one of the sources out of which Matthew and Luke were composed (see GOSPELS), and by *The Didache*, *Barnabas*, and the *Shepherd of Hermas*, it is quite clear that James represents a type of Christianity which regarded the teaching of Jesus as the all-essential thing, and which therefore was the prototype of the theory of Harnack and Tolstoi in modern times. The other extreme in the primitive interpretations of Christianity is found in the Apocalypse, which lays the supreme emphasis on the Parousia or the second advent of Jesus. To the author of the Apocalypse the chief interest of the Christian religion lies in the future, and centres in the series of events which leads up to the final climax in the return of Christ and the establishment of the millennial kingdom.

While James and the Apocalypse took up a single element in the common Christian faith and treated it as if it contained the essence of Christianity (though in both cases the other phases of the faith were recognised), the rest of the New Testament writers—especially Paul, John, and the author of Hebrews—embraced in their exposition of Christianity all the points which have been mentioned as constituting the faith of the apostolic age, expanding in different ways, according to their own vision and insight, the various truths in the common teaching. To take an illustration. We have seen that the primitive faith in the person of Christ expressed itself in the formula 'Jesus is Lord.' This simple formula is, of course, capable of indefinite expansion and elucidation, and examples

of this process are to be found in the great Christological passages in the Epistles. In the prologue to the fourth Gospel, in the opening verses of Hebrews, in the great *loci classici* of Ephesians and Colossians, attempts are made to bring out the full import and force involved in the common Christian belief with regard to Christ.

But in addition to the work of expansion and interpretation, some new and vital contributions were made, especially by the Apostle Paul, to Christian theology. We have seen that the common belief of the Church emphasised the teaching, the death, the resurrection, and the return of Christ. To these Paul and John added the mystical ideal of fellowship with the risen and eternal Christ 'If any man is in Christ Jesus, he is a new creature.' 'Abide in me, and I in you. As the branch cannot bear fruit by itself except it abide in the vine, so neither can ye except ye abide in me.'

It will be seen, therefore, that the apostolic age gave several answers to the questions, 'How does Christ save?' 'What is it in Christ that represents his real value to the world?' (1) One reply to these questions was, The value of Christ to the world consists of his incarnate life—of what he was and did during his earthly career. Christianity rests upon the basis of the historical revelation. But if we press the inquiry further and ask, 'What is it in the historic Jesus that constitutes his value for the world?' once more we get divergent answers. (a) Some tell us that the supreme value of Jesus lies in his teaching, especially in his revelation of the moral ideal. This seems to be the point of view of the Epistle of James and its supporters. (b) Others say that the supreme value rests in the sacrifice upon the Cross; though it should be noted that this view is never isolated and presented as the one solitary article of belief in the pages of the New Testament. (c) Others lay stress upon the fact of the Incarnation, and the revelation which is involved in it of the divine sympathy with human suffering. This is specially in evidence in Hebrews, though once again it is never isolated from the general body of Christian belief. (2) Another answer to the question is found in the mystical position taken up by John and Paul. It is not so much what Jesus did during his earthly career that benefits mankind: it is rather what he is and what he does as the exalted Christ at the right hand of the Father that constitutes his value for the Christian. It should be remembered, however, that we never find pure mysticism in the New Testament; it is always a mysticism that is based upon and grows out of the Christian facts. (3) The third line of reply to the question is found in the Christian belief in the speedy return of Christ. The essential thing about Christianity is not what Christ did in his incarnate life—nor yet what he is and does in his risen and exalted life—but rather what he is to do at the Parousia. Christianity, according to this answer, is mainly eschatological, and the hope of the second advent constitutes its kernel and centre.

The greatness of the New Testament expositions of Christianity lies in the fact that, with the exception of James and the Apocalypse, which isolated certain points and gave them special emphasis, the great theologians of the apostolic age embraced in their interpretations of Christianity all the answers which could be given to the question, 'What is it in Christ that constitutes his value for the world?' Paul's phrase, 'the unsearchable riches of Christ Jesus,' represents the attitude in which they stood to their Lord and Master. Christ was to them the supreme ethical teacher, and the final revelation of the will of God—but he was more than that. He was the 'power of God unto salvation,' and his death upon the Cross broke down the barrier of sin

that stood between man and God; but even that did not exhaust his value for mankind. His eternal spirit was ever present in the Christian Church, guiding, inspiring, and uplifting the individual Christian and the community alike. And more even than that—there was ever before their eyes the radiant hope that he would soon return to the world to complete his victory and set up his royal kingdom. Christianity meant all this to Paul and the great teachers of the 1st century. And even when all this has been stated, Paul seems to feel the inadequacy of his exposition, for in Colossians, one of the latest of his epistles, he describes Christ as 'all in all,' or, to use a modern equivalent, 'everything to everybody.'

*Christianity in the First Three Centuries.*—The New Testament is the record of the genesis of a great faith, and the beginnings of a theological exposition of that faith. As yet, however, the task of formulating Christianity is in its early stages. No rigid definition has yet been determined. It was during the first three centuries that the confines and boundaries of the new faith were fixed. The work of formulation proceeded upon two definite lines—the formulation of creed, and the formulation of organisation. There were many reasons that made it necessary for the Church to determine its standard of belief. The contact between Christianity and the thought of the age led to many experiments in theology. The heretics at Colossæ, for instance, attempted to work the Christian faith into a system of thought already in existence. The Gnostic philosophy of the universe attempted to capture it in the interests of its own creed. Then, too, real problems arose for which the apostolic age had found no solution. The New Testament, for the most part, is content with reiterating and enforcing the Christian facts and showing the value of those facts for faith and religion. It does not face, except by the way of suggestion, the important problems which Christianity forced upon the world. We find, even in the apostolic age, the emergence of heresies, such as Doketism, Ebionitism, Antinomianism, Nicolaitism, &c. There was a risk that chaos might ensue, and that Christianity itself might be overwhelmed in a vortex of conflicting beliefs. It was to avoid this confusion, and to enable the Church to present a united front to the thought of the age, that the first attempt was made to reduce the Christian faith to the form of a creed. The first creed was extremely simple, and probably ran somewhat as follows: 'I believe in God the Father Almighty: and in Jesus Christ his only Son and Lord, who was born of the Virgin Mary, suffered, rose again the third day, ascended into Heaven, and shall come to judge the quick and the dead: and in the Holy Spirit.' This formula is known to have been used about 140, and may be of earlier origin. It is, of course, the basis out of which the so-called Apostles' Creed was developed. But simple though the formula is, it marks a great advance upon the only theological test that seems to have been in existence in the apostolic age—i.e. the phrase 'Jesus is Lord.'

The development of a system of church organisation was equally important. In the New Testament very little importance is attached to the form of organisation or the type of ministry. There is no certain proof of the existence of any fixed order of ministers except the apostles, and the presbyters, who were the governing body in the Christian communities. Other officers are mentioned, but there is an entire absence of anything approaching to a stereotyped system. By the end of the 3d century, however, a definite organisation had been established. The threefold ministry—consisting of the bishops, presbyters, and deacons—was now regarded as indispensable to the Christian Church,

and, what is more, a sacerdotal value was ascribed to these orders. We cannot exaggerate the significance of the evolution of this system of church government on the history of Christianity. Gradually the centre of gravity in the Church shifted from the community to the ministry. The emergence of a priestly hierarchy completely revolutionised the character of Christianity, and in the course of time was followed by an inevitable deterioration of the Christian ideal.

Two other developments of considerable importance in this period ought to be mentioned: (1) The growth of sacramental teaching. Whatever may be involved in the attitude of the New Testament towards Baptism and the Lord's Supper, it is quite certain that in the early centuries these two sacraments were endowed with certain magical powers which changed the character of their original religious significance. A serious danger arose in certain quarters lest Christianity should become a matter of rite and ceremony—and the danger afterwards became a menace. (2) The creation of the New Testament. Though the canon of the New Testament was not absolutely fixed till the 4th century, yet the New Testament itself was well established in the affection and regard of the Church before the end of the 3d. While the apostles and their successors were alive, little need was felt for an authoritative record of the faith, but as an apostolic age passed away, the demand arose, especially in the face of Gnostic and other travesties of Christianity, for the preservation of the authentic documents which contained the account of the teaching of Jesus and his apostles. The making of the New Testament was the greatest achievement of the first centuries. It secured the perpetuation of the Christian ideal in a permanent form.

The first three centuries were really the formative period of Christianity. They transformed the Christian religion into a definite system, with a fixed body of belief and a sacerdotal hierarchy.

*The Patristic Period.*—The later centuries carried to completion the work which had been commenced in the earlier. They expanded the creed and they developed the system of organisation. As we have seen, the earliest creed was simple and practical. It simply embodied the Christian facts without attempting to explain or relate them. It required every Christian to express his belief in the three persons—God, Jesus Christ, and the Holy Spirit—but it left the connection between these persons vague and indefinite. The 2d century, indeed, had rejected the explanations suggested by the different forms of the Monarchian heresy; but it had not attempted any constructive work of its own, though some efforts had been made by the Apologists and the Alexandrines to turn the Logos doctrine to account by way of explanation. In the 4th century, however, the challenge of Arius compelled the Church to face the problem, and, as a result, the statement of the Nicene Creed was formulated. This statement naturally narrowed the circle of Christian belief. Hitherto it had been sufficient for a Christian to express his belief in the three persons; now he was under the additional necessity of expressing his belief in a certain metaphysical relation between the three. The 5th century raised another Christological problem—the problem of the co-existence of the divine and human natures in Christ. Various solutions were suggested by Apollinarianism, Nestorianism, and Eutychianism. All of these, however, were rejected in favour of the Chalcedonian formula, which henceforth became the standard of Christian belief. Once more a new burden was laid upon the Christian intellect, and a fresh complexity added to Christian faith.

While the Eastern Church was engaged in evolu-

ting a metaphysical Christology for the Church, Augustine, in the West, was formulating the Christian position on original sin, predestination, and grace, and his contribution gradually came to be recognised as the authoritative standard of Christian belief. Thus the 4th and 5th centuries were responsible for the most serious enlargement of the Christian creed that has ever been made, and these enlargements have generally been regarded as the authoritative interpretation of the Christian position on its intellectual side. But if the Patristic period produced revolutionary results in the intellectual statement of Christian belief, its influence upon the development of the ecclesiastical system was no less far-reaching in its results. One of the most important of the new features was the application of the principle of differentiation to the order of bishops. A distinction was first made between town and country bishops. Then the town bishops were ranked in different order in proportion to the importance of the city to which they belonged. Hence a new order of metropolitan bishops arose, to whom the other bishops of the diocese were subordinated. By this means the way was opened for the Bishop of Rome to secure the primacy, and thus the papal system became established in Christendom. Under the headship of the various popes the Church gradually attained an imperial position, and became secularised in the process. Wealth poured into its coffers, and the successors of the fisherman apostle ranked among the richest potentates of Europe. Under the papal system the power of the priest became mightier than ever. His power rested secure upon the doctrine of the sacraments and the penitential system. Forgiveness and absolution could only be obtained through his mediation. The God whom Jesus Christ brought so near to the heart of the world became once again the Great Unapproachable. He no longer stood at the open door ready to welcome his prodigal children upon their return. That business was now transacted by the priest, and very often, at any rate in the degenerate mediæval days, for a money consideration. From the 5th century onward there was a perceptible lowering of the Christian ideal, until at last the teaching of Jesus was entirely obscured beneath a network of metaphysical theology and superstitious practice, and as a result there was a distinct and general weakening of the moral standard. An attempt was made from time to time in the different forms of monasticism to recover the Christian ideal from the spirit of worldliness and hypocrisy which threatened to destroy it; but monasticism was ascetic rather than Christian, and though no doubt it did serve to raise the standard for the time, it carried the seeds of corruption in its own nature, and almost always fell a prey to the very evils which it sought to challenge and destroy. By the time the mediæval period was reached, Christianity had travelled a long way from the simple teaching of the New Testament. The gulf which separates St Paul's conception of Christianity from that of Hildebrand is almost infinite. While Christianity claimed to have conquered the world, the simple fact remains that it was the world which had conquered it.

*The Attempt at the Reformation to recover the Christian Ideal.*—The revolt was bound to come sooner or later, and the only wonder is that it did not come effectively at any rate before the time of Luther. The need of reform was universally recognised, but nobody seemed to know how to set about it. The University of Paris had used its influence to secure the meeting of a general council, with the object of reforming the Church 'in head and members,' but it proved to be little more than a fiasco. The 15th century witnessed a great propaganda of reform both in England and on the Continent, but

the forces of reaction were too strong for it to secure any real triumph. It was not till the 16th century that the reform movement, which had been gradually gathering momentum for two hundred years or more, found itself strong enough to challenge successfully the superstitions and abuses which had been introduced into Christianity. Luther and Calvin stood at the head of two great movements, which ran parallel to each other and gradually leavened the northern part of Europe with the spirit of reform. The one great lever which enabled them to lift Germany, Switzerland, and finally Scotland and the Netherlands, out of the morass of irreligion and immorality, for which the papacy had come to stand, was the recovery of the Bible, and especially the New Testament, which for centuries had been practically a forgotten book. The recovery of the Bible meant the recovery of the Christian ideal, and the recovery of the Christian ideal meant the influx of new spiritual life and power into a degenerate Christendom. There were three great policies of reform which were put before the world at the time. (1) There was the policy of the Humanists, headed by Erasmus, which strove to secure an internal reform of the Church and avoid any open rupture with Roman Catholicism. That policy, however, had been tried for over a century, and had failed to make any headway against the forces of resistance, and the world had grown impatient with its impotence, and come to the conclusion that 'it was useless to drone charms over a wound that needed the knife.' (2) There was the policy of Luther, who saw that a rupture was inevitable, but felt that the breach ought to be reduced to a minimum. The line he advocated was to change those things, and those things only, in Roman belief and practice which were in flat contradiction to the teaching of the Bible, and to accept everything else without question. This principle led to the denunciation and abandonment of many superstitious rites and ceremonies, but it retained some elements which the more radical reformers wished to demolish. The doctrine of transubstantiation was attacked, for instance, but a theory of consubstantiation was substituted for it, which, though it deprived the priests of their magical powers, left the associations of the Mass much the same as they were before. The great achievement of Luther, however, was his recovery of the evangelical doctrine of justification by faith. This meant that Protestant theology as expounded by Luther was grounded on the theology of St Paul, and that once again Paulinism became the life-blood of the Christian Church. (3) The third policy was that of Calvin, the founder of the Reformed Church. Calvin's fundamental principle was that the Bible constitutes the basis not only of theology and morality, but of ecclesiastical polity as well. The method of reform which he advocated and put into practice was to take the Bible as his authority and build up *de novo* his system of theology and his Church institutions upon its teaching. This entailed the abandonment of the whole Episcopal ideal, and the substitution for it of the Presbyterian method of Church government. Calvin in this way laid his axe at the root of the tree of ecclesiastical tradition and felled it to the ground. The intervening centuries were blotted out of his calculations, and a return was made to the teaching of the New Testament and the apostolic age. Calvin, however, took over the historical creeds and the theology of Augustine, not so much because they had been consecrated by usage and had the authority of the Church to support them, but because he felt that they represented the only conclusions which could be legitimately drawn from the teaching of the Bible. Henceforth, as far as Protestantism is concerned, Christianity became a matter of inter-

preting 'the Bible, the whole Bible, and nothing but the Bible.'

*Christianity since the Reformation.*—The Reformation found a new basis of authority in the Bible, but took it for granted that the historical creeds, and the evangelical theology as expounded by Augustine, represented a summary of the teaching of the Bible. There were some difficulties, of course, to be faced, and Luther found it necessary to throw over the Epistle of James as 'an epistle of straw' and some other books in the Bible, because they did not yield the theological position which he regarded as fundamental. The reformers assumed the plenary inspiration of Scripture, though they differed in their exposition of the theory.

The progress of Christian thought could not stop at the Reformation settlement. There were several reasons which made it necessary to go forward. (1) In the first place, the reformers assumed that the Bible, when properly interpreted, would yield a uniform body of doctrine and a uniform ecclesiastical polity. This assumption was falsified by the discoveries made within Protestantism itself, that the study of the Bible might yield very different results to different students. Where one man discovered Episcopacy, another found Presbyterianism, and a third Anabaptism, and a fourth Independency. For a couple of centuries or so ecclesiastical controversy raged round the interpretation of Scripture. Much ink was spilt in the war of proof-texts. (2) In the 18th century the fundamental position of the reformers that the historical creeds and the Augustinian theology represented the authoritative teaching of the Bible was seriously challenged. The Trinitarian controversy in England raised the whole question of the Person of Christ, and Socinianism and Arianism won a large number of supporters. This, however, was simply a temporary phase of thought which was not destined to survive in any strength, except in the form of Unitarianism. A much more important movement—known as Arminianism—struck a severe blow at the Augustinian doctrines of predestination and irresistible grace which, through the influence of Calvin, had obtained an important place in Protestant theology. The intellectual attack was popularised in the Methodist revival, which sought to free the evangelical theology from Calvinism, and to a large extent succeeded in its purpose. Both the Trinitarian and the Arminian controversy were fought out on the assumption that the Bible was the final court of appeal in matters of doctrine. (3) Another movement, which attained considerable dimensions in Germany, exercised considerable influence on the development of the conception of Christianity—viz. Pietism. Pietism was a revolt against theology, and a plea for practical Christianity. The leaders of the Reformation had grounded their faith upon the Epistles of St Paul; the Pietists turned to the Sermon on the Mount, and argued that the Christian ideal which it contained ought to be made the standard of life. The Pietists were the forerunners of the humanitarian conception of Christianity which came into such prominence in the latter half of the 19th century. (4) Two other forces helped to modify the official Protestant position. The Society of Friends, or the Quakers, as they came to be called in popular speech, denied that the Bible was the sole and only source of divine knowledge. Every man possessed an 'inner light' or divine inspiration, which guided his life and moulded his character. The Mystics, too, maintained the possibility of personal communion with God, unmediated by church, sacraments, or Bible. The general effect of both Quakerism and Mysticism was to question the fundamental basis of Protestantism, that the Bible was the sole basis of authority and rule of faith.

*The Modern Development.*—In modern times a still more remarkable advance has been made upon the Reformation position, and many new phases of thought have been developed in the discussion of Christianity. (1) An attempt has been made by Newnman and many others to justify the Roman Catholic position by the doctrine of development. It has been frankly admitted that many of the most important Catholic doctrines find no support in the pages of the New Testament, but it is maintained that the New Testament was never intended to be a final statement of Christianity; in fact, the promise was given that the Holy Spirit should be bestowed upon the Church to lead it into the way of truth. The Roman Catholic development, it is argued, was the result of that promise. Under the inspiration of the Spirit the Catholic system of theology and ecclesiastical polity were slowly evolved. But the doctrine of development proves either too much or too little to be an effective apologetic for Roman Catholicism. If it be maintained that the inspiration of the Spirit has been always at work in the whole history of the Church, then Protestantism, and every modern movement, can claim a share of its influences. There is no reason at all why it should be assumed that any particular branch of Christendom has a monopoly of the Spirit's guidance. If, on the other hand, it be maintained that the inspiration of the Spirit could only manifest itself in the œcumenical councils of an undivided Church, then the argument proves too little, for many of the doctrines of Catholicism were formulated after the division of Christendom took place. (2) A second very important modern tendency is represented by the watchword 'Back to Christ.' This phrase originated as a protest against the theological and ecclesiastical overgrowth which had covered the simple teaching of the New Testament. The movement assumed two forms, which may be represented respectively by the two phrases 'Back to Christ' and 'Back to Jesus.' The former advocated a return to the New Testament position, and included the epistles as well as the gospels in the scope of its inquiry. The latter set the gospels in opposition to the epistles, and advocated a return to the teaching of Jesus, as opposed to the theology of Paul and the other New Testament writers. Both movements represented a real gain. Christianity was tested and examined afresh, in the light of its earliest ideals. But neither movement could claim to be final, because both found themselves faced by the same problems which confronted the apostolic age, and hence have been under the necessity of travelling the same road, which the Church in the early centuries followed—a road which leads inevitably to the creation of theology. (3) Perhaps the most momentous movement in recent times has been the development of biblical criticism (see BIBLICAL CRITICISM). The doctrine of verbal inspiration has been generally abandoned. The Old Testament has been rearranged and its teaching re-assessed, and brought under the category of evolution. Scholarship is still at work on the New Testament, facing the two great problems—(a) the historical value of the narrative in the gospels; (b) the theological value of the epistles. The whole of this process has been revolutionary for theology and the interpretation of Christianity. The position for the reformers was simple. They took the Bible as their authoritative text-book, assuming that it contained a uniform revelation from beginning to end. That assumption has now been proved to be mistaken, and we have to rest our position to-day not on the letter but on the spirit of the teaching of Scripture. (4) A fourth influence which has also left its mark upon the modern discussion has been the tremen-

dous progress which has been made quite recently in the comparative study of religion. The increasing knowledge which has been acquired by the patient study of other religions has raised the question, 'How does Christianity stand in relation to other faiths?' and it has been the task of the Christian apologist to prove the supremacy of Christianity among the religions of the world. But the matter does not end there. The history of the course of the development of other religions—Buddhism, for instance—throws no little light on the evolution of ecclesiasticism in the Christian Church. The pathological study of religions is an illuminating intellectual pursuit, and enables us to realise that there are certain forms of error and corruption which seem to be common to all religions, and which inevitably cause decadence and loss of vitality.

*The Modern Problem.*—The great problem which confronts Christian thought to-day is the question as to where the true basis of authority is to be found, and the real dividing lines of Christendom are to be seen in the answers which are given to this question. The existing ecclesiastical divisions are in many cases artificial, and simply perpetuate the memory of ancient controversies which have long since been forgotten, while they have no reference at all to the modern cleavage of opinions. It is on the question of authority that the real cleavage exists. (1) A large section of Christendom still finds the ultimate basis of authority in the ecclesiastical tradition of the past. That tradition is represented partly in the decisions of ecclesiastical councils and synods, partly in the writings of the great theologians, partly in customs and practices which have been consecrated by long usage in the Church. Such a position, however, is confronted by one very serious difficulty. It is quite obvious that antiquity is not necessarily a guarantee of truth. The ancient Church was no more infallible than is the modern. Some kind of winnowing fan is therefore required to sift the chaff from the wheat; and the need that soon manifests itself of some principle of selection shows that, left to itself, this theory of authority inevitably breaks down. (2) Others find the basis of authority in the individual Christian conscience. Each man is endowed, it is maintained, with power to appraise the value of the different forms of religious teaching. The truth instinctively appeals to a man's conscience; error is just as instinctively rejected and set aside. This theory breaks down because it is altogether too subjective and individualistic. If it were universally applied, it would result in confusion, and *Quot homines, tot sententiae*, would be the rule of life. No doubt the ideal conscience would inevitably reach unerring conclusions, but an ideal conscience cannot be posited of each individual; on the contrary, conscience is often blunted and seared. (3) Yet again the basis of authority is sometimes found not in the individual, but in the universal Christian consciousness. Here we are on surer ground. There is a strong presumption in favour of religious truth which has been vindicated and proved in general experience of Christendom. The one difficulty is to find the truths which possess this universal guarantee behind them. There is strong support for an evangelical theology in Christian experience, but there is an almost equally strong vindication of the most extreme sacramentarian teaching. It is useless to attempt to deny the fact that different forms of experience exist in different groups of Christians, and if we make universality the test, the results will be scanty and mean. (4) The majority of Protestants still cling to the Protestant position, that the final authority is to be found in the Bible, though the more enlightened theologians demand

that the Bible shall be interpreted in the light of modern biblical criticism. Here again there are difficulties. 'What, for instance, is to be our primary authority within the Bible itself?' Is it to be found in the teaching of Jesus or in the theology of St Paul? The chief theological battle is raging round this problem to-day, and upon the settlement of this question depends the interpretation of Christianity in the future.

*Christianity and the Future.*—It is not easy to foresee exactly what will be the trend of Christianity in the future. There is no sign that its divisions are likely to be obliterated because some of those divisions represent entirely different attitudes of faith. But it is undoubtedly the fact that centripetal forces are at work to-day, and the divisions which have become anachronistic, and have nothing in modern thought or life to justify their existence, will soon be doomed. It is possible that there will be a regrouping of the sections, answering more or less to the real cleavages in modern thought. One of the most hopeful features in the situation is the gradual decay of bitterness and animosity, and the growth of the spirit of toleration. But though systems and organisations may vary, and though restatements of theology may be rendered necessary from time to time, the eternal elements in Christianity—the truths that have been the shining light of all the centuries—are assuredly destined to exercise a transcendent influence in the future.

See articles on BIBLE, BIBLICAL CRITICISM, CHRIST, JESUS, CHURCH, CHURCH HISTORY, CREED; Harnack, *What is Christianity?* P. T. Forsyth, *The Principle of Authority*; Fairbairn, *The Philosophy of the Christian Religion*; Weinel, *Jesus in the 19th Century*.

**Christian Knowledge**, THE SOCIETY FOR PROMOTING, oldest of the great religious associations connected with the Church of England, was founded in 1698 'to promote and encourage the erection of charity schools in all parts of England and Wales; to disperse, both at home and abroad, Bibles and tracts of religion; and, in general, to advance the honour of God, and the good of mankind, by promoting Christian knowledge both at home and in other parts of the world by the best methods that should offer.' The 'S.P.C.K.' still partakes of the nature of an educational association, a missionary society, a Bible society, a religious tract society, and an emigrants' spiritual aid society. See the History of the Society published in 1898. —A Scottish Society for Propagating Christian Knowledge, incorporated in 1709, devotes its energies mainly to the Highlands and Islands.

**Christiansand** (*Kristiansand*), capital of a province, is situated on a sandy plain in the extreme south of Norway, and has a cathedral. It is a shipbuilding centre, and has dockyards, a harbour of refuge, and a trade in timber, paper, wood-pulp, pitch, stockfish (salted cod), fish-oil for curriers, salmon, mackerel, lobsters, and ptarmigans—largely for the London market. Since the great fire of 1892 the picturesque wooden houses, long so characteristic, are forbidden by law. The inhabitants are noted for their tall stature. Pop. 16,600.

**Christian Schools**, BROTHERS OF, sometimes inaccurately called Ignorantines, a religious congregation in the Roman Catholic Church, established for the religious and secular education of the poor. It originated in France in the end of the 17th century, and was organised by a charitable ecclesiastic, the Abbé John Baptist de la Salle (canonised 1900), canon of the church of Reims (1651–1719), who in 1684 resigned his canonry, sold his possessions for the poor, and drew up rules for his brotherhood of teachers—all lay brothers and subject to one general head. Teach-

ing was made gratuitous for day-scholars, but boarders and day-boarders paid fees. Learning Latin was not obligatory on the poor; after the catechism the basis of the teaching was reading and writing the mother-tongue. On this ground it has been claimed for the canon of Reims that he was really the founder of organised primary schools and primary education. The brothers devote themselves by a vow to the profession of teaching for life, and are trained in normal schools of their own. They wear a special ecclesiastical costume, and work always in pairs, and, though laymen, are bound by the usual vows of poverty, chastity, and obedience. In 1725 Benedict XIII. issued a bull recognising them as a religious congregation.

**Christian Science** is a religious system which proposes to work out the salvation of mortals through the application of scientific rules of right, in contradistinction to a dependence upon doctrinal beliefs. It regards creeds as beneficial only in so far as they improve the conduct of their adherents. It teaches that all mankind must, either here or hereafter, literally fulfil Christ's command, 'Be ye perfect, even as your Father which is in heaven is perfect;' that the standard of Christian perfection is no less than the image and likeness of God; that to be the perfect likeness of God—in other words, to be perfectly like God—one must have a perfect knowledge of him, even his very nature and essence; that, according to John xvii., to be God-like one must understand exactly what God is, and shape one's course accordingly—must have a perfect understanding of Christ, the only true guide to eternal life. Christian Scientists believe that the body of man is the exact manifestation of his mentality, and therefore, when the human mind is imbued with sufficient realisation of the omnipotence and omnipresence of God, this not only prevents but cures bodily disease; that when the mind is improved spiritually through the understanding and application of Christian Science, the body responds accordingly; that an improved mental condition inevitably means a corresponding bodily improvement; that, though centuries may pass meanwhile, the prophecies of Isaiah and St John will eventually be fulfilled, and there will be no more pain, sorrow, and death, since mankind will be too spiritually-minded to be sick, suffer, and die. Christian Science is based on the Bible; as a doctrine it was 'discovered' in 1866 by the Rev. Mary Baker Glover Eddy, who began in 1862 'to write down and give to her friends the results of her Scriptural studies;' but these compositions, she says, 'were crude, the first steps of a child in the newly discovered world of Spirit.' Her first pamphlet was copyrighted in 1870, but not printed till 1876. *Science and Health, with Key to the Scriptures*, her principal work and the text-book of the system, was published in 1875, and in a quarter of a century reached its 270th thousand. In that work she declares: 'In the year 1866 I discovered the Christ science, or divine laws of Life, and named it Christian Science. God had been graciously fitting me, during many years, for the reception of a final revelation of the absolute divine Principle of scientific being and healing.' The text-book also gives the following statement of being: 'There is no life, truth, intelligence, or substance in matter. All is infinite Mind and its infinite manifestation, for God is all in all. Spirit is immortal Truth; matter is mortal error. Spirit is the real and eternal; matter is the unreal and temporal. Spirit is God, and man is His image and likeness; hence man is spiritual and not material.' Mrs Eddy was born at Bow, N.H., and received a careful education, which included natural philosophy,

logic, moral science, Greek, and Hebrew. Bred a Congregationalist, she even in childhood wrote verses containing ideas approximating to her later teaching, and as a girl was remarkable for the spirituality of her temper. At eighteen she was writing for the New Hampshire papers, and for the magazines of both north and south. She had lectured with great acceptance in many cities of the Union before, in 1866, she was led to formulate her doctrines. In 1867 she began teaching Christian Science; in 1879 had organised the Church of Christ Scientist in Boston; in 1881 she was ordained to the ministry, and founded the Massachusetts Metaphysical College at Boston. In 1883 she started *The Christian Science Journal*, in 1898 *The Christian Science Sentinel*, and in 1903 a German monthly magazine (*Der Herold*). In 1908 she accomplished a long-cherished plan, the foundation of *The Christian Science Monitor*, a daily newspaper, unsectarian and free from political bias, whose mission is to report all that is helpful, interesting, and pure in the news of the world; in two years it had acquired a world-wide circulation. Mrs Eddy, who had in 1908 changed her residence from Concord, N.H., to the suburbs of Boston, passed away on 3d December 1910. Her various works develop the principles contained in *Science and Health*. See a biography by Miss Sibyl Wilbur, also Miss E. M. Ramsay, *Christian Science and its Discoverer* (1923).

**Christian Socialists.** See SOCIALISM; also MAURICE (J. F. D.).

**Christians of St Thomas.** See THOMAS.

**Christianstad,** the capital of a Swedish province of the same name, on a lake-like expansion of the Helge River, 10 miles from its mouth in the Baltic, and 350 SSW. of Stockholm; pop. 13,000. Its port is Åhus, at the mouth of the Helge.

**Christiansted,** the chief town of the island of Santa Cruz (q.v.), in the Virgin Islands of the United States, on the north shore; pop. 5000.

**Christiansund** (*Kristiansund*), sometimes confounded with Christiansand though 350 miles farther north, is a Norwegian coast-town (pop. 15,000), built on four islands, Kirke-landsö, Inlandsö, Nordlandsö, and Skjopen. The main thoroughfare being the sea-channels between these islands gives it a curiously picturesque character, which is heightened by the irregularity of ground on which the wooden houses are built, scarcely any two being on the same level. It has a considerable trade with Spain and Italy in salt-fish.

**Christina,** queen of Spain. See MARIA CHRISTINA.

**Christina,** queen of Sweden, only child of the great Gustavus Adolphus, was born 17th December 1626, and succeeded her father in 1632. Distinguished equally by beauty and the possession of a lively imagination, a good memory, and uncommon intelligence, she received a man's rather than a woman's education. During her minority the kingdom was governed by the five highest officers of state, the principal being Chancellor Oxenstierna. In 1644 she assumed the reins of power, and in 1650 was crowned with the title of *king*. She had previously declared her cousin, Charles Gustavus, her successor. For four years thereafter she ruled the kingdom with vigour, and was remarkable for her patronage of learned men, such as Grotius, Salmasius, and Descartes. In 1654, however, at the age of twenty-eight, weary of the personal restraint which royalty imposed on her, she abdicated in favour of her cousin, reserving to herself sufficient revenues, entire independence, and supreme authority over her suite and

household. Leaving Sweden, she proceeded to Brussels, where she embraced the Roman Catholic religion. She next went to Rome, which she entered on horseback, in the costume of an Amazon, with great pomp. Confirmed by Pope Alexander VII., she adopted the surname of Alessandra. She visited Fontainebleau, where in 1657 she caused her grand equerry, Monaldeschi, who had enjoyed her entire confidence, to be executed in her own household for treason. The death of the king in 1660 caused her to hasten from Rome to Sweden; but, failing in her attempt to be reinstated on the throne, she again left the country. In 1666 she aspired to the crown of Poland. The remainder of her life was spent at Rome in artistic and scientific pursuits. Here she died 19th April 1689. See books by Bain (1889) and Gribble (1913).

**Christine de Pisan.** See PISAN.

**Christison,** SIR ROBERT, was born at Edinburgh, 18th July 1797, son of the professor of Humanity (1806-20) there. After graduating in 1819, he proceeded to London and Paris, and in the French capital studied toxicology under the celebrated Orfila. He was in 1822 appointed to the chair of Medical Jurisprudence in the university of Edinburgh, and in 1832-77 was professor of *Materia Medica*. He risked his life more than once in his experiments with poisons on his own system. During a vigorous old age he could walk, run, or climb mountains better than any of his contemporaries. He died 23d January 1882. Christison wrote a *Treatise on Poisons* (1829), a standard work; *Biographical Sketch of Edward Turner, M.D.* (1837); *On Granular Degeneration of the Kidneys* (1839); and *The Dispensatory, a Commentary on the Pharmacopœias of Great Britain* (1842). See his *Life*, edited by his sons (1885-86).

**Christmas,** the day on which the nativity of the Saviour is observed. The institution of this festival is attributed by the spurious Decretals to Telesphorus, who flourished in the reign of Antoninus Pius (138-161 A.D.), but the first certain traces of it are found about the time of the Emperor Commodus (180-192 A.D.). In the reign of Diocletian (284-305 A.D.), while that ruler was keeping court at Nicomedia, he learned that a multitude of Christians were assembled in the city to celebrate the birthday of Jesus, and having ordered the church doors to be closed, he set fire to the building, and all the worshippers perished in the flames. It does not appear, however, that there was any uniformity in the period of observing the nativity among the early churches; some held the festival in the month of May or April, others in January, conjointly with the feast of the Epiphany. It is nevertheless almost certain that the 25th of December *cannot* be the nativity of the Saviour, for it is then the height of the rainy season in Judæa, and shepherds could hardly be watching their flocks by night in the plains.

Christmas not only became the parent of many later festivals, such as those of the Virgin, but especially from the 5th to the 8th century, gathered round it, as it were, several other festivals, partly old and partly new, so that what may be termed a *Christmas Cycle* sprang up, which surpassed all other groups of Christian holidays in the manifold richness of its festal usages, and furthered, more than any other, the completion of the orderly and systematic distribution of church festivals over the whole year. Not casually or arbitrarily was the festival of the Nativity celebrated on the 25th of December. One of the principal causes that co-operated in fixing this period was that almost all the heathen nations regarded the winter solstice as the turning-point of the year—the beginning of the renewed life and activity of the powers of nature,

and of the gods, who were originally merely the symbolical personifications of these. In more northerly countries this fact must have made itself peculiarly palpable—hence the Celts and Germans, from the oldest times, celebrated the season with the greatest festivities. At the winter solstice the Norsemen held their great Yule-feast (see YULE) in commemoration of the fiery sun-wheel; and believed that during the twelve nights from the 25th December to the 6th January they could trace the personal movements and interferences on earth of their great deities, Odin, Berchta, &c. Many of the beliefs and usages of the old Germans, and also of the Romans, relating to this period, passed over from heathenism to Christianity, and have partly survived to the present day. But the church also sought to combat and banish—and it was to a large extent successful—the deep-rooted heathen feeling by adding, for the purification of the heathen customs and feasts which it retained, its grandly devised liturgy, besides dramatic representations of the birth of Christ, and the first events of his life. Hence sprang the so-called 'Manger-songs,' and a multitude of Christmas carols (see CAROL), as well as Christmas dramas, which at certain times and places degenerated into farces or Fools' Feasts (q.v.), and the custom of presents, and of special Christmas dishes, such as Christmas cakes, dumplings, &c. The favourite dish was a boar's head. Its supplanter, the turkey, had already appeared on the English Christmas board by 1573. The custom of decorating churches at Christmas, especially with holly and ivy, is a very ancient one. The Christmas tree, introduced to England from Germany by Queen Charlotte, would seem to be traceable to the Roman saturnalia, and was not improbably first imported into Germany with the conquering legions of Drusus. It is noteworthy that 'the Christmas tree' with its pendent toys and mannikins is distinctly portrayed by Virgil (*Geor.* ii. 389): '*Oscilla ex alta suspendunt mollia pinu.*' The Christmas numbers of magazines are often at great cost rendered specially attractive; they are now issued as early as October. The Pantomime (q.v.) has a special connection with Christmas-tide. The visits of 'Santa Claus,' bearing gifts, in England and America referred to Christmas, belong properly to December 6, the day of St Nicolas (q.v.). The French Noël is derived from the Latin *natalis (diēs)*, 'birthday.' Washington Irving's *Sketch Book* gives a charming picture of an old English Christmas.

In the Roman Catholic Church three masses are performed at Christmas—one at midnight, one at daybreak, and one in the morning. The day is also celebrated by the Anglo-Catholic Church—special psalms are sung, a special preface is made in the Communion Service, and the Athanasian Creed is said or sung. The Greek Church, the Lutheran Church, and most communions save the Presbyterian, likewise observe Christmas; while throughout England and many parts of the United States it is kept as a social holiday, on which there is a complete cessation from all business. But the Christmas festivities, which at one time lasted with more or less brilliancy till Candlemas, and with great spirit till Twelfth-day, have fallen off.

It has long been an English custom to bestow, under the name of 'Christmas Box,' a small gift of money on those who have in a humble capacity been serviceable—postmen, tradesmen's messengers, and the like; and the day after Christmas is often called 'Boxing-day.' Old usages of this kind are described in Brand's *Popular Antiquities*, Chambers's *Book of Days*, and *Notes and Queries*.

Christmas cards, on the other hand, which towards the end of the 19th century were sold and distributed in millions during the festive season, are in their

various forms comparatively modern. The invention has been ascribed by some to Sir Henry Cole, at whose suggestion J. C. Horsley designed a Christmas card in 1846; by others the credit of designing the first Christmas card in 1844 is given to W. C. T. Dobson, R.A. See Clem. A. Miles, *Christmas in Ritual and Tradition* (1912).

**Christmas Island**, in the Pacific, 1° 57' N. lat., and 157° 27' W. long., with some guano, is a British possession, annexed to the Gilbert and Ellice Colony in 1919. Another, annexed to Straits Settlements in 1889, lies about 250 miles SW. of Java, is 6 miles long by 4 broad, partly volcanic, partly coralline in structure, with extraordinarily rich phosphate deposits, worked since 1897 by a British company, but said to be almost inexhaustible. There is a third Christmas Island off Cape Breton.

**Christmas Rose.** See HELLEBORE.

**Christology.** See CHRIST.

**Christophe**, HENRI, king of Hayti, was born a slave on the island of Grenada, October 6, 1767. Coming to Hayti, he joined the black insurgents against the French in 1790, and, from his gigantic stature, energy, and courage, soon became a leader among them. By Toussaint l'Ouverture he was appointed brigadier-general. In 1802 he gallantly defended Cape Hayti against the French. He and Pétion secured the overthrow of the short-lived government of Dessalines in 1806; and in 1807 he was appointed president of Hayti. Civil war commenced between him and Pétion; but in 1811 Christophe was proclaimed *king* of Hayti, by the name of Henri I., and ruled with vigour and not without success. But his avarice and cruelty led to an insurrection; and deserted by his bodyguard and all his nobles, he shot himself, October 8, 1820. He left a code of laws which he called the 'Code Henri,' in imitation of the Code Napoléon. See HAYTI.

**Christopher**, HERB. See BANEERRY.

**Christopher** (from Gr. *Christophōros*, 'Christ-bearer'), a saint of the Roman Catholic and Greek Churches. According to the oldest form of the legend, he is said to have lived in Syria, and suffered martyrdom under the Emperor Decius (249–251). He is said to have been 12 feet high, and of prodigious strength. In the pride of his strength he would serve only the mightiest upon earth. After being some time in the service of a king, and seeing his master's dread of the devil, he gave himself to be the devil's servant. One day, however, he saw the devil trembling before an image of Christ, and he resolved thenceforth to serve Christ only. For his penance he undertook to carry pilgrims across a broad unbridged stream. One day Christ came to him in the form of a child to be carried over, but the burden grew ever heavier and heavier, until it was almost too much for him to reach the farther shore. 'Marvel not, Christopher,' said the child, 'for with me thou hast borne the sins of all the world.' In painting and sculpture the saint is usually represented with the infant Christ upon his shoulders, leaning on a great staff, and straining every nerve to support his weight (see the Monograph by Sinemus, Hanover, 1868). The various legends of St Christopher are found in a connected form in the *Legenda Aurea* (1st ed. Nürnberg, 1478; new ed. by Grässe, Leip. 1850) of Jacobus de Voragine, who died in 1292. The Greek Church celebrates his festival on May 9th, the Roman Catholic on July 25th.

**Christ's Hospital** was founded on the site of the Greyfriars' Monastery in Newgate Street, London, by Edward VI., on the 26th June 1553, as a hospital for fatherless and motherless children.

Apart from the king's grant, it was richly endowed by public subscription. It was usually called the 'Blue Coat School,' on account of the dress worn by the boys. This consisted of a blue woollen gown or coat with a narrow red-leather girdle round the waist, knee-breeches, yellow petticoat and stockings, a clergyman's bands at the neck, and a small blue worsted cap. The cap, however, was discontinued about 1850, and the petticoat in 1865, but otherwise the dress remains unaltered, thus affording a curious instance of the survival of the past in the present. The *ex-officio* governors are the Lord Mayor of London, the aldermen, and twelve common councillors. The 'donation' governors are the crown and royal family, and such persons as have given not less than £500 to the hospital funds. The income now available for the purposes of the hospital is almost wholly derived from legacies and benefactions subsequent to the foundation. Apart from these funds, the old governing body also administers large pension charities, including the Rev. W. Hetherington's Charity to the Aged Blind, which is distributed in pensions of £10 a year to upwards of 750 blind persons over fifty-five years of age, resident and born in England. The hospital's endowments are administered by the council of almoners, of 43 members, half appointed by the governors and half by various public bodies. All children were formerly admitted by presentation, but under the Charity Commissioners' scheme of 1891, and amending schemes, they are admitted now: (1) By presentation (a) of a donation governor; (b) of the council of almoners (for children of persons distinguished in literature, science, or art, or services to the public or the hospital, or for sons of commissioned officers in the navy or army); (c) of certain city companies. (2) By competition (a) on the nomination of a donation governor (for boys only); (b) from certain endowed schools in England and Wales; (c) from public elementary schools in the London County Council district; (d) from certain city parishes. The boys' school, after standing for 3½ centuries in Newgate Street, was in 1902 removed to West Horsham, whither also the preparatory school was subsequently removed from Hertford. The buildings include a chapel, dining-hall, class-rooms, science schools, infirmary, swimming-baths, gymnasium, &c., and the grounds extend to 140 acres. There are a classical and a modern side (with extensive laboratories), besides a nautical school, originally founded by Charles II. Several exhibitions to Oxford or Cambridge are annually awarded to 'Grecians' (the highest form). There are also funds for the apprenticing and the advancing in life of boys and girls. The girls' school, originally located in Newgate Street, was removed in 1778 to premises adjoining the boys' preparatory school, which had been erected at Hertford in 1683. A new science and art school was completed in 1903. Education up to university standard is provided, and a few university college and training-college exhibitions are available. Many eminent persons have been educated at Christ's Hospital, such as George Peele, Camden, Stillingfleet, Richardson, Coleridge, Lamb, Leigh Hunt, Pugin, Sir Louis Cavagnari, Sir Henry S. Maine, Dr Gordon Hake, Edmund Blunden. See E. H. Pearce, *Annals of Christ's Hospital* (1908); Edmund Blunden, *Christ's Hospital: a Retrospect* (1923).

**Christ's Thorn.** See JUJUBE, PALIURUS.

**Chromatic,** in Music (from the name of one of the Greek tetrachords or scales), is applied to notes in a melodic progression which are raised or lowered by accidentals, without changing the key of the passage, and also to chords in which such

notes occur. The *chromatic scale* is one proceeding by semitones alone. Much irregularity prevails in the method of writing such progressions. The most strictly correct practice is to write only such chromatic notes as could occur in chords belonging to the key in which the passage is written.

**Chromatic,** in Optics, is that part of the science which deals with the colours of light and of bodies. See ACHROMATISM, COLOUR.

**Chromatin.** See CELL.

**Chromatophores** are Pigment Cells (q.v.), containing pigment granules of various colours, which enable animals such as chamæleons and cuttle-fishes to change colour rapidly; also colour-bearing bodies within the cell in animals and plants. See CELL.

**Chromatype** is a photographic picture in which the paper employed has been sensitised by some of the salts of chromium.

**Chrome-tanning.** See LEATHER (*Tawing*).

**Chromidia.** See CELL.

**Chromium** (sym. Cr, atom. weight, 5·25) is a metal, so called (*chrōma*, 'colour') from the many-coloured compounds it produces. It was discovered by Vauquelin in 1797, in the chromate of lead,  $\text{PbCrO}_4$ , one of its rarer ores. As chrome iron ore,  $\text{FeO} \cdot \text{Cr}_2\text{O}_3$ , it is widely distributed in Asia Minor, New Caledonia, America, Sweden, &c.

The metal has been obtained in several modifications, one of which is so refractory as to be infusible at a temperature sufficient to volatilise platinum, while it may be heated to redness without oxidation, and resists the action of most acids. Another variety is a powder which burns brilliantly when heated in air, and is readily dissolved by acids. Many of the chromates are much used in painting and colouring. Chromium is added (with vanadium) to steel for stainless cutlery, and it helps to increase the hardness of steel (see IRON AND STEEL). Chromium forms four compounds with oxygen, of which the chief are chromic oxide,  $\text{Cr}_2\text{O}_3$ , and chromic anhydride,  $\text{CrO}_3$ .

Chromic oxide (chrome green) possesses a bright-green colour, and is the colouring ingredient in the emerald. Owing to its indestructibility by heat, it is used in porcelain-painting; while, being non-poisonous, it is now substituted for arsenical green pigments in wall-papers.

Chromic anhydride,  $\text{CrO}_3$ , forms dark-red crystals, containing no water. When strongly heated it becomes incandescent, and is converted into chromic oxide. It forms several classes of salts: the *Chromates*, such as chromate of lead,  $\text{PbCrO}_4$ ; the *Bichromates*, of which bichromate of potash,  $\text{K}_2\text{Cr}_2\text{O}_7$ , is an example; and the trichromates and tetrachromates, which are unimportant.

*Chromate of Lead*,  $\text{PbCrO}_4$ , is well known to artists as 'chrome yellow.' It is readily prepared by mixing a solution of acetate of lead with one of chromate of potash. When boiled with lime, its bright-yellow colour disappears, and a scarlet basic chromate is obtained, which is used in the dyeing of calico.

*Bichromate of Potash*,  $\text{K}_2\text{Cr}_2\text{O}_7$ , is prepared from chrome ironstone, by calcination with chalk and carbonate of potash, and subsequent treatment with nitric acid. It forms large red crystals, and has many uses in the arts. When added to a solution of gelatine and allowed to dry, it is found that on exposure to light the gelatin becomes insoluble, and a process based on this property has been used to some extent in photography. As an oxidising agent in galvanic batteries it is very effective, while mixed with sulphuric acid it is used in the bleaching of oils. See LEATHER for Chrome-tanning.

Chromic acid and its salts are all more or less

poisonous, owing to their corrosive and oxidising action on organic tissues.

**Chromo-lithograph.** See LITHOGRAPHY.

**Chromosome.** See CELL, HEREDITY.

**Chromosphere.** See SUN.

**Chronicle.** See HISTORY.

**Chronicles.** THE BOOKS OF, are a revised edition of the history of Israel written from the point of view of the Priestly Code (see BIBLICAL CRITICISM). They cover the whole of the ground from patriarchal times to the fall of Jerusalem, though some of the periods are passed over very lightly. The writer has obviously used as his principal sources the Pentateuch and the books of Samuel and Kings. The motive for this revision is clear. The absence of any reference to the ritual and the institutions of the Levitical Code in the other historical writings must have challenged comment, and the writer of Chronicles re-edits the older works, ascribing Levitical practices and customs to the earlier periods. The additions which the chronicler makes to the narrative represent David and all the righteous kings of Judah as absorbed in the observance of the ritual of the Priestly Code—the Passover and other festivals, and more particularly in the musical arrangement of the temple and the organisation of the Levites. Another characteristic of Chronicles is the omission of incidents which seemed discreditable to the heroes of Israel's history. The chronicler, too, absolutely ignores the history of the northern kingdom, because he feels that after the revolt the northern kingdom had no place in the true Israel. Originally the two books of Chronicles and Ezra and Nehemiah formed a single work. In their present form Chronicles breaks off in the middle of a paragraph, which Ezra restarts and finishes. The date of the book cannot be earlier than 332 B.C., as in Nehemiah, xii. 11, mention is made of Jaddua, who was high-priest at that date. The majority of modern scholars think the book was written during the period 300–250 B.C. In the Septuagint the book is called 'the Paralipomena,' i.e. the things left out. The most useful commentaries in English are Bennett (*Expositor's Bible*), Harvey-Jellie (*Century Bible*). The chief German authorities are Beitzel, Keil, and Zöckler. A full discussion of the problems of the book will be found in Driver's *Introduction to the Old Testament*.

**Chronogram,** or CHRONOGRAPH, a whimsical device of the later Romans, resuscitated in the Renaissance, by which a date is obtained by selecting such letters in an inscription as are Roman numerals, and adding their numerical values. Example:

GEORGIVS DVX BVCKINGAMLÆ.

The date MDCCXVVIII (1628) is that of the duke's murder. See BOOK (*Dates*).

**Chronograph** ('time-marker' or 'recorder'), an instrument to note, within a certain fraction of a second, the instant when a particular event occurs. The most recent are electrical, now indispensable to astronomers, since the transit of a star can, by touching a stud, be noted to within  $\frac{1}{1000}$ th of a second of time. The typical form of the chronograph is a cylinder which revolves once a minute, and carries on its surface a sheet of paper divided all round into equal parts, indicating fractions of a second. If, for example, the cylinder is 30 inches round, it is evident that very minute subdivisions of time are attainable.

A valuable application of the chronograph is for determining the longitude—e.g. in trigonometrical surveys. Thus two observers note simultaneously the transit of a star, say at Vienna and Paris (and

that without any reference to right ascension or declination), and having telegraph as well as chronograph, determine very easily the difference of time with an accuracy never dreamt of formerly.

Benson's chronograph, by a lever movement, measures intervals of time down to tenths of a second for use at horse-races, &c. By a special contrivance the seconds hand on a horizontal dial carries ink, and marks the plate beneath at the instant when a string is pulled. Another mode of recording the exact instant of start or finish is by having a paper travel under a pencil, so that when the latter is pressed a mark is made on or near one of the cross lines showing tenths or twelfths of a second.

Other forms of the chronograph are used for determining the velocity of projectiles. The most general arrangement consists in causing the bullet to pass through a series of screens; the rupture of each screen breaks for a moment the continuity of an electric current, sets in action an electro-magnetic apparatus, and makes a record. See GUNPOWDER.

**Chronology** (Gr., 'time reckoning'), the science of time, especially in regard to (1) the occurrence, recurrence, and succession of events, or (2) the duration of periods and cycles. The immense array of facts with which chronology is occupied may be distributed under two great heads—Mathematical or Astronomical Chronology, and Technical or Political Chronology. The former deals with celestial phenomena, their order and the laws of their occurrence and duration, events outside of man's sphere or influence. The latter branch deals with the whole history of our race upon this planet; and by the selection of certain fixed points in time called *Epochs*, refers to each of them the succession of social and political events occurring in the period immediately following it, and reckoned from it, which we term its *Æra*. As soon as the elements of mathematical chronology were understood, political chronology had solid ground to build upon, and assume a systematic form: then a science of history became possible. A 'year,' for example, seems now an easy and natural unit of time-measurement; but for long ages the only idea suggested by the word was that of a vague, intangible period. So late even as 450 B.C. we find Herodotus expressing duration of time by the phrase 'three generations' (= a century) or 'five generations'; and in all languages we find 'six summers' or 'sixty winters' instead of so many years.

In the rudimentary stage of chronology, a nation referred its history to the lifetime of some central figure, such as the king, the tribal chieftain, &c.; of which custom we actually find a survival in our system of dating acts of parliament. The priestess of Juno at Argos was another instance; and in the Roman and Athenian republics, where the chief-magistrates were chosen annually, an event was conveniently said to have occurred 'when Plancus was consul,' or 'in the archonship of Kallixenos.' Similar to the Roman *consul* and the Athenian *archon* was the Assyrian *limu* or 'eponym,' from whose name Babylonian and Assyrian documents were dated far more frequently than from that of the reigning king. Such a chronology, however, could only be of use within narrow limits both of time and place; and at all the great centres of civilisation we find that as men's historical views widened with the national growth, they began to invent eras, some from national or political motives, others ecclesiastical, and a few scientific. Progress in astronomy, such as we find in China and Babylonia at the dawn of history, was of notable service at this stage. To the Accadians of the latter country indeed both astronomical and political chronology owe a lasting debt of gratitude. The Chinese, no doubt, show a

time computation which is apparently prehistoric, and their recorded eclipse observations prove a chronology of at least four thousand seven hundred years' duration; but if they did adopt a year measurement equivalent to our Julian system some 2000 B.C., it is certain they have exerted no influence on European civilisation compared with that of the Accadians of Babylonia, or ancient Chaldeans as they used to be named. Fairly accurate chronology in ancient Babylon begins with Sargon I., king of Agade, 3800 B.C. The earliest authentic date is that inscribed on the foundation stone of the temple to the sun-god at Sippara by Naram-Sin, son of Sargon. This was dug up by Nabonidus, who began to reign over Babylon about 554 B.C., and who says that Naram-Sin reigned 3200 years before his time, thus giving a total of 3754 years B.C. as the date of his building of the temple. Thus by the year 4000 B.C. the nation had attained to considerable advance in literature, science, and art. Much of the greatness of Babylonia, foremost in culture for centuries, was afterwards reflected in Assyria, who inherited her civilisation and learning, as in a lesser degree also did Israel. Berosus gives a list of dynasties of 120 *savoi*, or 432,000 years before the Deluge, and of eight dynasties after it, and Ptolemy's canon in the *Almagest* gives the seventh dynasty in full from Nabonassar (747 B.C.) to Sinêladanos (Assur-bani-pal, 668-626). From about 2330 B.C. they used a regular calendar, with a week of seven days, and a year of twelve months, named after the zodiacal signs. Their year was of three hundred and sixty days, which probably suggested that division of all circles into degrees which we have derived from them. In astronomical chronology they had cycles of sixty years, six hundred years, and the *sar* (= 3600 years)—the factor sixty running through all their arithmetic. The great Babylonian work on astronomy and astrology was the 'Observations of Bel,' compiled at Accad for Sargon, and translated into Greek by Berosus. It was mostly a record of eclipses of the sun and moon, conjunctions and phases of Venus and Mars, the time of the new year, the names of the zodiacal signs and the divisions of the year. The famous Assyrian eponym canon, discovered by Sir Henry Rawlinson in 1862, fixes definitely for us the chronology of Assyria from 1330 B.C. to about 620 B.C.; but a fairly accurate list of kings can be made out up to perhaps 1700 B.C. Thus continuing that early pre-Semitic civilisation, the more warlike Assyrians furnish many dates of importance—e.g. 720 B.C., Sargon conquered Arabia and Syria, levying contributions from Cyprus; 705 B.C., Sennacherib conquered Phœnicia and Egypt, carrying away two hundred thousand Jews; 681 B.C., building of the great palace at Nineveh, where afterwards, during the golden age of the Assyrian empire, ruled great Assur-bani-pal (long called Sardanapalus), the brilliant patron of art and letters. The discovery, in our time, of his national library almost compensates the literary world for the loss of that of Alexandria. See BABYLONIA, ASSYRIA.

To the Chaldean astronomy we owe the *Saros*, a cycle of two hundred and twenty-three lunations, which is still of signal importance in calculating eclipses. To it also is due the era of Nabonassar, one of the most famous in the annals of chronology, the basis of all the computations of Ptolemy, and frequently referred to both by historical and astronomical writers—e.g. in connection both with Alexander the Great and Aristotle. From its epoch, 26th February 747 B.C., it maintained its ground till after the commencement of the vulgar era. In the same century, singularly enough, occur the epochs of two other eras which, though

of less note in astronomical chronology, are much more familiar to historical readers—viz. the Greek era of the Olympiads, reckoned from 1st July 776 B.C., and the Roman era of the Founding of the City (A.U.C.) from 22d April 753 B.C. The public games at Olympia formed an essential part of the national life to a Greek; and thus we find Xenophon refer an event to the year when Eubotas of Cyrene won the foot-race, just as in some parts of England a man will be heard saying 'Ah! that was the year Friar Tuck won the Derby!' The Olympic Games were of unknown antiquity, but the era or first Olympiad dates from the year when Corœbus was victor. Extending over a period of four years, the Olympiad (q.v.) was really a small cycle; thus the year 729 B.C. is expressed in Greek chronology as the third year of the twelfth Olympiad. The Latin epoch, the Founding of Rome, is not so accurately known as that of the Greeks; but the date assigned by Varro (753 B.C.) was accepted by Cicero and Pliny, and has been generally adopted by modern historians. Cato's date (751 B.C.) deserves note, from its use both by Livy and Dionysius of Halicarnassus: 750 was that of Polybius. Nor must we forget that all Latin writers, and many Greeks also, dated an event by naming the Roman consuls of the year. Under the empire, in 312 A.D., Constantine introduced the cycle of fifteen years, called *Indiction* (q.v.), of which, as an official mode of computation, there still remained some survival in France at the end of the 15th century. The old Roman era, however, as well as the Grecian, maintained some footing till after the birth of Christ; and the latter has even been traced to 440 A.D. = 304th Olympiad.

The Greeks had the honour of inventing the Metonic cycle (commencing 15th July 432 B.C.) of 235 lunations = 19 years, and also the Calippic of 76 years. Like the Chaldean *saros*, both of these cycles were used to predict new moons, eclipses, &c.

Of the Hindu or Egyptian eras there is little that affects the science of chronology. The antiquity of the Indian epics is a question purely literary; and the only epochs to record here are the descent of the Aryans on the Punjab about 2000 B.C.; the Council of 543 B.C., which inaugurated the Buddhist era, and that of 309 B.C., when Buddhism (q.v.) became the state religion. The Indian chronology has some affinity to the Chinese; and a singular refinement in their mode of computing time was their use of the sidereal year—i.e. reckoning by the return of a meridian to the same star (see YEAR). The Egyptians, on the contrary, though their year began with the rising of the star Sirius, called a year 365 days exactly, and were, therefore, compelled to use a cycle of 1461 years ( $= 4 \times 365 + 1$ ), a most cumbersome adjustment, though simple. The week of seven days was from earliest time adopted by the Brahmins in India, and the ancient Egyptians, as well as by the Accad settlers of Babylonia already referred to.

The Jewish chronology is unimportant except from its relation to religious matters, and scarcely affords examples of any era, since *sacred* chronology, as it is called, is only partially based upon the Pentateuch. What knowledge of astronomical chronology the Jews had was derived from the ancient Chaldeans through the Assyrians, and their calendar was mainly Egyptian. Their year, like that of the ancient Greeks and modern Turks, consisted of twelve months of alternately thirty and twenty-nine days (or twenty-nine and a half on an average—i.e. a lunation), with an intercalary month once in three years, and sometimes once in two. One peculiarity of the Jewish calendar was that they divided their year into *six* seasons—seed-time,

winter, cold season, harvest, summer, and hot season—an arrangement due probably to their climatic surroundings. Leaving Egypt *circa* 1320 B.C. (so Bunsen, following Eratosthenes; others give 1330), the Jews showed some signs of national vigour in the 12th century B.C. on the decay of the Egyptian empire, and their history reached a short culmination in the reign of Solomon. When split into two small kingdoms they soon found that, although assisted by Syria and their more civilised neighbours the confederation of the Phœnician cities, they were of but little avail against the might of Assyria. By the siege of Samaria in 721 B.C., and that of Jerusalem in 587 B.C., the little kingdoms of Israel and Judah were successively overthrown, and the Jewish nation finally shattered. Having no national chronology, the Jews who returned to Palestine are found using the Macedonian era, which dates from 311 B.C., the reign of Seleucus, one of the successors of Alexander the Great. This they did in common with the Syrians and Greeks all round the Levant, and reckoned by it till the 15th century, as some Arabians are said still to do. At present the Jews, as also the Freemasons, profess to date their calendar from the 'Creation,' 3760 years B.C.

Sacred chronology, or that of Scripture, is an attempt to harmonise the succession of events recorded in the Old Testament, especially with reference to the semi-traditional or prehistoric period preceding the Exodus. There are three accounts—the Jewish, the Samaritan, and the Greek Septuagint—and their discrepancies, though referring to the same periods and succession of events, are hopelessly irreconcilable. Sacred chronology divides all time before the birth of Jesus Christ into three great periods (as in the following table); and as to the first all the texts are at variance, while in the middle period the Septuagint agrees with the Samaritan, but both differ from the Jewish reckoning by 650 years:

Period	Jewish.	Samarit	Septuag't
Adam to Noah .....	1656	1307	2242
Noah to Abraham.....	292	942	942
Abraham to Jesus Christ..	2044	2044	2044
Creation to Incarnation.	3992	4293	5228

The three authorities, therefore, entirely disagree as to the total period. To complicate the confusion, all those results are given differently by different interpreters; and no less than over two hundred varying computations have been made as to the date of the creation, ranging from 3483 years to 6984. The familiar date in English books was 4004, following Archbishop Usher's reckoning. At last it became clear through science that man's duty is to strive to interpret nature, and to shrink from assigning any limit to her works as to either beginning or ending. The *Newtonian* chronology was an attempt (published posthumously be it remembered) to rectify some of the discrepancies in sacred and profane history, by combining a critical examination of authors with astronomical calculations. For example, the famous date of the Argonautic expedition was, by an ingenious application of the precession of the equinoxes, assigned by Newton to forty-three years after the death of Solomon, or 937 B.C. (Hales), a date utterly inadmissible. For the expedition, if indeed it ever took place, must have preceded the siege of Troy, which is ascribed to 1184 B.C.

The *Hegira* (Hedjrah) or epoch of the Moslem era is dated Friday, 15th July 622, the New-year's Day of the Arabian year, or, as others say, from the 16th. The Mohammedan year being strictly lunar—from

the primitive reckoning by months instead of years—the calendar requires several adjustments from time to time by means of tables arranged according to cycles of thirty years, of which nineteen have 354 days and the others 355. The principal festivals of the Moslems are the New-year, the birth of the Prophet, the taking of Constantinople, and the Grand Bairam (q.v.).

From these minor systems of chronology we at once pass to that of our present era, which, though begun as it were accidentally, unenforced by the authority and command of emperors, kings, or councils, seems destined soon to assert universal predominance. The Christian era (or 'vulgar era' as older writers termed it) has its epoch or point of departure determined by the Gregorian rule—viz.: 'The years are denominated as *years current* from the midnight between the 31st December and the 1st of January immediately subsequent to the birth of Christ, according to the chronological determination of the event by Dionysius Exiguus.' Now as Dionysius, the obscure author of this chronological scheme, lived in the beginning of the 6th century, there was no exact determination of the epoch; and it cannot therefore be so precisely formulated as other eras of less importance. It is generally agreed that the beginning of the era should have been fixed from two to nine years earlier. Another point not generally noted is that the correction of our calendar by Pope Gregory itself wanted correction; because instead of ten days the papal bull should have enjoined an omission of twelve. His Holiness or some adviser proposed the Council of Nice as their starting-point in estimating the error already made, and reckoned therefore from 1st January 325 A.D. instead of 1st January 1 A.D. The only wonder is that his astronomers assented. It may further be pointed out that the papal reformation itself is by no means the best that could have been devised; and that long before that date, in 1079 A.D., Omar Khayyám, the Persian astronomer-poet, proposed a scheme for adjusting years and days not only more exactly, but much more simply. Omar's rule, shortly, was: (1) Intercalate a day every fourth year, but (2) intercalate during the thirty-third year instead of the thirty-second. By this scheme five thousand years must elapse before a further correction is made—viz. of *one day*, whereas by Gregory's rule a correction of *three days* is necessary within four thousand years. In this connection may be noted the extremely ingenious mode by which the new style was adopted in Sweden—viz. by deciding to have no leap-years between 1696 and 1744.

From the mode of fixing the epoch of the existing era as indicated above, it is manifest that, since there is no 0 A.D. and no 0 B.C., we must diminish the sum of the nominal years B.C. and A.D. by unity to find the interval. Thus the years between 1st January 753 B.C. and 1st January 1947 A.D. are not 2700 but 2699. The epoch 1st January 1 A.D. was first, as we have seen, established by measuring backwards according to the estimate of Dionysius Exiguus in 527 A.D.; and when measured forwards from other epochs we find that our era dates from 1st January of the fourth year of the 194th Olympiad = 753 A.U.C. = 4714 of the Julian period.

That brings our subject to an era, which, theoretically at least, is the most important in the science of chronology. The epoch of our existing era is not well suited for technical purposes, as all astronomers and chronologists allow, because the birth of Christ is too recent an event; thus enhancing the difficulty of fixing the relation between the different systems, and of expressing a date or period of one era exactly in terms of

another. Therefore, just as Fahrenheit chose for his zero a mark thirty-two degrees below freezing-point, in order to avoid negative measurements, so the Julian period had its epoch fixed to 1st January 4713 B.C., a point of time antecedent to all other epochs, in order that its era should be a convenient standard to which all other chronological systems can be differentially referred. Its length is 7980 Julian or Metonic years, the product of 28 (Solar period), 19 (Lunar period), and 15 (Indiction), and thus constitutes a great cycle embracing and unifying three subordinate cycles which are constantly referred to;

because the year 4713 B.C. is the most recent date when those important periods began exactly all together. With the further development of technical chronology, and a more scientific treatment of history and ethnology, we may look for a much wider use and appreciation of the Julian period as a cycle comprehending all really historic time, and fulfilling certain astronomical conditions of the first importance. When the year of the Julian period is known, the corresponding date for any of the subordinate cycles is easily found, and conversely. We subjoin a table for the comparison of some selected dates:

EPOCHS AND LEADING EVENTS IN CHRONOLOGY REFERRED TO THE JULIAN PERIOD.

	Julian Period		Common Date.
	Month.	Year	B. C.
Babylonia already civilised under the Accadians. . . . .	Jan. 1	1	4713
Vernal equinox coincident with solar perigee. . . . .	March 21	625	4089
Eclipse observations recorded by Chinese astronomers. . . . .	..	1864	2850
Aryans settle in the Punjab. . . . .	..	2714	c. 2000
Palace built in Nineveh. . . . .	..	3364	1850
Exodus of Hebrews from Egypt according to recent Egyptologists. . . . .	..	3394	1820
Temple dedicated at Jerusalem. . . . .	May 1	3699	1015
Greek era of the Olympiads. . . . .	July 1	3998	776
Latin era of the Founding of Rome (Varroian epoch), A. U. C. . . . .	April 22	3961	753
Era of Nabonassar, prince of Babylon, the epoch used by Ptolemy. . . . .	Feb. 26	3967	747
Assur-bani-pal king—golden age of Assyria. . . . .	..	4046	668
Eclipse of Thales (Herodotus), identified by modern astronomers. . . . .	May 28	4129	585
Era of Buddha. . . . .	..	4171	543
Babylonia conquered by Cyrus. . . . .	July	4176	538
Pericles supreme at Athens—golden age of Greece. . . . .	..	4270	444
Metonic Cycle (astronomical epoch). . . . .	July 15	4282	432
Reformation of the calendar by Julius Cæsar. . . . .	Jan. 1	4669	45
A. D.			
Dionysian or Christian era—epoch not proposed till 527 A. D. . . . .	Jan. 1	4714	1
Hegira, the flight of Mohammed—epoch of the Moslem era. . . . .	July 15	5885	622
Summer solstice coincident with solar perigee. . . . .	June 21	5959	1246
Fall of Constantinople. . . . .	May 29	6168	1453
America discovered by Columbus. . . . .	Oct 11	6205	1492
French Revolution. . . . .	July 14	6502	1789
Completion of first Julian period. . . . .	Dec. 31	7980	3207
Autumnal equinox coincident with solar perigee. . . . .	Sept. 21	11196	6483

The Julian period or cycle in its modern form was proposed by Joseph Scaliger, but the Greeks of Constantinople appear to be the authors of it. Its exact epoch is noon of 1st January 4713 B.C. for the meridian of Alexandria, which was chosen as being that to which Ptolemy had referred the era of Nabonassar already discussed. Scaliger has the best right to the title of father of chronology, often given to Eratosthenes.

The astronomer Laplace in recent times proposed another universal era not so practical in its bearing on political chronology. He calculated that about 4000 years B.C. the major axis of the earth's orbit coincided with the line of the equinoxes, and that in 1250 A.D. they were at right angles. In the latter year, therefore, he proposed to fix the universal epoch whence the whole world should reckon, the vernal equinox to be the first day of the first year, when the solar perigee coincided with the summer solstice. With Laplace's estimate may be compared the dates of coincidence with the solar perigee which are tabulated above.

There are many other instances of astronomical chronology overlapping and influencing political chronology. Thus, by reckoning back we are able to identify the time and place of some remarkable eclipses, such as that of Thales (see in table above), which caused the suspension of a battle between the Medes and Persians. Another striking verification was by that of Larissa, the Nimroud of Layard. Scottish history furnishes another recent instance. We read that when King Haco sailed from Bergen with his Norse fleet to punish the king of Scotland, he put in at Ronaldsvoe in Orkney, which was then subject to him, and that there the sun appeared as a thin bright ring. Sir David Brewster found by computation that there

was an annular eclipse of the sun passing over Orkney on 5th August 1263, about one o'clock. Two months afterwards Haco was defeated at Largs, and Alexander annexed the Hebrides to Scotland. 'The ring at Ronaldsvoe was an evil portent.' Such verifications in chronology are dependent on the testimony of contemporary writers. Other valuable information has been derived from coins, medals, monuments, and inscriptions.

To treat adequately many of the important ramifications of our subject is here impossible, and we have therefore only passed under review the main features of the science as a whole. One department, however, of political or technical chronology deserves special attention from its interest to antiquaries and lawyers as well as to historians—viz. the method of assigning events to their respective years, or fixing their dates as it is called, either by verifying in cases of doubt, or reconciling and correcting in cases of discrepancy, inconsistency, and contradiction. How, for example, can the following dates be accounted for—all printed in the same month of the same year, 1705? In the *London Gazette* of 13th February is given a translation of which there is an abridgment in the *Edinburgh Courant* of the 19th, yet the original passage is in the *Amsterdam Gazette*, dated 22d February.

The first cause of such discrepancies is the difference of styles (see CALENDAR), which occasions seeming blunders of ten, eleven, twelve, or thirteen days, according to the century. As 170 years elapsed before England adopted the new style, the chief Roman Catholic countries being followed by Poland (1586), Hungary (1587), Strasburg (1682), German Protestant States (1700), and Tuscany (1749 or 1751), all in different years, there was

ample room left for innumerable discrepancies as to dates.

Besides differing in the style—i.e. Julian or Gregorian—two nations frequently began the year at different times. A Scottish writer assigned the execution of Charles I. to 1649, and his English contemporary to 1648, though both agreeing as to the month and day; because in Scotland the year began with the 1st of January, as it had done since 1600, and in England the 25th March was still New-year's Day. Throughout Europe there was much variation in this respect, not only between one country and another, but even in the same country as between one time and another, as well as between its different provinces at the same time. The most common New-year's Days were these four—(a) 25th December; (b) 25th March; (c) Easter; (d) 1st January. Thus England used both the first and second from the 6th century to 1066; the fourth till 1155; then the second till the day after 31st December 1751, which was called 1st January 1752. Scotland used the second till 1599, when the day after 31st December 1599 was called 1st January 1600. France under Charlemagne used the first, and afterwards also the third and second till 1563. The 25th March was originally chosen by Dionysius Exiguus, the author of our present era, as being the Annunciation—exactly nine months before Christmas. A survival of its use in England appears in the annual Treasury accounts, and in preserving Lady-day as a quarter-day.

In many English documents before 2d September 1752, owing to the delay in accepting the Gregorian reformation, we find a date thus, 12th February 1704 or 1706-7, meaning 1706 if the year begin on 25th March, or 1707 if it begin on the 1st of January. This ambiguity of course only applies to days falling between 1st January and 24th March.

A third cause of error or uncertainty arose from dating ancient writings not only by saints' days and church festivals, but by some Latin psalm or other portion of the service which the clergy (who of course were generally the *clerks*) associated with the day in question. Thus we find as a date (15th century) 'the Wednesday next after *Deus qui errantibus*,' and (in 1610) 'the Sunday on which the church sings *Reddite quæ sunt Cæsaris Cæsari*.' A Scottish parliament of 1318 met at Scone 'on the Sunday next after the feast of St Andrew the Apostle;' and an English one of 1399 is only dated in a contemporary account by the phrase 'on Monday the feast of St Faith the Virgin.'

A special complication arose from dating documents, and especially all state papers, by the year of the king's reign, as already referred to. Even in Rymer's *Fœdera*, a work of the highest importance in English chronology, we find that from this cause many of the public papers from Richard I. to Edward IV. are misdated by a whole year. Our early sovereigns dated their reign from the coronation, and the writers of history frequently assumed that every king's succession was officially dated from the day of his predecessor's death. In the case of popes of Rome, moreover, scarcely any two of them in immediate succession, until recent times, dated or computed on the same principle; and some of them vary their methods even within their own reigns. In this connection may be noted a clerical error in the Scottish records of David II., where after his return from captivity every date of his reign is given one year short. Frequently too in public documents, both English and Scottish, we read 'King Henry,' 'King Edward,' 'King Robert,' or 'King James,' without further qualification; so that for purposes of chronology we must study the penmanship, the style and wording, the seal, and above all the names of the persons enumerated. Even then the antiquary or historian is sometimes

unable to reduce the date of an instrument or letter within a narrower range than fifty or even a hundred years.

A reference to contemporary history will sometimes fix the date. For example, there are two acts in the Scottish statute-book which are thus dated—one, 'at Aberdeen in Lent next after the coming in Scotland of Vivian the Legate of the Apostolic See;' the other, at Stirling, 'on the Monday next before the feast of St Margaret the Maiden next after the first coronation of Philip king of the French.' From these data we can assign their dates as 1177 and 1130 respectively.

*Bibliography.*—Scaliger's *De Emendatione Temporum* (1583); Usher's *Annales V. and N. Testamenti* (1650); Sir I. Newton's *Chronology Amended* (1728); *L'Art de Vérifier les Dates* (1818-31); Herschel's *Astronomy*; Ideler's *Lehrbuch* (1831); Clinton's *Fasti, &c.*; *Chronology of History*, by Sir Harris Nicolas (1838); Brinkmann's *Handbuch* (1882); Woodward and Cates's *Encyclopædia of Chronology* (1872); Whitworth's *Churchman's Almanac from 1201 to 2000* (1883); Brockmann's *System der Chronologie* (1883); James C. Macdonald's *Chronologies and Calendars* (1897).

**Chronometer**, a time-keeper for determining the longitude at sea, is essentially a large watch with compensated balance-wheel. See **HOROLOGY**.

**Chrononhotonthologos** was a burlesque by Henry Carey (q.v.), in which Aldeborontephoscophornio and Rigdumfunnidos were characters.

**Chronoscope**, an instrument contrived by Sir Charles Wheatstone to measure the duration of certain short-lived luminous phenomena, such as the velocity of light, or the electric spark, of which the eye itself can be no judge, owing to the persistence of impressions on the eye after the cause of sensation has ceased. The phenomenon is observed by reflection in a mirror in such rapid motion that the image of the luminous object would appear to describe a circular arc the length of which must be a measure of the duration of the light. The electric spark is found by this test to have no duration, because its image in the mirror is a mere point. The chronoscope has also been used for measuring the time of flight of projectiles. By means of it Foucault even determined the difference of the velocity of light when passing through air and water, and thus deduced the corresponding indices of refraction.

**Chrudim**, a town of Bohemia, 74 miles ESE. of Prague by rail. It manufactures sugar, beer, alcohol, and artificial manure, and has important horse-markets. Pop. 15,000, mostly Czechs.

**Chrysalis**, or **CHRYSLID**, a term originally applied to the golden-coloured resting stages in the life-history of many butterflies, but sometimes extended to all forms of pupæ or nymphs—that is, to the second stages in the history of insects which undergo complete metamorphosis. It is the stage which results from the fasting quiescence of the generally active and voracious larva or caterpillar, and also, of course, the stage which after one or rarely two moults awakens into the winged insect or imago. During the whole or part of its often prolonged existence, the pupa or chrysalid is externally quiescent; but internally most profound structural changes are going on, which amount in many cases to a thorough reconstruction, and always result in the development of wings and sexual organs. Chrysalids vary greatly in degree and duration of quiescence, in habit, in the condition of their appendages, and in the development of external covering. The colours also vary greatly, and in some cases the golden or otherwise coloured appearance is doubtless protective. They are generally found hidden away in protected corners, or underground, or suspended from the leaves of plants. The completion of the internal

reconstruction is soon followed by a withering restlessness, in the course of which the chrysalis frees itself from encumbrances, and emerges



Various forms of Chrysalis :

a, orange-tip butterfly; b, black-veined white butterfly; c, swallow-tailed butterfly; d, purple emperor; e, silver-washed fritillary; f, Duke of Burgundy fritillary.

into freedom and flight. Mr Poulton has made some exceedingly beautiful experiments on the effect of external surroundings on pupæ, and has shown how gilded surroundings are associated with the appearance of gilded chrysalids. See BUTTERFLY, CATERPILLAR, INSECTS, METAMORPHOSIS.

**Chrysander**, FRIEDRICH (1826-1901), biographer and editor of Handel, was born at Lübben, in Mecklenburg-Schwerin, and studied philosophy at Rostock. His edition of Handel's works was in great part published by himself.

**Chrysanthemum** (Gr., 'gold-flower'), a genus of plants of the natural order Compositæ, sub-order Anthemideæ, having a hemispherical or nearly flat involucre, with imbricated scales, which are membranous at the margin, a naked receptacle, the florets of the disc tubular and hermaphrodite, those of the ray strap-shaped and female, the fruit destitute of pappus. The species of this genus are annuals, perennials, or shrubby; and all have leafy stems. They are natives chiefly of the temperate parts of the Old World. *C. leucanthemum*, the Ox-eye, or Ox-eye Daisy, is abundant in fields, meadows, and grassy places of woods in Europe and North America. It has large flowers, with white ray and yellow disc. It is often a trouble-



Yellow Chrysanthemum.

some weed among hay and in pastures; being perennial, and having a creeping brittle root-stock, it is not easily extirpated. It is common in Britain, which has another native species, *C. segetum*

(Corn Marigold), a frequent weed in cornfields, which is an annual, with large deep yellow flowers, which have given name to the genus. The Paris Daisies or Marguerites, popular as greenhouse and bedding plants, are forms of *C. frutescens* and *C. pinnatifidum*, the latter a native of Madeira, the former of the Canaries. The old-fashioned yellow and white chrysanthemum of our cottage-gardens is *C. coronarium*, a native of the south of Europe. *C. carinatum*, a pretty annual species from Barbary, is sometimes seen in gardens in this country treated as a tender annual. The most favoured species, however, with gardeners of this and other countries are *C. sinense* and *C. indicum*. The former was introduced in 1764, the latter much later; both have increased immensely in varieties. In 1832 there were only about forty known; now they are to be reckoned by hundreds, and the numbers are yearly being added to. Long before they were known in Europe the gardeners of China and Japan were enthusiastic cultivators of both; and the chrysanthemum gives its name in the latter country to the highest order of honour—'The Order of the Golden Flower.' The colours are exceedingly various and beautiful, and the form of the flower-heads in some varieties is marked by the most perfect symmetry, while in others it assumes a medusa-like character, with numerous twisted thread-like florets of several inches in length. The circumstance that it may be had in flower during the late autumn months and far into winter, coupled with its profuse flowering quality and its simple cultural requirements, renders it a universal favourite. Cuttings are struck in November, December, and January. They require no heat, but merely protection from frost, and till they strike root they must be kept in a close case away from draught. The soil they delight in most is a rich loam, with decomposed manure, a third of the latter to two-thirds of the former. They should be placed out of doors from May till the beginning of October, when they must be housed to protect them from frost. For kindred plants which have sometimes been included in the genus, see FEVERFEW, PYRETHRUM.

**Chrysanthius**, a 4th century Greek philosopher of the Neoplatonist school, was high-priest of Lydia.

**Chryseis**, daughter of Chryses, the priest of Apollo at Chryse in the Troad, was taken by the Greeks, and assigned to Agamemnon. His repulse of her father when he came to ransom her was punished by a pestilence sent by Apollo, and ended only by her liberation.

**Chryselephantine** (Gr., from *chrysos*, 'gold,' and *elephas*, 'ivory'). The art of making statues jointly of gold and ivory was extensively practised amongst the Greeks. It developed out of the art of wood-carving, the draperies of the wooden figures being gilded for ornament, while the faces, hands, &c. were painted white. Then the uncovered parts of the body came to be made of marble, producing Acroliths (q.v.); and ultimately ivory was used, with gilding or gold-plating. The bulk of the figure continued to be made of wood, or wood and clay; thin gold plates were fastened over the parts intended to represent clothing, while on the fleshy parts small plates of ivory were skilfully laid. The colossal works executed by Phidias in the time of Pericles are the most famous of this class, the greatest being the Athene on the Acropolis, which represented the goddess in armour, covered with a long robe, and the famous Olympian Zeus, executed in the same materials (see COLOSSUS). The combination of gold and ivory was chiefly used in statues of the gods; hence it was regarded as blameworthy arro-

gance when the Macedonian kings had their family statues made of chryselephantine work. See SCULPTURE.

**Chrysippus**, an eminent Stoic philosopher, was born about 280 B.C., at Soli in Cilicia. He came to Athens when still a youth, and devoted himself with ardour to philosophy. His principal master was Cleanthes, but he is said to have studied also under the academic teachers, Arcesilaus and Lacydes. He had the reputation of being the keenest disputant and best logician of his age, so much so that people used to say: 'If the gods make use of dialectic, it can only be that of Chrysippus.' Although he did not create a new system, and explained the physical universe like the rest of his school, in morals he modified the more extreme views of the earlier Stoics. Chrysippus seldom wrote less than 500 lines a day, and is said to have composed more than 700 works. Of these but a few fragments remain, which were edited by Petersen in 1827. See Zeller's great work on the history of Greek philosophy.

**Chrysis** ('golden-wasp'), a genus of hymenopterous insects, type of a family Chrysidæ. Their systematic position is not far from that of the true wasps. The French call them *Guêpes dorées* ('gilded wasps'), and they sometimes receive the English names of Golden-tailed and Ruby-tailed Flies. They delight in sunshine, and may be seen poised in the air—the motion of their wings being so rapid as to render the body alone visible.

**Chrysobalanææ**, a sub-order of Rosacææ (q.v.), presenting close affinities through Cæsalpinææ to Leguminosææ. The 180 species are trees or shrubs, natives of tropical and sub-tropical America and Africa. The fruit of many is eatable, as the Coco Plum of the West Indies (*Chrysobalanus Icaco*). The kernels of some resemble sweet-almonds, notably those of *Acia dulcis*, and other species of Guiana. A useful oil is expressed from the seeds of *Prinsepia utilis*, a spiny Himalayan plant.

**Chrysoberyl** (Gr., 'golden beryl'), a gem almost as hard as sapphire, the finer specimens of which are very beautiful, particularly those which exhibit an opalescent play of light. Lapidaries sometimes call it oriental or opalescent chrysolite. It is of a green colour, inclining to yellow, semi-transparent, or almost transparent, and has double refraction. It occurs crystallised in six-sided prisms; often in macles, or twin crystals. It is found occasionally in granite, but more frequently in gneiss and mica-schist; sometimes it occurs in sandstone or in alluvial soil derived from the disintegration of schistose rocks. Localities for its occurrence are the Ural Mountains, Ceylon, Pegu, Brazil, and Connecticut. It is composed of aluminate of beryllium—the alumina being about 80 per cent. of the whole. The chrysoberyl of the ancients was a different mineral, probably the Chrysoprase (q.v.) of the moderns.

**Chrysocolla**, an ore of Copper (q.v.).

**Chrysolite** (Gr., 'golden-stone'), a mineral composed of silicate of magnesium and iron; of a fine yellowish-green colour, with vitreous lustre; transparent, and having double refraction; in hardness, about equal to quartz; and with conchoidal fracture. It often crystallises in four-sided or six-sided prisms, variously modified. Very fine specimens are brought from Egypt and from some parts of the East, also from Brazil. Chrysolite is used by jewellers as an ornamental stone, but is not highly valued. *Olivine*, or common chrysolite, is an important rock-forming mineral. It is dark yellowish-green in colour, and occurs generally in somewhat rounded grains or corroded crystals in

some igneous rocks, such as the basalts. Occasionally large granular masses, which may have a rectangular outline, are met with in lavas—some of them weighing as much as 30 lb.

**Chrysolo'ras**, MANUEL, the first to transplant Greek literature into Italy, was born at Constantinople in the middle of the 14th century A.D. About the year 1391 he was sent by the Byzantine emperor, John Palæologus, to England and Italy to entreat assistance against the Turks, and in 1397 he left his native land and went to Florence, where, as teacher of Greek literature, he was highly esteemed and admired. Leonardo Bruno, Poggius, Philéphus, Guarinus of Verona, and other eminent scholars were among his pupils. He was afterwards employed by Pope Gregory XII. in an attempt to promote a union of the Greek with the Roman Church, and in 1413 went with John XXIII. to the Council of Constance, where he died 1415. His chief work was *Erotemata*, a Greek grammar (Venice, 1484).—His nephew, JOHN CHRYSOLORAS, also taught Greek in Italy.

**Chrysomela**. See COLORADO BEETLE.

**Chrysophane**, a medicament valued in the treatment of Psoriasis (q.v.), is derived from Rhubarb (q.v.) and andira, with other herbs.

**Chrysophyllum**. See STAR APPLE, SAPO-TACEÆ.

**Chrysoprase** is a valuable variety of chalcedony, prized more highly as a precious stone on the Continent than in this country. It is of a fine leek or apple-green colour in choice specimens, but inferior ones exhibit other shades of green, and it is sometimes spotted with yellowish-brown. It is often set in a circlet of diamonds or pearls. Unfortunately it is apt to lose its colour through time, particularly if kept in a warm place.

**Chrysops**. See CLEG.

**Chrysosplenium**, or GOLDEN SAXIFRAGE, a genus of Saxifragacææ, comprising some forty north temperate species, two in Britain, with small apetalous yellowish-green flowers.

**Chrysostom**, DION. See DION CHRYSOSTOMUS.

**Chrys'ostom**, ST JOHN (Gr. *Chrysostōmos*, 'golden-mouthed'; so named from the splendour of his eloquence), was born at Antioch about 347 A.D. His mother, Anthusa, was a pious woman, wholly devoted to her son, who grew up under her loving instructions into an earnest, gentle, and serious youth, passing through, as Neander significantly observes, none of those wild, dark struggles with sinful passions which left an ineffaceable impress on the soul of Augustine, and gave a sombre colouring to his whole theology. He studied oratory under the famous heathen rhetorician, Libanius, and began the career of an advocate; but, soon dissatisfied with this, he placed himself for three years under the instruction of Bishop Meletius, by whom in his twenty-third year he was baptised and ordained an *anagnostēs* or 'Reader.' After six years spent as a monk in the mountains near Antioch, an illness forced him to return in 380 to that city, where he was ordained deacon by Bishop Meletius in 381, and presbyter by Bishop Flavianus in 386. The eloquence, earnestness, and practical tone of his preaching excited the attention of Jews, heathens, and heretics, and secured for him the reputation of the greatest orator of the ancient church. In 398 the Emperor Arcadius elevated him to the archiepiscopate of Constantinople. Chrysostom immediately began to restrict the expenditure in which his predecessors had indulged, and bestowed so large a portion of his revenues on hospitals and other charities that he gained the surname of 'John the Almoner.' He also endeavoured to reform the lives of the clergy, and

sent monks as missionaries into Scythia, Persia, Palestine, and other lands. His faithful discharge of his duties, especially in reproof of vices, excited the enmity of the patriarch Theophilus and of the Empress Eudoxia, who succeeded in deposing and banishing him from the capital in 403. He was soon recalled, to be banished again in 404. After a short stay at Nicæa, he was removed to the little town of Cucusus, in the desert parts of the Taurus Mountains. Even here his zeal was not abated. He laboured for the conversion of the Persians and Goths in the neighbourhood, and wrote the seventeen letters or rather moral essays to Olympias, to whom he also addressed a treatise on the proposition—'None can hurt the man who will not hurt himself.' The intercession of Innocent I. of Rome and the Emperor Honorius only moved Arcadius to order that he should be more remotely banished to Pityus on the Euxine, at the very verge of the Eastern Roman empire. Accordingly, the old man was made to travel on foot, and with his bare head exposed to a burning sun. This cruelty proved fatal. Chrysostom died on the way at Comana, in Pontus, September 14, 407 A.D., blessing God with his dying lips. A sect sprang up after his death called *Johannists*, who refused to acknowledge his successors; nor did they return to the general communion till 438, when the Archbishop Proclus prevailed on the Emperor Theodosius II. to bring back the body of the saint to Constantinople, where it was solemnly interred, the emperor himself publicly imploring the pardon of Heaven for the crime of his parents, Arcadius and Eudoxia. The Greek Church celebrates the festival of Chrysostom on the 13th of November; the Roman, on the 27th of January. St Chrysostom's works are very numerous, and consist of *Homilies* on parts of Scripture and points of doctrine; *Commentaries* on the whole Bible, part of which have perished; *Epistles* addressed to various people; *Treatises* on different subjects, such as Providence, the Priesthood, and the like; and *Liturgies*. Of these the most valuable, as well as the most studied, are the *Homilies*, which are rightly held to be superior to everything of the kind in ancient Christian literature. Thomas Aquinas said he would not give in exchange those on St Matthew for the whole city of Paris. Here his exegesis is sound, practical, and very 'English,' in Cardinal Newman's phrase. In general he rejects the allegorical system of interpretation, and adheres to the grammatical, basing his doctrines and sentiments on a rational apprehension of the letter of Scripture. He is, however, far from being a bibliolater. He recognised the presence of a human element in the Bible as well as a divine; and, instead of attempting by forced and artificial hypotheses to reconcile what he thought irreconcilable in Scripture statements, he frankly admitted the existence of contradictions, and shaped his theory of inspiration accordingly. But his greatest excellence lay in that power, springing from the fervour and holiness of his heart, by which the consciences of the proud, the worldly, and the profligate were awakened, and all were made to feel the reality of the gospel message. The historian Sozomen says of him, that he was 'mighty to speak and to convince, surpassing all the orators of his time.' The surname Chrysostom was first applied some time after his death, and is first found in Isidore of Seville, who died in 636.

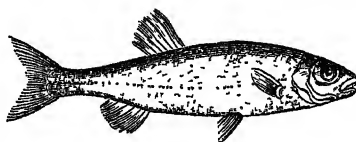
The best edition of St Chrysostom's works is that of Bernard de Montfaucon in 13 vols. folio (Paris, 1718-38; reprinted by the Abbé Migne, Paris, 1863), which was largely based on the splendid edition of Sir Henry Savile, printed at a cost of £8000 (Eton, 8 vols. 1613), 'the first work of learning on a great scale,' says Hallam, 'published in England.' Some

of the *Homilies* are translated in the Oxford *Library of the Fathers*.

See the older church historians; and cf. the moderns, especially Neander, both in his History and in his special book on St Chrysostom, translated by J. C. Stapleton (1838). See also Thierry, *Chrysostom et l'Impératrice Eudoxie* (2d ed. Paris, 1874); Newman's *Historical Sketches* (1873); books on Chrysostom by W. R. W. Stephens (1872), R. W. Busk (1885), F. H. Chase (1887), Schaff (1891), Puech (Eng. trans. 1902).

**Chrysotype**, a photographic process, the result being produced mainly by a solution of chloride of gold. See PHOTOGRAPHY.

**Chub** (*Leuciscus cephalus*), a fish of the carp family Cyprinidæ, of the same genus with the roach, dace, bleak, minnow, &c. The colour is bluish-black on the upper parts, passing into white on the belly; the cheeks and gill-covers rich golden yellow. The weight rarely exceeds 5 lb. It is plentiful in the rivers of England, and occurs in some of those of the south-west of Scotland, in Europe, and in Asia Minor. It spawns in April



Chub.

and May, and comes into condition again by the end of June or early in July. It prefers rapid water and a clear bottom, and often hides in holes. Its diet is very mixed. It is not much esteemed for the table. The scales have been used for making artificial pearl. See PEARLS. The common American chub is the *Leucosomus rhotheus*.

**Chubb**, CHARLES, locksmith, was patentee of several important improvements in 'detector' locks, originally patented by his brother, Jeremiah Chubb of Portsea, in 1818. He was in the hardware business at Winchester and Portsea previous to his settlement in London, where he died, 16th May 1846. Under his son and successor, John Chubb (1816-72), further patents were taken out and improvements made in locks and safes, and the business was greatly developed. See LOCK; and Chubb and Churcher, *The House of Chubb* (1919).

**Chubb**, THOMAS, deist, writer on religious questions, was born at East-Harnham near Salisbury in 1679. His father, a maltster, died early; consequently his children were poorly educated and early set to work. Thomas was first apprenticed to a glover in Salisbury, but his eyesight becoming weak, he became an assistant to a tallow-chandler, in which employment he died in 1747. He had already contrived to pick up considerable learning, when the 'historical preface' to Whiston's *Primitive Christianity Revived* impelled him to write his own tract, *The Supremacy of the Father Asserted*, which Whiston helped him to publish in 1715. Encouraged by the patronage of Sir Joseph Jekyll and others, he continued to write, and a quarto volume of his tracts, published in 1730, made his name known to everybody. He drifted nearer and nearer to deism, yet he went regularly to his parish church, and regarded the mission, if not the person, of Christ as divine. Unfortunately his learning was far inferior to his natural ability, and his teaching lacks distinctness and consistency. His principal works are *A Discourse concerning Reason* (1731), *The True Gospel of Jesus Christ Asserted* (1738), *An Enquiry into the Ground and Foundation of Religion* (1738), and a *Discourse on Miracles* (1741). The best statement of his views is contained in his *Posthumous Works* (2 vols. 1748).

**Chubut**, an Argentine territory in Patagonia, lying E. of the Andes, between 42° and 46° S.; area, 93,427 sq. m. The population, under 4000 in 1895, but now estimated at over 30,000, includes Welsh settlements in the Chubut Valley (established 1865) and in the Andes. The climate is dry, healthy, and windy. The Chubut River traverses the territory, receiving the Chico from Lake Musters in the south. Irrigation and railways are transforming the region. Wheat, barley, and alfalfa are grown. In recent years stock-farming has increased amazingly, there being rich pasture in the valleys. Gold is mined in the Andes; salt is worked, and granite. Oil-fields at Comodoro Rivadavia are being opened up by government, which is building a line thence to Lake Buenos Aires. Another state line from Puerto Deseado (in Santa Cruz territory) to Lake Nahuel Huapi will cross Chubut. Puerto Madryn on Nueva Bay is the chief port, with a railway to Trelew and Gaiman (60 miles) up the Chubut Valley. The capital, Rawson (pop. 2000), lies at the Chubut mouth. See ARGENTINA, PATAGONIA; and D. R. Phillips, *The Celtic Countries* (1915).

**Chudleigh**, CAPE, is on the north coast of Labrador, at the entrance of Hudson Strait.

**Chukchis**, or TCHUKCHIS. See SIBERIA.

**Chumbi Valley**, a pass on the trade route between India and Tibet, in the wedge of Tibetan territory between Sikkim and Bhutan. Under the Younghusband treaty of 1904 it was held by Britain pending the payment of the indemnity.

**Chumbul**, an Indian river, flowing 650 miles NE. from the Vindhyan Mountains to the Jumna.

**Chunam**, a very fine kind of quicklime made in India from calcined shells or from very pure limestone, and used for chewing with Betel (q.v.), and for plaster. For plaster, it is mixed with fine river-sand, and thoroughly beaten up with water.

**Chunar**, a town of India, on the right bank of the Ganges, 26 miles SW. of Benares. The fortress contains Warren Hastings's house. Pop. 10,000.

**Chundernagore**. See CHANDERNAGORE.

**Chunder Sen**. See BRAHMA SAMAJ.

**Chung-king**, a Chinese port in Sze-chwan, on the Yang-tze, opened in 1890; pop. about 800,000.

**Chupat**. See CHUBUT.

**Chupra**. See CHAPRA.

**Chuquisaca**, or SUCRE, nominal capital of Bolivia, stands on a mountain-closed tableland, 8825 feet above the sea, on a small tributary of the Pilcomayo. It is the seat of the Supreme Court and of an archbishop, and has a magnificent cathedral and a small university. Owing to its mild climate, many of the richer miners of Potosí winter here. The 24,000 inhabitants are mostly a mixture of Spaniards and Quichua Indians. Chuquisaca was founded in 1539 on the site of an ancient Peruvian town of the same name, and was for a time called *Ciudad de la Plata*, from the rich silver-mines in the neighbouring mountains; but the Peruvian name signifying 'bridge of gold' was soon restored. The name Sucre is derived from the general who in December 1824 won the last great battle for colonial independence at Ayacucho, and was Bolivia's first president (1825-28). The department of Chuquisaca occupies the south-eastern corner of Bolivia, and embraces a large portion of the Gran Chaco. The eastern portion, occupied by wild Indian tribes, is low-lying and unwholesome; the west, among the offshoots of the Eastern Cordilleras, is healthy. Area, 26,400 sq. m.; population, about 230,000. The valleys are fertile. Wine is produced at Cinti. Gold, silver, copper, iron, marble, and petroleum are found.

**Chuquito**, a town of Peru, once capital of a province, on the west shore of Lake Titicaca; pop. 5000.

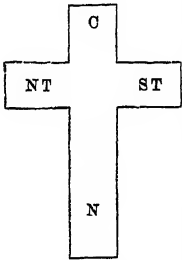
**Chur** (Fr. *Coire*; Ital. *Coira*; local Romansch, *Quera*; ancient *Curia Rhetorum*), a town of Switzerland, capital of the Grisons, in the valley of the Upper Rhine, lies in a fertile plain 1940 feet above the sea, and surrounded by high mountains. It is 80 miles SE. of Zurich by rail, and stands on the Plessur, a mile and a half from its junction with the Rhine. It is of importance as standing on the great road to Italy by the Splügen Pass, and thus possessing a considerable transit trade. The bishop's palace, and the quarter around it, inhabited by Catholics, occupy the summit of an eminence, and are separated from the rest by walls and battlements, closed by double gates. Here stands the old cathedral of St Lucius, a Romanesque edifice dating from the 8th century. It contains singular old carving, paintings by Cranach, Holbein, and Dürer, and also, it is said, the bones of St Lucius, a legendary British king. The town-hall, the Rhetian museum, and two Protestant churches are in the lower town. Romansch is still spoken in the vicinity. Chur is a great tourist centre; and wine, fruit, and corn are produced by the country round. Pop. 15,000.

**Church**, the whole body of Christians; the Christian place of worship; the clergy; or a sect or denomination of Christians. It is derived from the Greek *kyriakon*, 'belonging to the Lord,' and that from *kyrios*, 'lord'; the Old English form is *cyrce*, the Scottish *kirk*, the German *kirche*. The *kyriakon*, the original name of the place of assembly, meant accordingly 'the Lord's house.' The Christian Church, like every other society, must have a certain constitution and rules according to which its affairs are administered. It is disputed, however, among Christians, how far this constitution has been defined, or these rules prescribed by divine authority, and how far they have been left to the discretion of men. The form of church government depends primarily on the idea entertained of the constitution of the church. Episcopalians and Presbyterians agree that many congregations are to be united under a common government; but this, according to Episcopalians, should be more or less absolutely in the hands of bishops, who are superior to the mere pastors of congregations; while according to Presbyterians it should be carried on by ministers and elders of these congregations meeting for this purpose on a footing of equality. Congregationalists, or Independents, place all church government in the hands of the members of each congregation and the office-bearers whom it has elected. This theory of church government is maintained by many Baptists and others who, for various reasons, assume different denominations. See BISHOPS, PRESBYTERIANISM, INDEPENDENTS, METHODISTS. See also STATE RELIGION, CHURCH HISTORY, and articles on the various churches.

Under BASILICA some account is given of the mode in which the primitive form of the Christian church or place of assembly originated, and whence it derived its characteristic features. In course of time the numbers of the clergy increased, and a complete hierarchy, with a fixed liturgical service, became established. The simple apse was now no longer sufficient, and the presbytery or place for the clergy was enlarged. This was effected in various ways, sometimes by the erection of a low enclosure or choir extending from the presbytery or raised part in front of the apse into the nave. This 'bema' or choir served for the accommodation of the clergy and singers, and to it were attached on either side two pulpits or *ambones*,

from which the Gospels and Epistles were read to the worshippers assembled round the three open sides. Such an arrangement may still be seen in the ancient basilica of San Clemente in Rome.

In other instances the apse is lengthened eastwards so as to provide additional space. An example of this plan occurs at S. Apollinare in Classe, near Ravenna. In the Basilican churches the nave remained as at first, a long simple hall, with side aisles—in which the congregation assembled, the men on one side, and the women on the other. Meanwhile in the East the use of the dome had caused the introduction of a variety of plans, and in particular the form of the Greek cross, which was conveniently roofed by a large central dome and four subsidiary domes over the four arms of the cross. This plan suggested the transept or



Church :

C, Choir; N, Nave;  
N T, North Transept;  
S T, South Transept.

portion with high roof at right angles to the nave; and it is easy to see how the wide space in the Basilican churches between the nave and apse, in which stood the altar, might also be enlarged so as to form a transept. The above is what actually happened in the south of France. The Venetian merchants introduced the above Greek domed design at Périgueux, where they had reproduced in the 11th century a copy of St Mark's of Venice; and we find in the churches of that district a transept introduced from an early period, having several apses to the east, and side aisles like the nave.

It was especially necessary in the churches of the monasteries that there should be ample accommodation for the monks in the portion of the church set apart for them. This probably led to the lengthening of the choir, but in the earlier Cistercian churches, although the transept is introduced, there is no projection to the east except the central and side apses. But when the plan of the 'cross' church, however it may have been invented, had been developed, the idea speedily claimed attention, and its symbolical significance recommended its adoption. It is remarkable, however, that during the growth and development of the early Gothic style in the reign of Philip Augustus, when most of the cathedrals and churches of northern France were rebuilt, they were almost all constructed without transepts, the object apparently being to concentrate the attention on the one important point, the high altar. It was in the monastic churches that the transept was chiefly developed.

Along with this, another feature, which had first been introduced in the south, was worked out and perfected by the northern architects—viz. the carrying of the aisle round the apse, so as to convert the latter from being a simple half-cylinder, roofed with a semi-dome, into a circular or octagonal east end, supported on a screen of pillars, behind which was the surrounding aisle, with its radiating chapels, while the upper part of the apse was carried up the full height of the choir, which it terminated with a brilliant east end. Fergusson supposed that this 'chevet,' or splendid eastern termination of French Gothic churches, was the result of the absorption of a circular edifice into the church. There is no doubt that the church owes several of its features to this system of absorption. Originally the group of ecclesiastical buildings consisted of the church or basilica, at the west end of which was an atrium or open court, having a circular or octagonal baptistery opening from it opposite the

door to the church. In Germany the atrium was roofed in and became part of the church, while the western baptistery was also absorbed into the one chief edifice, and became the western apse so common in that country. But it had also been customary to build occasional churches of a circular form in imitation of the church of the Holy Sepulchre at Jerusalem. In Germany and elsewhere a choir was added to these for the use of the clergy, but in France the circular church was retained by the clergy as the choir, and a nave was constructed in connection with it for the people. The fine effect of the circular termination was thus seen, and had only to be seen to be immediately adopted. Besides the chapels radiating from the 'chevet,' numerous others were gradually introduced, extending beyond the aisles; the height of the main structure was increased, and great windows were inserted in the clerestory, till the interior presented a glowing vision of rich colour and endless variety of perspective.

Such was the growth of the Christian church during the middle ages, and such is the general form it still retains in Roman Catholic countries, notwithstanding the great changes of style through which it has passed from the 13th to the 20th century. Since the Reformation a new form of church has been introduced. The ancient traditions were no longer held sacred by Protestants, and a style of building adapted to the new mode of service was called for. Hence arose the arrangements of the numerous churches designed by Sir C. Wren, Gibbs, and others during the 17th and 18th centuries. These consist of a great hall with a gallery running along the two sides and west end, with a large window or apse at the east end. During the 19th and 20th centuries the plan of the mediæval church has frequently been again resorted to, both in England and the United States; but among Presbyterians, Independents, and many others, the modern plan of a hall designed with galleries so as to contain a numerous congregation, having the pulpit placed in the most prominent position, is still the most generally used.

The following table shows the comparative size of some of the great churches of the world, giving in feet their total length, breadth at transept, and height of spire or tower or dome :

	Length	Transept	Spire.
St Peter's, Rome.....	664	500	435
Cathedral of Florence..	580	324	390
Milan Cathedral.....	500	254	400
Cologne Cathedral.....	445	282	515
Strasbourg Cathedral.....	354	212	474
Antwerp Cathedral.....	354	212	400
Amiens Cathedral.....	442	194	323
Notre Dame, Paris.....	400	150	204
St Paul's, London.....	510	282	404
St Paul's, Constantinople	246	..	188
Canterbury Cathedral.....	530	124	235
York Minster.....	524	222	213
Westminster Abbey.....	500	189	199
Salisbury Cathedral.....	474	229	404
Glasgow Cathedral.....	319	..	225
St Patrick's Cathedral, New York	332	174	323

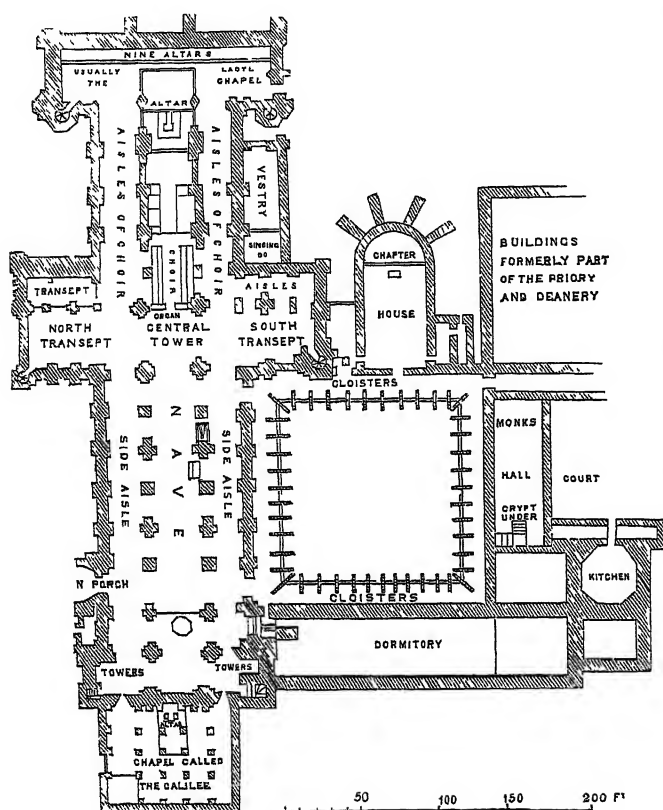
Churches vary of course in accordance with their importance and size. The largest are the metropolitan and cathedral churches, then the conventual, the collegiate, and the parish churches; but although they vary in magnitude and richness, they are all constructed on the same principles, and follow one idea.

The annexed ground-plan of Durham Cathedral shows the various parts of one of the most perfect mediæval structures in England, with the names attached to the different portions, which will be described under their respective headings. See AISLE, APSE, BASILICA, CLERESTORY, TRIFORIUM, &c. Plans, sections, or other illustrations of other important churches will be found at BYZANTINE ARCHITECTURE, GOTHIC ARCHITECTURE, LOM-

BARD ARCHITECTURE, RENAISSANCE, RHENISH ARCHITECTURE, &c., where much additional information on the developments of church building falls to be given. For the historical succession of the

Bishop Andrewes, and on the Oxford movement (1891) are also very valuable. His Bacon, Spenser, St Anselm, Dante, and some of his essays were reprinted in 1888 (5 vols.). His *Village Sermons* were published in 1892. He died 9th December 1890. See Lives by his daughter (1894) and Lathbury (1905).—He was a nephew of SIR RICHARD CHURCH (1785–1873), born at Cork of Quaker parentage, who had become C.B. (1815) and K.C.H. (1815), and had been in the Neapolitan service, when in 1827 he became generalissimo to the insurgent Greeks. He died at Athens. See Lives by Lane-Poole (1890) and E. M. Church (1895).

**Church, STATES OF THE,** or PAPAL STATES, stretched from the Po to near Naples, and in 1859 had an area of 15,774 sq. m. and a pop. of 3,000,000. It was divided for administrative purposes into twenty districts, including the Comarca of Rome; six legations, among them those of Bologna and Ravenna; and thirteen delegations, including Ancona and Perugia. More general divisions were the *Romagna, Umbria*, and the *March of Ancona*. The war of 1859 and the popular vote of 1860 left the pope only the Comarca of Rome, the legation of Velletri, and the delegations of Civita Vecchia, Frosinone, and Viterbo, 4493 sq. m. in extent, with a pop. of about 700,000, the rest being united with Italy. The temporal power of the popes originated in a gift of the exarchate of Ravenna by Pepin to Pope Stephen II., and it reached its greatest extent under Innocent III. (1198–1216). The withdrawal of the French garrison of Rome in 1870 led to the final downfall of the pope's temporal power. See POPE, ITALY.



Ground-plan of Durham Cathedral.

styles, see ARCHITECTURE; see also the articles and illustrations at AMIENS, ANTWERP, BOSTON, BURGOS, CANTERBURY, COLOGNE, DURHAM, EXETER, LINCOLN, MOSCOW, PETERBOROUGH, SALISBURY, ULM, WESTMINSTER, YORK, &c.

**Church, RICHARD WILLIAM**, Dean of St Paul's from 1871, was born at Lisbon, 25th April 1815. He took an Oxford first-class from Wadham (1836), and was elected fellow of Oriel (1838). From 1853 he held the rectory of Whatley, near Frome. In 1854 he published his scholarly *Essays and Reviews*. His university sermons (1876–78) in a volume entitled *Human Life and its Conditions* (1878), the series of St Paul's and Oxford sermons in *The Gifts of Civilisation* (1880), and the five St Paul's sermons forming *The Discipline of the Christian Character* (1885), are profound contributions to religious thought. Other works are his *Life of St Anselm* (1871), an amplification of two essays in his first volume; *The Beginnings of the Middle Ages* (1877), an introduction to the series of 'Epochs of Modern History'; *Dante: an Essay*, with a translation of the *De Monarchia* by his only son, F. J. Church, a young man of rare promise, who died in 1888; *Spenser* (1879), and *Bacon* (1884), two of the best books in the series of 'English Men of Letters.' His occasional essays or lectures on such subjects as Montaigne, Brittany, Cassiodorus, the sacred poetry of early religions, the *Pensées* of Pascal and

**Church-ale**, a kind of church festival in old England at which ale was drunk liberally. The name is obviously compounded like *bridal* = *bride-ale*, *scot-ale*, *clerk-ale*, *bid-ale*, &c. The church-ales were usually held upon Whitsuntide, and two persons were chosen beforehand to preside over the feast, and divide out the victuals and drink voluntarily contributed by the parishioners. Sometimes the drink which had been brewed from malt given by the parishioners was sold about Whitsunday at the church for the support of orphans and poor, the repair of the church, and similar objects. The practice of holding church-ales with the corresponding games was denounced by the Puritans, and is not overlooked in Stubbs's *Anatomie of Abuses*.

**Church Discipline** (*Disciplina ecclesiastica*), the practice of the Christian Church in dealing with such of its office-bearers and members as have by public scandal caused hindrance to its common spiritual life. Its Scripture authority, resting on such passages as Matt. xvi. 19; xviii. 15 (*et seq.*), is further enforced in Paul's epistles and in the gospel and epistles of John. Under the Decian persecution there was so much apostasy that special rules became fixed for the restoration of the *Lapsed* (q.v.), which remained in force till the 5th century. But the great strictness with which Penance (q.v.) was enforced led to the opposite extreme; it became customary for penitents to be restored

simply on their producing letters of recommendation (*libelli pacis*) from persons who had confessed Christ. The Montanists, however, maintained that those who had been once excommunicated should pass their whole life in the *status poenitentiae*, and the Novatians denied that the Church possessed the right to assure the *Lapsi* of the forgiveness of sins, which only God could grant. The Donatists (q.v.) could not arrest the gradual secularisation of discipline. By the 6th century penances began to be commuted for certain fixed taxes. In the Western Church, after public penances had become rare, other punishments took their place, partly derived from the exercises of earlier asceticism, partly from the usages of Frankish law. The episcopal *Missi* of Charles the Great combined the functions of a civil and ecclesiastical court, and allowed church punishments to be compounded for money. From the time of Gregory the Great the doctrine of Purgatory (q.v.) had been a dogma of the Church; and Peter Lombard and other scholastics built on it the theory of Indulgences (q.v.), which was confirmed by Clement VI. in 1343. The extreme punishments in the middle ages were the Greater Excommunication (q.v.) for the individual, and Interdict (q.v.) for the community. The churches of the Reformation held that 'the power of the keys' belonged to the whole Church, by which it was to be intrusted to the regularly called servants of the Word. They rejected Auricular Confession (q.v.) and the whole system of Satisfaction and Indulgences; restricting the sphere of their church discipline to matters of social morality, and its enforcement simply to spiritual admonition and partial or complete exclusion from the sacraments and offices of the Church. The Lutheran Church rejected the Greater Excommunication as a merely secular punishment with which the servants of the Church had nothing to do; but retained the Lesser, simply as a means of moral training. Though Luther and Melancthon adhered firmly to the participation of the whole congregation in the imposition of excommunication, yet, in consequence of the development of the consistorial system, it passed into the hands of the consistories in the different states. In the 17th and 18th centuries it fell gradually into disuse. The Reformed Church laid greater stress on congregational discipline. Zwingli assigned it to the civil magistrate of the Christian state; Calvin, on the other hand, referred it to the Presbytery (q.v.). In Presbyterian churches it is exercised by the kirk-session—an appeal lying to the presbytery, and from that to the synod and general assembly. The church discipline provided for by the Canons of the Church of England has almost entirely fallen into disuse.

**Church History.** The history of the Christian Church includes its external history, which treats of the extension of the Church, and its relation to the state; and internal history, which is concerned with the Church's inner life, doctrine, worship, and constitution. With respect to time, the Church's history is usually divided into three periods—*Ancient*, *Medieval*, and *Modern*. Its Medieval History may be dated from its establishment in union with the new empire founded by Charles the Great in 800. Modern Church History begins with the Reformation (in the view of Roman Catholic historians, with the Humanistic movement, or the discovery of America). Each of these periods may be divided into two: Ancient Church History, at the complete victory of Christianity over Greek heathenism under Constantine the Great; Medieval, at the culmination of the papal power under Innocent III.; and Modern, at the close of the Thirty Years' War by the Treaty of Westphalia.

The first of these periods extends from Christ to Constantine. The beginning of the Christian Church dates from the departure of Jesus Christ from the earth and the Pentecostal effusion of the Holy Spirit (about 33 A.D.), the time when the first confessors of Christ exceeded the limits of a private society, and began to form a public community. Its nucleus was the first Jewish Christian community at Jerusalem under the 'pillar-apostles' James, Cephas, and John. The spiritual conception of the Messiah which the disciples had received from the personal influence of Jesus was sealed on their minds by their faith in his resurrection; and their comprehension of his gospel is seen in the wide aims of their first missions, in their progressive deliverance from legalism, and in the belief that faith is the essential element of salvation. As members were quickly added to the Church, especially from the Jews of the Dispersion (called Hellenists, because they spoke Greek), a beginning of its organisation was made in the appointment of seven deacons, including the Hellenist Stephen, the protomartyr of the Church. The elements of the primitive faith were unified and systematised by the Apostle Paul, the aim of whose life was the conversion of the whole world to Christ. He succeeded in emancipating the Gentile Christian world from the ceremonial law, and in his three great missionary journeys (about 40–58 A.D.) began the evangelisation of Europe. The destruction of Jerusalem (70 A.D.) completed the deliverance of Christianity from Judaism, and gave the Church the consciousness of a world-wide mission. The Judaising Christians were thenceforth an insignificant sect.

The Roman empire maintained the pre-Christian view that there could be no worship of God apart from the corporate life of the state, and, when the early Christian Church refused to take part in the state worship, it became a *religio illicita*, and was proscribed and persecuted as dangerous to society. To the distinguished and learned Christianity was a gloomy infatuation, to the populace the Christians' contempt for the gods seemed the cause of every public calamity. The tyrannical caprice of Nero charged them with the burning of Rome (64 A.D.), and persecuted them with revolting cruelty. Under Domitianian Christianity was punished as a form of high-treason. The first regular decree for legal procedure against the Christians was issued by Trajan. Under the more tolerant rule of the emperors from Hadrian to Marcus Aurelius (117–161), the Christian congregations were organised as *Collegia tenuiorum* ('poor men's guilds'), or *Collegia funeraticia* ('funeral societies'), and as such enjoyed a sort of legalised existence. The vast cities of their dead in the catacombs of this period nowhere preserve memorials of martyrdom or persecution. The Christians had to suffer many a local persecution, but, apart from the temporary and thoughtless cruelties of Nero and Domitian—who, according to Tertullian, was 'a piece of Nero for cruelty'—they had the toleration, and sometimes the protection, of the emperors. Ranke ascribes such action especially to Antoninus Pius—'the best-intentioned and most peaceable among them, and perhaps not without sympathy for Christianity'—whose reign he regards as the culmination of the Roman empire. A consequence of this tolerant bearing of the imperial power was the peaceful behaviour of the Christians, who in general rejected the principles of Montanus, which aimed at the subversion of the state. This condition of affairs came to an end under Marcus Aurelius, who, no longer able to resist the popular outcry, suffered a persecution to take place in several provinces.

About the middle of the 2d century the Christian congregations in the Roman empire were consoli-

dating themselves into a confederacy, which called itself the 'Great' or 'Catholic' (i.e. universal) Church. By the middle of the 3d century the confederation was accomplished. The Church was now organised with a hierarchical constitution and an elaborately regulated worship, while the New Testament canon was regarded as equally authoritative with the Old. From 250 the emperors whose political aims were most akin to the traditional policy of Rome struggled for life and death with the growing power. Of the times before Decius Origen testifies (*Contra Celsum*, iii. 8) 'few and very easy to count are those who have died on account of the Christian religion;' and Lactantius says (*De Morte Persecutorum*, iii. 4), 'after the acts of the tyrant (Domitian) had been rescinded, the Church was not only restored to her pristine state, but shone forth much more brightly; and, times following when many good emperors held the helm of government, she suffered no attacks from enemies. . . . But thereafter the long peace was broken. For after many years the accursed beast (*exécrabile animal*) Decius arose to vex the Church.' Under Decius began the first universal and systematic persecution of Christianity as a part of the military and religious policy of the state. The sufferings of the Christians continued under Gallus and Valerian till 260, when Gallienus declared Christianity a *religio licita*. For forty years the Church had peace, and grew mightily on every side. Diocletian by four edicts of progressive severity, from February 303 to March 304, when he decreed torture for all Christians, put forth a desperate effort to annihilate Christianity in the whole empire. At his abdication (May 305) the horrors of the persecution ended, except in the East, where they were continued without mercy by Maximin Daza. The victory of Constantine in 313 delivered Christendom from this its last and most relentless persecutor.

Constantine saw in the unity of the Church a new foundation for the unity of the empire, and placed Christianity on an equality with Paganism: under his sons it became predominant. The reaction under Julian ended with his death. It was the struggle with Gnosticism that had first led the Church to the remarkable development of its dogmatic system, which gives its characteristic stamp to the history of the second period of the ancient church. The simple baptismal confession had become transformed into a rule of faith giving fixity to the ecclesiastical tradition. Justin, Irenæus, Tertullian, and Hippolytus had been among its first exponents. While in the scriptures of the New Testament canon the Church possessed an abiding witness to the 'simplicity that is in Christ,' the rule of faith in the course of the 3d century had been built up in the forms of the Greek philosophy of Clement and Origen. The first church synods had been held in Asia Minor in connection with the Montanist controversy about 170; and by the 3d century such assemblies were common in various provinces of the empire. The institution of œcumenical councils, in which only bishops were entitled to vote, originated with Constantine. The controversy with respect to the Easter festival had disturbed the Church for a century and a half. The universal practice in Asia was to observe the exact day of the month (the 14th Nisan), while the usage of Alexandria and Palestine and the West was to celebrate the Passion always on a Friday, and the Resurrection on a Sunday. This controversy was finally laid at rest by the Ecumenical Council of Nicæa in 325. Trinitarianism gained its first victory over Arianism at Nicæa by the combined influence of Athanasius and Constantine, and completed its triumph at the second Ecumenical Council (at Constantinople) in 381.

After this the Church was distracted with controversies about the views of Origen (394-438), the Apollinarian controversy (362-381), the disputes between the schools of Antioch and Alexandria (381-428), the Nestorian controversy (428-444), the Monophysite controversy (444-553), the Monothelete controversy (633-680), and the Iconoclastic controversy (726-842). These discussions originated in the Eastern Church, while in the West the theological interest centred on the great conflict between Augustinianism and Pelagianism (412-529). The tyrannical interference of the Eastern emperors in the controversies of the Church, their supremacy in the ecclesiastical councils, and their penal enforcement of doctrinal decrees, led to infinite confusion in the relations between church and state, and prepared the way for the ambitious policy of the popes, and for the final breach between the churches of the East and West.

While these age-long controversies kept the relations of church and state continually strained, Paganism was steadily suppressed. Orthodox Christianity in union with the state soothed the declining years of the ancient empire; but could not prevent the conquest of Rome by Alaric the Goth. Its advance in Persia was checked by political persecution before the advent of Islam, which subsequently overwhelmed the Christianity of the East. In the West however, Christianity rose with renewed vigour from the ruins of the old empire, by the conversion of the Teutonic and Slavonic nations. The Teutonic conquerors of Gaul and Italy were Christians before their invasion of those countries. The Anglo-Saxon conquerors of England were heathens. A century and a half after their settlement Christian missionaries gained a footing in the south and north, and within a century from the landing of Augustine the English kingdoms had embraced Christianity. In the general declension of political faith under the decaying Roman empire, the social power once held by the officials of Rome had gradually passed into the hands of the Christian bishops. In the lawlessness and disorder of the barbarian invasions, these representatives of the claims of moral order and human brotherhood were the trusted mediators between the conquerors and the conquered, and exercised a constant influence during peace and war. But this great authority over the new nations brought along with it much injury to religion. Discipline declined as the power and wealth of the clergy increased.

The third period of the Church's history extends from Charles the Great to Innocent III. 'At the commencement of the 8th century,' says Ranke, 'on the one side Mohammedanism threatened to over-spread Italy and Gaul, and on the other the ancient idolatry of Saxony and Friesland once more forced its way across the Rhine. In this peril of Christian institutions, a youthful prince of Teutonic race, Charles Martel, arose as their champion.' By his great victory of Tours (732) a final check was given to the advance of the Saracens in the West, and Christendom and civilisation were rescued from the grasp of Islam. The subjugation of the Saxons by Charles the Great was the toilsome work of thirty-two years (772-804), and their Christianisation was secured by the castles, towns, mission-stations, and monasteries which the conqueror planted in their country. Under the Carlovingian kings of the Franks from the middle of the 8th century, the temporal dominion of the Papacy was founded. The legend of the 'Donation of Constantine,' bestowing imperial power and dignities upon the pope, together with the sovereignty over Rome and all Italy, and the countries of the West, was invented at Rome about 730, and embodied in the Pseudo-Isidorian decretals (about 850). It was contested by few in the middle ages, till Laurentius

Valla demonstrated its untenability. For centuries this clumsy forgery formed one of the supports of the Papacy in its struggle for universal supremacy. The connection between the churches of the East and West had been already loosened by the schism of 484-519 during the Monophysite controversy, and by the iconoclastic policy of the emperors from Leo to Theophilos (717-842). At length the progressive centralisation of the Western Church under the Roman see, to whose authority the 'œcumenical bishops' of Constantinople could not submit, and in the 11th century the transfer by the Bulgarians of their allegiance from Constantinople to Rome, led to a final rupture. The patriarch Photius already in 867 laid down the dogmatic basis of the Schism as consisting in the western deviations from the dogmas, customs, and constitutional forms of the ancient church, especially the addition of the 'filioque' clause to the creed of Nicœa and Constantinople, teaching that the Holy Spirit proceeds not only from the Father, but also from the Son. The severance was completed on the 16th July 1054, when the papal legates laid the anathema on the altar of St Sophia in Constantinople.

The growth of Monasticism, from the beginning a lay movement in pursuit of the old ideal of Christian perfection, which men felt that a worldly priesthood no longer represented, entered at first into competition with the clergy, but gradually became subservient to Catholic aims. In the East, where the contemplative life prevailed, the best function of the monasteries was as nurseries of the priesthood, while the monks of the West christianised Germany and Britain, cultivated wildernesses, preserved the classic treasures of antiquity, and were the diligent teachers of the common people. Above all the monastic orders, the Benedictines can claim the glory of conspicuous services to Christian missions and intellectual culture. 'In the 9th and 10th centuries,' says Gibbon, 'the reign of the gospel and of the Church was extended over Bulgaria, Hungary, Bohemia, Saxony, Denmark, Norway, Sweden, Poland, and Russia. . . . The admission of the barbarians into the pale of civil and ecclesiastical society delivered Europe from the depredations by sea and land of the Normans, Hungarians, and Russians. The establishment of law and order was promoted by the influence of the clergy; and the rudiments of art and science were introduced into the savage countries of the globe.' In the West, men held that the Holy Roman Empire, consolidated by Charles and Otto the Great, was the embodiment of the ideal state, and that God had two vicars on earth, the emperor in temporal things, and the pope in spiritual things. 'The analogy of the two,' says Bryce, 'made them appear parts of one great world-movement towards unity; the coincidence of their boundaries, which had begun before Constantine, lasted long enough after him to associate them indissolubly together, and make the names of Roman and Christian convertible. . . . The Holy Roman Church and the Holy Roman Empire are one and the same thing in two aspects; and Catholicism, the principle of the universal Christian society, is also Romanism; that is, rests upon Rome as the origin and type of its universality, manifesting itself in a mystic dualism which corresponds to the two natures of its Founder. As divine and eternal, its head is the pope, to whom souls have been intrusted; as human and temporal, the emperor, commissioned to rule men's bodies and acts.' In the first half of the middle ages the Church believed herself to be co-extensive with the Kingdom of God, the realisation of the noblest ethical ideal, and her servants conceived it their highest duty to labour to make the

whole field of human life subject to her supremacy. Not even the moral declension of the Papacy in the centuries succeeding Charles the Great, especially during the sixty years' so-called Pornocracy (904-963), could quench the ardour of the Church's faith in that ideal; and the cloister, purged and strengthened by successive reforms, saved the authority of the Church by uniting in Gregory VII. the monastic ideal of self-renunciation with the ecclesiastical ideal of the conquest of the world.

At the great Lateran Council under Pope Innocent III. in 1215, the Catholic Church was at the zenith of its power. Innocent was the sun, and from him the princes of Christendom held their light in fee. The Crusaders, though unable to hold Jerusalem, had enhanced the prestige of the Papacy; and Scholasticism placed its skill and learning at the service of the Church. The Waldenses and Albigenses were to be crushed relentlessly, and the Inquisition was now established for their permanent repression. No persecutions which the Church had ever suffered are to be compared for determined cruelty with those which in this period she inflicted on the heretics of southern France and of the Netherlands. Emperors and kings might contend with Rome for temporal authority; they were ready to decree the burning of heretics as much as she desired. But this unrestricted sway brought its own downfall. After the Papacy in the Avignon sojourn (1305-77) had become the tool of French policy, and after all the contrivances of pious fraud had been resorted to, during the Schism of 1378 to 1409, to fill the coffers of rival popes at Avignon and at Rome, the people began to lose faith in the holiness of the hierarchy, and the ever louder cry for 'reformation of the Church in its head and members' became irresistible. The Schism of thirty years, during which two popes claimed the same divine prerogative, was the most direct contradiction of the doctrine that had obtained in the Catholic Church since the time of Hildebrand, that the Papacy was the unifying centre of Christendom. The conviction gained ground that even its authority was subject to that of an œcumenical council. In the development of this idea a twofold tendency presented itself. One party, that of Gerson and D'Ailly, which prevailed at the councils of Pisa and Constance, regarded the council as representative only of the hierarchy, and, while recognising the Papacy as a divine institution, aimed at restricting the absolutism of the papal see by the co-rule of a spiritual aristocracy, consisting of the bishops and the doctors of the universities. The other, mainly composed of German theologians, made the first attempt within the medieval Church to undermine the Roman Catholic conception of the Church by a distinction between the *ecclesia universalis*—the spiritual community of all believers—and the *ecclesia Romana*, of which the pope was head. The second party regarded this *una catholica ecclesia* alone as infallible, and held that the council represented not only all classes of the hierarchy, but all classes of Christendom; and that church reform was a duty that fell to the secular power, not only the princes, but also the entire body of the laity. But all the resolutions of the three great reforming councils were made void by the pitiful issue of the Council of Basel in the Concordat of Vienna in 1448, when the fathers of the council recognised Nicholas V., and received the holy father's forgiveness. Thus ended the last attempt towards the reformation of the Church on its old foundations.

At length the teaching of the Lollards and Hussites, the failure of the councils, and the shameless traffic in indulgences; the impotent conclusion of Scholasticism that philosophy and religion might both be true, though contradic-

tory; the new art and learning of the Renaissance; the awakening of the spirit of nationality; and the widespread longing of the poor for redress from the exactions of priests and nobles—had prepared men's minds for that great movement in the 16th century, which issued in the Protestant churches and in the division of the whole of western Christendom into two hostile camps down to the present day. Luther, Zwingli, Melancthon, and Calvin were its greatest leaders. The Reformation called forth a thousand changes in human existence. As it passed from country to country in all northern Europe, it broke the cloister-vow, abolished celibacy, confiscated the property of the Church, founded secular schools for the people, stripped the clergy of their privileges; and the philanthropic duties and the tasks of civilisation, which for centuries had been incumbent on the servants of the Church, it gradually transferred to the state and the community. Where it triumphed, and even where it was successfully resisted, there was no sphere of life in which its influence was not felt. The communistic movement of the Anabaptists, which had been developed in the midst of the religious perplexities of Germany, was crushed in the ruins of Munster in 1535, and with the death of 'this prodigal child of the Reformation' passed away the premature political socialism of the Reformation period. The aims of the Papacy, all centred on its political interests, were wholly irreconcilable with the Reformers' doctrine of the priesthood of all believers and the sole authority of Scripture in matters of faith. The political and humanistic period of the Papacy was succeeded by a régime of passionate zeal, under which every nerve was strained to win back the territories which had shaken off the Roman yoke. The resolutions of the Council of Trent (1545-63), subscribed by 255 prelates, separated for ever the Protestant and Catholic churches, and obtained in the latter the authority of a symbolical book.

The Counter-Reformation, led everywhere by the Jesuits, and favoured in Germany by the Peace of Augsburg (1555), went on with great success till the middle of the 17th century. It began in Bavaria in 1563, and quickly spread over southern Germany. But it was in France that the revived Roman Catholicism of the 16th century won its first great victory. The number of the 'Religioneux' or 'Huguenots' in France had, in 1558, amounted to 400,000. From the massacre at Vassy by François of Guise in 1562 to the Massacre of St Bartholomew (August 23-24, 1572), four religious wars had lacerated France, and during the reign of Henry III. there were yet five of these desolating civil wars. The crafty see-saw policy of Popes Sixtus V., Gregory XIV., and Clement VIII. secured every advantage afforded by the vicissitudes of the conflict, and it was not till after Henry IV. had gone over to Roman Catholicism that the pope in 1595 recognised him as the king of France. Liberty of conscience was extended to the French Protestants by the Edict of Nantes in 1598. From 1555 the ecclesiastical position of each German territory was dependent on the religious convictions of its ruler, and the members of the Lutheran Church had political equality with 'the old religion'; but the exclusion of the Reformed from that provision led to the isolation of Lutheranism from the great struggles of Protestantism in France, the Netherlands, and England. The principle *cujus regio, ejus religio*, by which subjects should follow the confession of their rulers, unavoidably led, in the political condition of Germany in the 16th and 17th centuries, to the breaking up of the Lutheran Church into a number of small national churches, and confused the development of Lutheran theology with the dynastic and family interests of the several courts. Stability was only attained

after the fearful struggle of the Thirty Years' War, when, at the Peace of Westphalia, Catholics and Protestants agreed to recognise each other's right to existence. The excellences of the Lutheran Church were the depth and power of its ascetic elements and its religious literature, especially its hymns, the noble expression of German mysticism. But the continuation and political maintenance of the Reformation has been mainly the work of the Reformed or Calvinistic churches. 'In a time,' says Hausser, 'when, of all the creations to the Reformation, Europe presented nowhere else any solid or lasting bulwark, the little Genevan state of Calvin sent out year after year its apostles into the world, and was the most dreaded foe of Rome, when nowhere else was there any resistance to her might.' In the Lutheran Church many of the Romish ceremonies were retained, and congregational organisation was neglected; whereas in the Reformed churches the congregations were organised on a democratic basis, that had nothing akin to the traditional principles of monarchical power. 'With the passive resistance of Luther men could not counteract the Caraffas, the Philips, and the Stuarts; that needed a school prepared for war to the knife; the only such school was Calvin's, and it everywhere took up the glove—in France, in the Netherlands, in Scotland, and in England.' Lutheranism has been established in Scandinavia and the countries along the Baltic, while the Reformed Church, which has throughout evinced a more radical character than the Lutheran, has especially prevailed in South Germany, Switzerland, France, the Netherlands, and Scotland.

In England, Edward VI., the successor of Henry VIII.—who had been recognised by the parliament in 1534 as 'the only supreme head in earth of the Church of England'—with the help of Cranmer, Latimer, and Ridley, completed the Reformation. The Common Prayer-book was introduced, and a confession of faith in 42 articles drawn up as the standard of the church's doctrine. After a period of persecution under Mary, the Anglican Church was established under Elizabeth in the closest union with the state. By Elizabeth all ecclesiastical disobedience was regarded as treasonable, and the legislation of her later years was directed against those who took offence at the ritual and the hierarchy, and were known as Nonconformists. English Puritanism (which may be dated from 1567, when its adherents began to separate from the Established Church) was at first only an opposition to the ceremonial elements which the Church of England still retained after its separation from Rome. The principle of Puritanism was reformation through the members of the church itself, as opposed to reformation originating with the crown. It aimed at the overthrow of the episcopal system, and the establishment of a strict system of discipline in the spirit of Calvin. Under Charles I. the Puritans were severely persecuted, and many of them emigrated to America, and were the early settlers of New England. English Puritanism in alliance with Scottish Presbyterianism gained in the Great Rebellion a complete victory over the monarchy, but in England the fruits of the victory fell to the Independents, who were the most consistent section of the party. The Synod of Dort in Holland (1618-19), which was regarded as an oecumenical council of the churches of the Calvinistic Reformation, had decided the controversy between the Arminians and Calvinists entirely in favour of the latter. The Westminster Assembly (1643-49), called by the Long Parliament, drew up the confession of the Puritans, which is closely akin to the resolutions of Dort, and is still the standard in the churches of Scot-

land. Later phases of Puritanism developed a great variety of sects, the Baptists and the Society of Friends, or 'Quakers,' being the most notable.

The Reformation in Scotland had received from John Knox a strictly Calvinistic stamp. The Protestant nobles (called the 'Lords of the Congregation') entered in 1557 for the first time into a 'Covenant,' and the Scotch Confession of Faith was ratified by the Scottish parliament in 1560. All the efforts of Mary, Queen of Scots, to win Scotland back to Roman Catholicism were fruitless. The first National Covenant 'against all kind of Papistry' was signed by king and people in 1581, and frequently renewed. In 1592 the Presbyterian constitution was established. Yet under James I. and his successors determined efforts were put forth to make the Church of Scotland a province of the Anglican Church. The obtrusion of the Liturgy in 1637 was met by the Solemn League and Covenant in 1638.

During the Civil War and the Protectorate of Cromwell, Independency increased in numbers and in influence. Two fanatical sections of the party, the 'Fifth-Monarchy Men,' and the 'Levellers'—who aimed at complete separation of the church from the state, which they maintained should preserve an attitude of religious indifference—were repressed by the iron hand of Cromwell on their attempt to establish their principles by force of arms. The declaration of faith and order issued by the Synod of the Independents in 1658 is not different in its doctrine from the Westminster Confession. After the accession of Charles II. Episcopacy was re-established both in England and Scotland. On the 24th August 1662 two thousand ministers were ejected from their livings in the Church of England, because they refused to subscribe the second Act of Uniformity, which enjoined all ministers in England to declare their unfeigned assent and consent to the entire Book of Common Prayer. In the same reign, the successive Conventicle, Five Mile, Corporation, and Test Acts increased the civil disabilities of both Nonconformists and Catholics. The persecutions did not cease till the Revolution, when the Act of Toleration in 1689 extended religious liberty to dissenters, only requiring from them the payment of tithes to the Established Church.

In the 17th century a middle party within the Church of England, known as the 'Latitudinarians,' had endeavoured to exercise a mitigating influence on the violence of the disputes between the extreme Episcopals and the rigid Puritans. Hales and Chillingworth were in the first half of the century the leading exponents of the party, which later included the 'Cambridge Platonists,' Whichcote, John Smith, Cudworth, More, and even Simon Patrick and Tillotson. About the middle of the 17th century another movement began in England as a reaction against the religious extremes of the Great Rebellion. The principles of the English 'Deists' originated undoubtedly in the reaction from the religious excesses of the Cromwell period, but were more largely due to the progress of philosophy and the historical and natural sciences. They passed over to France, where they found a congenial soil under Louis XIV. and Louis XV., and, in presence of the Dragonnades and the persecutions of the Protestants after the revocation of the Edict of Nantes in 1685, developed into the Atheism and Materialism of the Encyclopédistes. These afterwards bore bitter fruit in the French Revolution—'the religious issue of which proved,' says Hase, 'not only the necessity of religion for a civilised people, but also the national indispensability of a church.'

In Germany the reaction from the fanatical violence of the Thirty Years' War and the lifeless orthodoxy of the 17th century took the form

of Pietism. It began with the *collegia pietatis* founded by Spener about 1670, and the similar *collegia philobiblica* of Francke, professor at the university of Halle from its foundation in 1694. Halle became the centre whence Pietism spread on every side, and its influence, like that of Geneva under Calvin, extended to all the Protestant countries of Europe. The church of the Moravians, in the form in which it was renewed by Zinzendorf, is a daughter of Pietism, and the founder of Methodism testified that Moravianism was the first medium of his own inspiration. Pietism, with Moravianism, which inwardly rests on the same foundation, is, says Weingarten, 'the last fruit of that heart-religion, springing originally from Franciscanism, which consists in the closest vital fellowship of the individual Christian with Christ.' It laid great weight on strictness of conduct, and dwelt rather on regeneration and sanctification than on the Reformation doctrine of justification by faith. During the reign of Rationalism it appeared quiescent, but it revived in the 19th century, and in alliance with the orthodoxy which it formerly combated forms the predominant party in the Evangelical Church of Germany.

The founders of English Methodism did not aim at any new doctrine or order, but only sought, like the German Pietists, to deepen spiritual life, and make it more practical and fruitful. Methodist societies began to be organised in 1739, after Wesley and Whitefield had been excluded from the pulpits of the Established Church. These two leaders separated in 1748 on the question of predestination, Wesley holding the Arminian, and Whitefield the Calvinistic view. Ten years after Wesley's death his followers numbered 40,000, and in twenty years more increased to upwards of 100,000. Wesleyan Methodism and its numerous offshoots have been distinguished both in this country and in America for their evangelistic zeal and their influence over the common people; and their earnestness and success have been the means of imparting a healthful stimulus to the Church of England. About the end of the 18th century the influence of the Methodist movement extended into the Established Church, and issued in the formation of the 'Evangelical party,' which, centring in Cambridge, soon became the most energetic party in the Church of England. At Oxford, which from Land's time had been the centre of the old 'High Church' party, began about 1833 the Tractarian movement, of which the first impulse came from the Evangelical revival; while in one of its sides, at least, it was a kind of æsthetic outcome of the Romantic revival in literature and art. No fewer than 150 of the clergy and leading laymen connected with the movement followed Ward and Newman (in 1845 and 1846) into the Roman Catholic Church, but the party, held together for nearly fifty years under the leadership of Pusey, has now fully identified itself with the Anglican Church as the 'Catholic Church planted in England.' Though 'Anglo-Catholicism' has driven large numbers into the Roman communion, it has succeeded in doing what Methodism a hundred years before attempted, and has brought new life into the Church of England. It bears a close affinity to Roman Catholicism in ritual and doctrine, but refuses to acknowledge the universal supremacy of the Bishop of Rome. The 'Broad Church' party, the third in the modern Church of England, traces its beginning to Cole ridge, but in spirit and to a large extent also in teaching, is substantially identical with the old Latitudinarians and the Cambridge Platonists, who, with great spiritual earnestness and honesty, maintained for over a hundred years a large and

tolerant theology. The modern Broad Church party agrees with the Evangelical or 'Low Church' party in minimising the importance of apostolical succession and sacramental grace, and in attaching no intrinsic value to particular forms of ritual or clerical vestments; but unlike it demands a more liberal interpretation of dogmatic definitions, and a greater freedom in the subscription to creeds. In its preaching it aims at guidance rather than conversion, frankly contradicting the prevailing Evangelical teaching that attributes everything to sovereign grace and emphasises the complete corruption of unregenerate human nature. It has throughout advocated a bolder view of the applicability to Scripture of methods of criticism and exegesis that have found favour in Germany. One of its earliest leaders was the famous Dr Arnold, who advocated the great Hooker's theory of the identity of church and state—a kind of spiritualised Erastianism—as the only means of fully carrying out the realisation of Christianity on earth. It has added many illustrious names to the roll of English churchmen, among them Whately, Maurice, Frederick Robertson, Julius Hare, Kingsley, Thirlwall, and Stanley.

The standard of Anglican doctrine is fixed by acts of parliament in the Thirty-nine Articles of 1571, and in the Book of Common Prayer (1552, revised in 1559 and 1661). Not till the 19th century was the church's close connection with the state loosened by a series of laws removing the civil and political disabilities of dissenters. The Church of England includes at most two-thirds (some say only one-half) of the population, and possesses the whole of the ecclesiastical endowments of the country. Its comprehensiveness is altogether unexampled; within no historic church in the world is to be found such divergency of honest opinion. Its enormous revival of activity during the 19th century struck its roots deeper into the religious heart of England, and though its disestablishment has often been proposed, the Church of England is so closely interwoven with the other institutions of the nation, and is so dear to the majority of the English people, that such a contingency must seem remote. In any event, the solidity and dignity of the Episcopal Church would retain for it the chief place among the ecclesiastical societies of England. Such hindrances to its efficiency as pluralities and non-residence have long been removed, the episcopate within England has been largely extended, and missionary bishops appointed to organise and extend foreign missions. Such agencies for relieving poverty and distress as sisterhoods and special missions have leaped into life, and in the Church Congresses (first, 1861) and Diocesan Conferences (first, at Ely, 1864), the door was opened to the co-operation of laymen in church work. The growing demand for greater freedom of action on the part of the church resulted (1852 and 1856) in a revival of the powers of Convocation, in abeyance since 1717. In 1867 was held the first Lambeth Conference of prelates of the Anglican rite from all regions. To give the Church of England a greater measure of spiritual independence, parliament in 1919 passed an Enabling Act, in accordance with which a National Assembly was elected in 1920 to legislate for the church. There are three houses—of bishops, of clergy, and of laity.

James I. gave the whole ecclesiastical endowment in Ireland into the hands of the Anglican clergy. The Irish branch of the Anglican Church, which only embraced one-eighth part of the population, was disestablished and disendowed in 1871 by the Irish Church Act of 1869. In the census of 1911 the Catholics of Ireland numbered 3,242,670; Episcopalians, 576,611; Presbyterians, 440,525; Methodists, 62,382; others, 68,031.

The Church of Wales (with Monmouthshire) was disestablished and disendowed in 1920. Being detached from the Church of England, it elected an Archbishop of Wales.

Patronage had been abolished in Scotland in 1690, but was restored under Queen Anne in 1712. The repeated protests of the General Assembly were disregarded, but with the gradual ascendancy of the 'moderate' party in the church itself were discontinued, and the dissatisfied seceded from the Establishment, forming the 'Secession' and 'Relief' churches. In 1834 the Assembly passed the Veto Act, declaring that no pastor should be 'intruded on any congregation contrary to the will of the people.' After a ten years' conflict between the 'non-intrusionist' and 'moderate' parties, the former seceded from the Established Church, and formed the Free Church of Scotland in 1843. The United Presbyterian Church arose from the union of the Secession and Relief churches in 1847, and in 1900 formed, by union with the Free Church, the United Free Church of Scotland; a small protesting section making good their claim to the name and much of the property of the Free Church (q.v.).

In the United States it is a part of the constitution that 'no religious test shall ever be required as a qualification to any office or public trust,' and that 'congress shall make no law respecting an establishment of religion.' 'This separation between church and state,' says Schaff, 'is not a separation of the nation from Christianity. . . . The American nation is as religious and Christian as any other in the world, and shows this plainly by its voluntary support of so many churches and sects; by its beneficent societies of every kind; by its church-going, and respect for the clergy, who are inferior to no class in respect and influence; by its strict Sabbath-keeping, which has its equal only in Scotland; by its zeal for home and foreign missions; by its reverence for the Bible; by a veritable flood of religious books, tracts, and periodicals; and by the whole tone of its public morality.' Of Protestants, the Methodists and Baptists are the most numerous, especially among the lower classes and in the southern states; while the Presbyterians, Congregationalists, and Episcopalians have the greatest influence among the middle and higher classes. In 1917 the Roman Catholics had 15,742,262 members; Methodists (Episcopal and non-Episcopal), 7,165,986; Baptists, 7,236,650; Presbyterians, 2,257,439; Lutherans, 2,463,265; Congregationalists, 790,163; and Episcopalians, 1,098,173.

A great development of missionary zeal took place in the Protestant churches of Europe and America during the 19th century, leading to a vast expenditure of life and money. Among civilised races, like the Jews, Chinese, and Hindus, the success attained has been small compared with that among races to which the Christian missionaries have brought, along with the preaching of the gospel, a vastly superior civilisation, such as the natives of Madagascar and Polynesia. The Roman Catholic Church has by its colonies and conquests in the New World endeavoured to redress the balance of the Old. In South and Central America, and the Spanish-speaking and French-speaking West Indies, the population is almost exclusively Roman Catholic; while in British North America the proportion of Roman Catholics is 39 per cent., and in Australia and Polynesia about 15 per cent. The largest and most important missionary institute of the Roman Catholic Church is the Propaganda, founded by Gregory XV. in 1622. The missions of the Benedictines, Cistercians, Premonstratensians, and especially of the mendicant orders, who penetrated Africa and North and South America, were from the 16th and 17th centuries almost eclipsed by those of the Jesuits. In the East and

West Indies, Japan, China, and Abyssinia, they have won over thousands to their society and church. While Protestant missions have aimed at saving individual souls, the Roman Catholics have used every possible means to effect conversions, and have counted their converts in crowds. Their constant policy has been to ingraft Catholic ideas and usages on traditional prejudices and customs. In India they commended themselves to the great as Christian Brahmins and to the poor as apostles of freedom; in Japan they sided with the native nobility against the luxurious priestly class; in China they made their way to favour through geometry and astrology; in Spanish South America they took the oppressed natives under their protection, contended against slavery, and founded in Paraguay a socialistic theocracy of their own.

Ever since the Reformation the Roman Catholic Church had been growing more and more ultra-montane, and this tendency became most marked in the second half of the 19th century, largely through the increasing influence of the Jesuits. That order, suppressed in Portugal (1759), in France (1764), in Spain and Naples (1767), in Parma (1768), and by the bull 'Dominus ac Redemptor Noster' of Clement XIV. in 1773, was restored by Pius VII. in 1814. The golden days of the Jesuits were under Pius IX. (1846-78), who gradually passed entirely under their influence. The Jesuit generals, Father Roothaan (1829-53) and Father Beckx (1853-84), called the 'black popes', reigned in Rome side by side with the 'white pope,' Pius IX. The dogma of the Immaculate Conception, which the Jesuits maintained against the Dominicans, was promulgated by the pope in 1854, and ten years later the *Encyclica* and *Syllabus* proclaimed to the world that the political and ecclesiastical theories of Jesuitism were accepted by the holy see. The Jesuits acquired considerable influence in France under Napoleon III., but were expelled in 1880. In Italy, since the downfall of the pope's temporal power (1871), they are restricted to Rome, and they were excluded from Spain and Mexico (1868), from Germany (1872).

The famous canon expressed by Vincent of Lerinum in 434: 'Quod semper, quod ubique, quod ab omnibus creditum est,' has been the formal principle of Catholicism throughout its history. At first it fell to the bishops in the synods to decide whether any particular doctrine bore these three marks of Catholicity. Sometimes one synod set aside the resolutions of another, and even at the ecumenical councils the whole Church was never represented in the same proportions. The supreme authority of the pope was the only means to secure absolute unity, and neither the defenders of the 'episcopal system' at the medieval councils nor the Gallicanism of the French clergy (set forth in their declaration of 1682) were able to interpose an effective resistance. To secure the Papacy from all such opposition in future, the Jesuits persuaded Pope Pius IX. to have it decreed by the Vatican council that only the pope is the infallible head of the Church. Leo XIII. has set his seal upon the work of Pius IX. by restoring, in 1886, to the order of the Jesuits all the privileges it enjoyed before its dissolution. The ancient conflict between emperor and pope, revived in the 'Kulturkampf,' ended (1883-86) in a victory for the Papacy, by the withdrawal of the 'May Laws' and the reversal of the German ecclesiastical policy pursued since 1872.

To-day Roman Catholics are reckoned at about 270 millions; members of the Orthodox churches at 120 millions; Protestants at about 170 millions; while non-Christians number about 1000 millions.

The primary sources of Church History are: (1) Original documents, such as the records and decrees of church councils; the official publications of

bishops and popes (pastoral epistles, bulls, briefs, decretals, and constitutions); laws relating to ecclesiastical affairs, issued by sovereigns, chancellors, or parliaments; liturgies and service-books, rules of religious orders, symbolical books and confessions of faith, sermons and treatises of theologians and ecclesiastical leaders, journals and reports of eye-witnesses, and letters of contemporaries eminent in church or state. (2) Monuments, such as ecclesiastical buildings, pictures, sculptures, inscriptions, vessels, &c. Among the secondary sources are calendaries, martyrologies, and necrologies; traditions, annals, and chronicles—all requiring to be sifted by criticism, the farther their date from the period to which they refer.

The earliest church historian whose writing is extant is Eusebius of Cæsarea, who made use of the earlier works of Hegesippus (about 150 A.D.) and Julius Africanus (3d century). The history of Eusebius, extending to 324 A.D., was continued by Socrates to 439, Sozomen to 423, Theodoret to 428, Philostorgius to 425, Theodoret to 527, and Evagrius to 594. The chronicle of Eutychius of Alexandria, written in Arabic, comes down to 937. Nicephorus Callisti (1330) closes the series of the Greek church historians. The Byzantine civil historians from 500 to 1500 contain valuable materials for church history. The earliest Latin historians of the Church were Rufinus, who wrote a translation of Eusebius, and brought it down to 395; Sulpicius Severus, 'the Christian Sallust,' extending to 400; Orosius to 416; Cassiodorus, who combined Socrates, Sozomen, and Theodoret into a text-book, the famous *Historia Ecclesiastica tripartita*, which was the standard down to the Reformation; and Jerome, whose translation of Eusebius, and continuation to 378, was followed by the chroniclers Prosper of Aquitaine, Idacius, and Marcellinus. Of medieval writers of special histories the most notable are Jornandes (550); Gregory of Tours (540-595), who wrote the chronicles of the French Church in the 5th and 6th centuries; Bede, the father of English church history, which he narrated to the year 731; Paul the deacon (760), author of a history of the Lombards; and Adam of Bremen, the chief authority on the northern churches from 788 to 1072. The *Dialogus Miraculorum* of Cæsarius of Heisterbach throws great light on his own age (first half of 13th century). Besides the *Liber Pontificalis*, a history of the popes to 885, which was probably the work of various authors, general church history was written by Anastasius of Rome and Haymo of Halberstadt in the 9th century, by the Norman monk Ordericus Vitalis, and the cardinals Petrus Pisanus, Pandulf, and Boso in the 12th century; in the 13th, by Martinus Polonus, whose *Chronica summorum Pontificum Imperatorumque* was the most popular history-book of the middle ages; in the 14th, by Ptolemy of Luca; and in the 15th, by Antoninus of Florence, whose work comes down to 1459. Laurentius Valla's attack on the legend of the 'Donation of Constantine' appeared in 1440.

The Reformation, at first more productive in exegesis than in history, awoke to the necessity of justifying itself by the Church's development in the past, as well as by the statements of Scripture. After the Peace of Augsburg, a society of Lutheran theologians at Magdeburg, headed by Matthias Flacius (Illyricus), compiled a comprehensive history, arranged in 13 folio vols., each embracing a century. The *Magdeburg Centuries* was answered by the *Annals* of Cæsar Baronius, in 12 folio vols., which was followed by the histories of Hottinger, Spanheim, and Samuel and Jacques Basnage in the Reformed Church, and of Pagi, a Franciscan monk, who also criticised Baronius. The history of the Council of Trent was written

by Sarpi and Pallavicino. Church history was afterwards cultivated in the Roman Catholic Church chiefly by the Benedictines of St Maur and the Oratorians in France. Alexander Natalis, Fleury, Bossuet, and the Jansenist Tillemont, were the most celebrated writers. Protestant historians had been for nearly a century employed in polemical writing, and the compilation of dry summaries of events and dates, when Georg Calixtus gave a new impulse to the study by a series of dissertations urging the value of unprejudiced investigation. The mystic Gottfried Arnold maintained the right of heretics against the Church in his '*Impartial History* (1699), and was answered by Weismann, George and Franz Walch, and S. J. Baumgarten. From the 16th century down to the 18th the Church of England was ably vindicated in the light of history by Jewel, Hooker, Pearson, Beveridge, Cave, and Bingham. Strype's *Annals* and *Ecclesiastical Memorials*, and Neal's *History of the Puritans*, are the authorities for the Reformation and the Puritan movement in England. Of the other English writers of church history down to the present century, the chief names are those of the martyrologist Foxe and Archbishop Parker in the 16th century; Usher, Fuller, Dugdale, and Burnet in the 17th; and Jeremy Collier, Echard, Calamy, Bower, Lardner, and Milner in the 18th. Knox's *History* (1586) is the authority for the Reformation in Scotland. Scottish church history was written in the 17th century by Row, Spottiswood, and Calderwood; and in the 18th by Defoe and Wodrow. Mosheim was the first to establish the study of ecclesiastical history on a scientific basis, and the sceptical Semler, though, according to Hase, 'without all style and feeling for the peculiar conditions of antiquity,' founded the criticism of the sources. The huge work of Schrockh, in 35 vols., begins the so-called 'pragmatical' school of church historians, which laboured to collect external facts and relate them to their causes, and was also represented by Spittler, the elder Henke, Staudlin, and Planck. In the early part of the 19th century, Ernst Christian Schmidt, in 6 vols., presented an impartial statement of facts. Gieseler produced a masterpiece of scientific investigation, with the most valuable extracts from the sources accompanying the text, a method which had been previously employed by Danz, and was also cultivated by Niedner. In modern Protestant church history the greatest work is that of Neander, which, in contrast with the pragmatical histories, dwells mainly on the inner development of the Church in doctrine, worship, and religious life. He has been followed by Jacobi and Hagenbach. Among academic treatises on church history the most notable are those of Guericke, H. Schmid, Lindner, and Kurtz, all from the Lutheran point of view; those of Herzog and Ebrard in the Reformed Church; and the very able and interesting lectures of Hase, Hase, and Rothé. Recent church history dates from F. C. Baur, who in separate treatises covered the whole field. The effect of his work on the first three centuries has been to turn the attention of many writers for more than a generation to the study of the early church. The contention of Baur, and his disciples Schwegler and Zeller, which represented the original apostles of Christ as persistently struggling for the perpetuity of 'Petrinism' against Paulinism, and interpreted the New Testament to prove this theory, has been considerably discredited by the investigations of Ritschl, Weizsäcker, Lechler, Harnack, Weiss, and De Pressensé.

In the Roman Catholic Church the study of church history has been pursued with great energy. The *Acta Sanctorum* of the Bollandists, begun in the 17th century, have reached their 63d volume.

Of the councils, the chief collection is that of Mansi, in 31 vols., and history that of Hefele in 7 vols. In the earlier part of the 19th century the chief writers in Germany were Count Stolberg (whose work in 15 vols., extending to 430 A.D., has been brought down to 1300 in other 17 vols. by Kerz), Katercamp, and Mohler, who was the first of a new school of thoroughly scientific historians, to which Ritter, Locherer, Dollinger, Alzog, Kraus, and Pastor belong, while the works of Hergenrother and of Bruck have a strong ultramontane bias.

English writers on general church history are still largely dependent on the labours of German scholars. There is no English church history worthy of a place beside the works of Neander, Gieseler, and Hagenbach.

Of other 19th-century writers may be mentioned Hinds, Burton, Kaye, T. Price, Marsden, Lathbury, Hardwick, Maurice, Blunt, Milman, Hook, Newman, Stanley, Creighton, Robertson, Wordsworth, Abbey and Overton, Haddan and Stubbs, Perry, and Stoughton in England; Cook, M'Crie, Hetherington, Welsh, Lee, Grub, Tulloch, Skene, and Cunningham in Scotland; Reeves and Killen in Ireland; Schaff, Allen, and Fisher in America; Gfroier, Ranke, Heppe, Henke, Overbeck, Hausrath, Keim, Häusser, Kahnis, Schürer, Lipsius, Hilgenfeld, Langen, Moeller, and Holtzmann in Germany; and Bungenier, Capefigue, Montalembert, Aubé, D'Aubigné, Renan, De Broglie, Michaud, and Chastel in France. For works on his life, see the article JESUS.

For bibliography, see Hagenbach's *Encyclopædie* (11th ed. by Kantsch, 12th by Reischle, reconstructed by Crooks and Hurst, New York); and for Roman Catholic theology, Hurter's *Nomenclator* (1871-86); also Weingarten, *Zeitafeln und Ueberblicke der Kirchengeschichte* (5th ed. 1897); F. C. Baur, *Die Epochen der Kirchlichen Geschichtsschreibung* (Tüb. 1852); Ter Haar, *De Historiographie der Kerkgeschiedenis* (1871); Wattenbach's *Deutschlands Geschichtsquellen im Mittelalter* (7th ed. 1904); relevant articles in Hauck-Herzog (3d ed. 1896-1909), Hastings's *Encyclopædia of Religion and Ethics* (1908 et seq.) and *Dictionary of Apostolic Christianity* (1913 et seq.), and *The Catholic Encyclopedia* (1907-1915); the references in the various works of the Abbé Duchesne; also the various articles in this work on the subjects mentioned in the preceding pages, and especially to the following:

Albigenses	Confessions.	Independents.	Protestantism.
Aquinas.	Councils.	Jesuits	Reformation
Arius.	Creeks.	Jesus.	Religion
Arminius.	Crusades.	Knox.	Rom Cath Ch.
Athanasius.	England.	Lord's Supper.	Russia
Augustine.	Church of.	Luther.	Sacraments
Baptism.	Friends.	Methodists.	Saints.
Bishop.	Society of.	Missions.	Scholasticism.
Calvin.	Gallian Ch.	Monachism.	Scotland
Canonisation	Gnosticism.	Moravians.	Sveaenborg.
Celibacy.	Greek Church.	Nestorius.	Unitarians.
Christianity.	Huguenots.	Pope.	Waldense.
Christ.	Huss.	Presbyterianism.	Wycliffe.

**Churchill, CHARLES**, satirist, was born in Westminster in 1731. After leaving Westminster School, where he was contemporary with Colman, Robert Lloyd, Cowper, and Warren Hastings, he did not enter Oxford or Cambridge, being apparently disqualified by an imprudent Fleet marriage at seventeen. In 1756 he was ordained priest, 'through need, not choice,' and at his father's death in 1758 he was appointed to the curacy and lectureship of St John's, Westminster, the poor emoluments of which office he strove to eke out with teaching. But he was hopelessly improvident and already dissipated; accordingly, after a bankruptcy of but five shillings in the pound—and that paid only by the aid of Robert Lloyd's father—a formal separation from his wife, and a course of unclerical indecorum and dissipation that called forth the remonstrances of his dean and the protests of his parishioners, he slipped his neck from the orders which he wore so awkwardly, and cast himself

entirely upon the town (January 1763). His *Rosciad*, published in 1761, had already made him famous and a terror to all the actors of the time. The poem was modelled on Dryden, and had real talent and vigour, as well as scurrilous and unsparing personality to commend it. Later in the same year, in *The Apology*, he made a savage onslaught on his critics, and particularly Smollett. *Night* (1762), a long poetical epistle addressed to Lloyd, and suggested by Day, Armstrong's somewhat unwelcome poetical epistle to 'gay Wilkes,' contained some nervous lines, but was on the whole a poor production marred by an impudent bravado of honesty, as if it were some justification of misconduct to make a candid avowal of it. *The Ghost* (1762) is an incoherent and tiresome poem of over four thousand lines in octosyllabic metre, only remembered now for the attempt to satirise Dr Johnson as 'Don Pomposo' on occasion of the Cock Lane ghost-story, and the much more warrantable ridicule cast upon Whitehead the laureate. Churchill next helped Wilkes in the *North Briton*, and heaped timeous ridicule upon the Scotch in *The Prophecy of Famine* (1763), an admirable satire, bright with wit sharpened into stinging verse—undoubtedly his best work. 'It is indeed falsely applied to Scotland, but on that account may be allowed a greater share of invention,' says Boswell, with characteristically wrong-foot-foremost but whimsically ingenious reasoning. Later in the same year appeared Churchill's *Epistle to Hogarth*, for which the great caricaturist paid the poet by gibbeting him to all future time as a bear in torn clerical bands and ruffles, with a pot of porter, and a club inscribed 'Lies and North Britons.' Other works of Churchill's were *The Duellist*, an onslaught on Wilkes' assailants in the House of Lords; *The Author*, which pleased the critics and even Horace Walpole; *The Conference*, interesting especially for one redeeming feature—a singularly touching and true confession of remorse for the seduction (but not desertion) of a Westminster tradesman's daughter; *Gotham*, a long and ambitious exposition of his political ideas; *The Candidate*, a splendid attack on Sandwich; *The Farewell*, *The Times*, and *Independence*, the last containing an interestingly unflattering portrait of the poet by his own pen, in which he laughs at his burly frame and rolling gait—'much like a porpoise just before a storm. Meantime the satirist had prospered and gained enough not only to pay off all his old debts, but to help others, for no man was ever more faithful and unreserved in love towards his friends than this sinning and repenting prodigal. In the October of 1764 he crossed to Boulogne to see Wilkes, was seized suddenly with a fever, and died on 4th November. Just before the end he sat up in bed to bequeath annuities of £60 to his wife and £50 to his mistress, for which, however, there proved to be no funds. His body was buried at Dover, and on a slab above his grave was inscribed with less than dubious truth the line from his poem *The Candidate*: 'Life to the last enjoyed, here Churchill lies.' Fifty-four years later Byron, leaving England for the last time, stood beside his tomb, his mind filled with reflections on 'the Glory and the Nothing of a Name,' which he shaped into a poem scarce worthy of its theme.

Churchill left two unfinished satires—*The Journey*, broken off at a line of sadly ominous significance: 'I on my journey all alone proceed;' and the severe and masterly *Dedication* to the arrogant Warburton. His satires are for the most part long since forgotten. He had a happy knack of turning strong and honest thought into nervous verse. At the same time he lacked the chief essentials of true satire, a real insight into the heart of man and that

rarest power of happy exaggeration, of preserving likeness in unlikeness and verisimilitude in distortion. A fatal volubility in rhyming, a kind of boisterous but unequal energy, and an instinctive hatred of wrong, manly and honest, although often scarce to be distinguished from the mere reflex reaction of natural spleen and obstinacy, combined to make him the hero of the hour and its ephemeral interests, but was not equipment enough for a Dryden, a Juvenal, or even a Butler. See Forster, *Essays* (vol. ii. 1858); Southey, *Life of Cowper*; Putsch, *Churchill, sein Leben und seine Werke* (Vienna, 1909).

**Churchill, LORD RANDOLPH HENRY SPENCER**, third son of the seventh Duke of Marlborough, was born on February 13, 1849, and educated at Eton and Merton College, Oxford. Lord Randolph was first returned for Woodstock in 1874; but it was not until after the general election of 1880 that he became prominent in politics, when he appeared as the leader of a guerilla band of Conservatives known as the 'Fourth Party.' He was frequently in collision with his leaders on questions of party organisation and the conduct of the Opposition; but his vigorous attacks on Mr Gladstone's policy, both foreign and domestic, were of unquestionable value to the Conservative cause. Towards the end of Mr Gladstone's ministry Lord Randolph began to have a considerable following among the younger Conservatives, who regarded him as the future leader of the Tory Democracy. After a plucky attempt to defeat Mr Bright at Birmingham in 1885, Lord Randolph was returned for South Paddington. He was Secretary for India in Lord Salisbury's first ministry (June 1885—January 1886). From July to December 1886 he was Chancellor of the Exchequer and leader of the House of Commons, when he resigned. Re-elected in 1892, after a tour in South Africa, he remained a leader of the Conservative party till his death in 1895. See a monograph by Rosebery (1906), and a Life (1906) by his son, WINSTON LEONARD SPENCER CHURCHILL (b. 1874), who fought with distinction in South Africa, wrote of his experiences, published a novel (*Savrola*), and, entering parliament as Conservative for Oldham in 1900, became a keen critic of the government. In 1905 he was made Under-secretary for the Colonies in the Liberal ministry, in 1908 President of the Board of Trade, in 1910 Home Secretary, in 1911 First Lord, in 1918 Secretary for War and Air, in 1921 for the Colonies. In the Great War he was at Antwerp and in France. He was responsible for the Dardanelles expedition and intervention in Russia. He resigned with Mr Lloyd George and was defeated at Dundee in 1922, in 1924 at Westminster. He rejoined the Unionist party, and was returned for Epping in October 1924. Thereafter he became Chancellor of the Exchequer in the Baldwin administration. See his apology, *The World Crisis* (1923-24).

**Churchill River**, of Canada, rises between the north branch of the Saskatchewan and the Athabaska, and flows NE. for nearly 1000 miles. Known at first as the Beaver, it finally enters Hudson Bay, near Fort Churchill.

**Churching of Women**, a religious usage prevailing in the Christian church from an early period, of women, on their recovery after child-bearing, going to church to give thanks. It appears to have been borrowed from the Jewish law (Lev. xii. 6); and the earliest express mention of it is in the pseudo-Nicene Arabic canons. No ancient forms for the purpose are extant, and those in actual use are of medieval date. The Greek rite is only partially concerned with the woman, being also the presentation of the new-born child in the

church on the fortieth day after birth (a usage based upon Luke, ii. 22); the Latin rite, contrariwise, is exclusively a benediction of the woman, and is restricted to such as have borne children in wedlock. It is not obligatory, nor included among strictly parochial rights, but only recommended as a pious and laudable custom. In the Church of England, also, a service for the churching of women, differing little from the medieval rite, finds a place in the Prayer-book. By the Presbyterian and Independent churches of Britain and America it is rejected as having no Scripture warrant.

**Church Music.** See ANTHEM, ANTIPHONY, CHANT, CHOIR, HYMNS, MASS, MUSIC, PLAIN-SONG, SERVICE.

**Church-rates**, in England, a tax or assessment laid on the parishioners and occupiers of land within a parish, by a majority of their own body in vestry assembled, for the purpose of upholding and repairing the fabric of the church and the belfry, the bells, seats, and ornaments, the churchyard fence, and the expenses (other than those of maintaining the minister) incident to the celebration of divine service. The parishioners are convened for this purpose by the Churchwardens (q.v.). The Chancel (q.v.) being regarded as belonging peculiarly to the clergy, the expense of maintaining it is laid on the rector in receipt of the great tithes, though custom frequently lays this burden also on the parishioners, as in London and elsewhere.

The church-rate was anciently a charge on parishioners in respect of their lands, according to their area and the stock thereon, but it was a personal, not a real charge; and every bishop was bound to contribute to the repair of the public 'baptismal churches' of his diocese (i.e. churches with public baptisteries annexed to them). The responsibility of the parishioners for the repair of their parish church is recognised as early as 1018 by a law of King Canute, enacting that 'all folk shall of right help the church-bot,' which was the sum levied for repairs of churches. The care of the fabric of the church, and the due administration of its offices, are laid upon the minister and the churchwardens conjointly, and the latter may be proceeded against by citation in the ecclesiastical courts, should they neglect these duties. But there is no legal mode of compelling the parishioners as a body to provide the rate; and this circumstance has occasioned much difficulty in imposing the tax in parishes in which dissent is prevalent, and has led to many churches falling into a partially ruinous condition. The proper criterion for the amount of church-rates is a valuation of the property within the parish, grounded on the rent that a tenant would be willing to pay for it. Glebe land, the possessions of the crown in the actual occupation of the sovereign, and places of public worship, are not liable for church-rates; but there is no other exception as regards immovable property, and in some parishes custom even extends it to stock-in-trade. It has been often decided in the courts that a retrospective church-rate—i.e. a rate for expenses previously incurred—cannot be validly imposed. Much difficulty has been experienced in recovering the rates imposed by the parish on individuals refusing to pay. Previous to 53 Geo. III. chap. 127, the only mode was by suit in the ecclesiastical court. That statute, however, in all cases under £10, empowered the justices of the peace of the county where the church was situated, on complaint of the churchwardens, to inquire into the merits of the case, and order payment. Against the decision of the justices an appeal lies to the quarter-sessions. In 1868 an end was put to all parochial contentions by enacting that no suit or proceeding

should thereafter be allowed in any court to enforce or compel payment of a church-rate, except where a contract or local act authorised it. But except so far as related to the compulsory payment of these rates, the churchwardens might, as before, make, assess, receive, and deal with such rates. In each district parish the inhabitants may treat their own church as if it were their parish church, and make and receive rates for the repair of the same. A body of trustees may now be appointed in each parish to receive contributions for ecclesiastical purposes in the parish. The result of this act of 31 and 32 Vict. chap. 109, is thus not to abolish church-rates, but rather to convert them into voluntary payments; allowing, as it does, all faithful adherents of the church to contribute, as before, to the repairs of their own churches. But it has been found practically inapplicable, and its enabling clauses are rarely acted on, so that voluntary contributions have in nearly all cases been substituted for rates.

In Scotland the burden of upholding extra-burghal parish churches is imposed on the parish heritors in proportion to their rent; and where the parish is partly within burgh and partly in the country, the expense is borne partly out of pew rents and partly by the heritors. See SCOTLAND (*Church History*), NON-CONFORMISTS, PARISH, HERITORS. In Ireland church rates were abolished in 1823.

**Churchwardens** are the modern representatives of the ancient *Seniores Ecclesiastici*, laymen who were custodians of church goods and ornaments, and agents for ecclesiastical affairs on their temporal side, but had no share in church government, nor any right of session in synods. In England they are lay ecclesiastical officers, elected yearly at Easter, sometimes by the parishioners and minister jointly, sometimes by the minister alone, sometimes by the parishioners alone, by the select vestry, by the lord of the manor, or by the outgoing warden, but most commonly (and always in the case of new parishes) the incumbent chooses one and the parishioners the other. They are appointed for the purpose of protecting the edifice and goods of the church, keeping order in the church during public worship, seating the parishioners, and executing other parochial functions. They are admitted to their office by the Ordinary, usually the bishop of the diocese, and are his officers, as well as representatives of the lay parishioners. But their office in this respect is only one of observation and report, and they cannot interfere directly with the incumbent, if in their mind violating the laws ecclesiastical, but must simply delate the matter to the bishop by presentment at his visitation. They are also usually appointed as trustees of sequestrated benefices. Certain classes are ineligible for election as churchwardens, such as Jews, minors, aliens, and persons convicted of felony, fraud, or perjury; and there are many exempted from serving, though eligible if elected, such as peers, members of parliament, justices, clergymen, Roman Catholic ecclesiastics, dissenting ministers, officers of the army and navy, barristers, solicitors, &c. They are generally two in number, but the office being single, neither can legally act alone. By the Local Government Act, 1894, churchwardens can in rural parishes be overseers of the poor, as they had been since early times.

The closest analogy in the Roman Catholic Church is found in the trustees of the church fabric fund of the parish. These are named *Marguilliers* (Lat. *matricularius*) in France, and are three in number, elected by the other members of the parish council, one of them going out of office yearly. They have the charge of the ordinary expenditure of the church, the superintendence of its minor officials, such as the beadle, &c., and the general conduct of the civil

part of parish business. See CHURCH-RATES, PARISH, VESTRY.

See J. Charles Cox, *Churchwardens' Accounts from the 14th Century to the Close of the 17th Century* (1913).

**Churchyard.** The churchyard in the earliest days of Christianity was often prior in time to the church itself. The Roman law so strictly protected the area within which stood monuments of the dead from violation, and even from the incidence of those acts of ownership to which other lands were subject, that the Christians found it usually feasible to obtain security for their burial-places, which would have been by no means equally extended to their places of religious assembly. For this reason, and also from personal feeling, they were in the habit of assembling for worship at the tombs of martyrs, and it became usual to erect churches close to these. But where the church was prior in point of time, it was not at first usual to bury within the curtilage or precinct of the building, and the cemeteries were entirely apart. A few instances of interment within the churchyard proper appear as early as the 4th century, but it is not till after the 6th that it became a general custom. The first direct evidence of the formal consecration of a burial-ground is in this same era (Greg. Turon., *De Gloria Confessorum*, chap. 6), but the usage most probably dates much earlier, because such dedication was customary in respect of all things and persons set apart for religious purposes. The belief in the efficacy of prayers for the dead had much influence in promoting burial within the precincts of churches, as those attending for worship might be expected to pray for those interred close by; and this reason, adduced by Gregory the Great, was embodied in the Canon Law.

The introduction into England of the custom of burying in churchyards is ascribed to Cuthbert, Archbishop of Canterbury (741-758), and by common law the freehold of the churchyard belongs to the rector of the parish, qualified by the rights of the parishioners, who, in their turn, are bound to repair the fence at their own cost, unless there be a local custom for the owners of adjoining lands to repair so much of the fence as marches with their ground. The trees and grass growing in the churchyard also belong to the rector, but though he may depasture his sheep or cattle there, he is not at liberty to cut down the trees unless to provide timber for repairing the church. Until the enactment of the statute 43 and 44 Vict. chap. 41, no form of burial service except that of the Church of England could legally be used in any churchyard; but under that act notice may be given to the incumbent or officiating minister, by the representatives of any deceased person, that they intend the burial to be either without any religious service at all, or with some 'Christian and orderly religious service' other than that of the Church of England. The widest interpretation is to be put on this definition, so as to include all services used by any society professing to be Christian, but non-Christian rites are specifically excluded from the operation of the statute. Churchyards, even if closed for purposes of burial, cannot (except by parliament) be converted to secular uses, and the freehold continues to vest in the incumbents of the parishes where they are situated. Any person guilty of violent or indecent behaviour in a churchyard, or disturbing any clergyman conducting a burial therein, is liable by 22 and 23 Vict. chap. 32, sect. 2, to a penalty of £5 or two months' imprisonment, and for damage to any monument or fence, under 24 and 25 Vict. chap. 97, sect. 39, to imprisonment not exceeding six months with or without hard labour. See BURIAL, CEMETERY.

**Churchyard Beetle.** See BLAPS.

**Churl.** See CEORL.

**Churns** are machines used for the production of butter from cream or from whole milk. By agitation the fat globules are thrown against each other until, after a period which varies in length with the quality of the butter fat, the temperature, and the condition of 'ripeness' or incipient acidity of the cream, grains of butter are produced. Churns are of great variety in form and dimensions, from the ladies' glass hand churn producing a few ounces of butter at a time, to one driven by water, steam, or horse-power, and churning the whole milk of a dairy at one operation. The *plunge* churn or *thump* churn is one of the oldest and most simple varieties. The common *upright hand* churn seen in country places is perhaps the best-known form of it, but the principle is equally applicable to larger churns. The *box* churn, either oblong or cubical, is stationary like the latter, the action being brought about by 'dashers' or 'works' made to revolve on a horizontal spindle passing through its centre.

*Revolving* churns, taking the shape of a box or barrel, are supported from two points on a rigid framework, so that the whole body of the churn is turned round at the rate of forty to fifty revolutions per minute by a crank handle after the fashion of an ordinary grindstone. Sometimes the motion is a simple rotatory one, as when the barrel is supported from the centre of both ends, giving it the position of a barrel rolling on the ground. It may also be hung from two corresponding points, one on each side, and occupy an upright position while at rest. The action is then called 'end over end.' An eccentric motion is given by hanging the body unevenly. These churns may also contain 'dashers' or 'diaphragms,' which increase the agitation of the cream. A churn without them gives satisfactory results with well-ripened cream, but not with fresh cream or with whole milk. The great advantage of the 'end-over-end' type is the ease with which it can be worked—a matter of first importance where hand labour is employed. Despite the introduction of innumerable later types, the end-over-end form is still found the most generally useful. *Swinging* or 'cradle' churns are in much favour for small dairies, because they are so extremely easily worked, inexpensive, and simple, and because they contain no movable 'dashers,' which demand much care and labour in keeping them sweet and clean. The body, consisting of an elongated box, may be suspended by four chains or thin iron rods, or it may be carried on four flat, flexible iron supports. It is pushed so that it swings backwards and forwards, giving the cream within a course which assumes the form of the figure 8.

Many varieties of high-speed churns have been recently introduced, in which the agitation produced in the cream is enormously increased. With some of these it is possible to obtain butter in three or four minutes—less than a quarter of the time normally required. The advantage of this is obvious, especially when the quantity of cream to be dealt with is small. The butter produced is, however, usually close and greasy in texture, and deficient in the typical 'grain' of good butter. See BUTTER and DAIRY.

**Churrus.** See HEMP.

**Chusan**, the principal island (230 sq. m.) of the Chusan Archipelago, lies about a mile off the east coast of China, opposite Ningpo. Mountainous in the centre, it is generally fertile, and everywhere carefully cultivated. Ting-hai, the capital, a walled town about 3 miles in circumference, is, from its position on the route between Canton and Peking, close to the great ports of Shanghai and Ningpo, a place of both strategic and com-

mercial importance, and its land-locked harbour is a busy shipping centre. Its carved work and silver wares are in repute, and cordage, matting, and fans are exported. It was taken by the British in 1840, and again occupied in 1860. Pop. 30,000 to 40,000.—The most remarkable of the surrounding group is the sacred island of Pu-tu, a mile east of Chnsan, covered with Buddhist temples, pagodas, and monasteries, and inhabited by upwards of a thousand monks. The chief monastery is one of the richest in China.

**Chutney**, an East Indian condiment, made of mangoes, chillies or Capsicum (q.v.), and lime-juice, with other native fruits, such as tamarinds, &c., the flavour being heightened by garlic. It is sometimes made in England of chillies, 1 to 1½ lb.; apples, 1 lb.; red tamarinds, 2 lb.; sugar-candy, 1 lb.; fresh ginger root, 1½ lb.; garlic, ½ to ¾ lb.; sultanias, 1½ lb.; fine salt, 1 lb.; distilled vinegar, 5 bottles.

**Chuvash**, an autonomous republic of the Volga basin, constituted in June 1925. Capital, Cheboksara; pop. 7000.

**Chyle, Chyme.** Food, having been partially digested and absorbed in the stomach, is then passed on into the small intestine. It is of a pulpy consistency, and is termed *chyme*. Both digestion and absorption continue in the small intestine (see DIGESTION). Of the digested chyme a portion finds its way directly into the blood-vessels of the intestine. Nearly all the fat, however, passes into a special system of Lymphatics (q.v.) termed *lacteals*. These lacteal vessels lie in the walls of the intestine, and, during the fasting condition, are filled with a watery-looking fluid called lymph, which exudes from the neighbouring blood-vessels. During absorption, however, the lacteals, in addition, become filled with the absorbed fat which is in a state of minute subdivision. This gives the *chyle*, as it is now termed, a milky appearance. The lacteals convey the chyle into a large vessel, the thoracic duct, which finally conducts it into the large veins at the root of the neck, where it mixes with the blood. One may observe the lacteals on opening the abdomen of an animal killed some few hours after a full meal containing fat. When filled with chyle they resemble white threads branching in the substance of the mesentery—a membrane stretching between the intestine and the back of the abdomen. Microscopically chyle consists of a fluid containing minute fat-globules and a few corpuscles, similar to white blood-corpuscles. Chyle is alkaline in reaction, and coagulates when withdrawn from the body. It may be looked upon as lymph plus the fat which has been absorbed. It contains (1) Proteids, such as serum-albumen, serum-globulin, and fibrinogen. Fibrin is formed during the process of coagulation. (2) Fats—palmitin, stearin, olein, and also cholesterolin and lecithin. (3) Extractives, notably urea and grape-sugar. (4) Salts, especially sodium chloride. See LYMPH, DIGESTION.

**Cialdini, ENRICO**, was born at Castelvetro, Modena, August 10, 1811. Designed for the medical profession, he studied at Parma, but by his share in the abortive insurrection of 1831 was forced to escape to France. He joined the foreign legion raised by Dom Pedro against the Miguelists, but, in 1835 passing over to the Spanish service, he fought against the Carlists, and was made colonel. When Charles Albert headed the Italian rising in 1848, he hurried to Italy; in the struggle which ensued he received a dangerous wound, and fell into the hands of the Austrians. On his release, he was employed by the Sardinian government to reduce the volunteers to discipline, and fought at the head of his new regiment in the brief campaign of 1849. In the Crimea he com-

manded a division of the Sardinian contingent; and on his return was appointed aide-de-camp to the king. He was intrusted by Cavour with the formation of the famous Cacciatori delle Alpi. In the war of 1859 the victory at Palestro was his chief exploit. In 1860 he defeated the Papal army at Castelfidardo; in 1861 Gaeta and Messina yielded to him. Created Duke of Gaeta, and for a few months governor of Naples, he had to act against Garibaldi in the second Sicilian expedition (1862). In 1864 he became a senator; and in the war of 1866 he occupied Venice. In 1876 he was ambassador at Paris, but retired in 1881. He died at Livorno, 8th September 1892.

**Cibber, COLLEY**, actor, manager, and dramatist, was born in London on 6th November 1671. He was the son of Caius Gabriel Cibber (1630–1700), a sculptor of some note, born at Flensburg, whose best-known work is the *basso-relievo* on the pedestal of the London Monument (see his *Life and Work*, by Harold Faber; 1926). Colley Cibber was educated at the free school of Grantham, in Lincolnshire; and in 1690 embraced the profession of an actor, joining the famous company of the Theatre Royal in Drury Lane. At this theatre, on the fortunes of which he exercised so important an influence, he remained, with one or two short intervals, during the whole of his theatrical career of forty-three years. At first he made very slow progress, and it was not till the secession from Drury Lane in 1695 of all the chief actors that Cibber had an opportunity of showing how good a comedian he was. In January 1696 Cibber's first comedy, *Love's Last Shift*, was acted at Drury Lane, the author playing Sir Novelty Fashion. By this production his fame both as dramatist and actor was securely fixed; and he went on increasing in reputation till, after the secession in 1709, he was chosen one of the managing actors of the Haymarket Theatre. In 1710 Cibber and his partners were transferred to Drury Lane, in the direction of which Steele was in 1714 associated with Cibber, Wilks, Booth, and Doggett. Various changes occurred in the *personnel* of the management, which was finally broken up at the retirement of Cibber in 1733. During their management the associated actors wrought a vast improvement in the condition of the stage. Plays became more decent; the dissipated loungers that were accustomed to haunt the side scenes were denied admittance, at the risk, as Cibber relates, of the managers' lives; the pecuniary affairs of the theatre were managed with regularity; and the whole atmosphere of the theatre gained in respectability. As an author Cibber contributed largely to the improvement in decency which followed Jeremy Collier's famous philippic in 1698; and it must always be remembered to his credit, that in his comedies he does not rely for his ludicrous effects on the outraged husband who had almost invariably been the butt of previous dramatists. His greatest work, however, is his *Apology for the Life of Mr Colley Cibber, Comedian* (published in 1740; new ed. by R. W. Lowe, 1888), one of the most interesting autobiographies in our language. On the death of Eusden in 1730, Cibber, who was a devoted partisan of the Protestant succession, was appointed poet-laureate, in which office he wrote odes which were justly the object of universal ridicule. On this account, among others, he was ferociously attacked by Pope, who, in revenge for a damaging retaliatory pamphlet, elevated Cibber to the throne of Dullness in the 1743 edition of *The Dunciad*. The crime of dullness was, however, the last that could be charged to Cibber, who was vain, pert, a loose liver and a loose talker, but not a dullard. Cibber died suddenly on 11th December

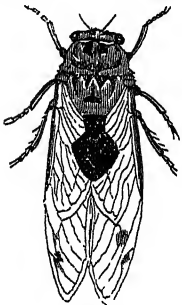
1757. His wife was a Miss Shore, sister of the 'Sergeant-trumpet' of England. After their marriage, about 1693, she went on the stage, but did not attain to any great eminence.—His son, THEOPHILUS CIBBER (1703–58), was a successful actor, a dramatist, and miscellaneous writer. In 1734 he married, and in 1738 was separated from, Susannah Maria Arne (1714–66), a sister of Dr Arne (q.v.). She gained a high reputation in opera and oratorio, and afterwards in tragedy. Handel and Arne wrote several parts for her.

**Cibol.** See ONION.

**Ciborium.** See PYX.

**Cibrario, LUIGI**, an Italian historian and politician, was born at Turin, 23d February 1802. He studied law, entered the service of the state, and soon distinguished himself by his historical investigations. In 1848, when Italy rose against the Austrians, Charles Albert appointed him commissioner at Venice and a senator of Sardinia. In 1839 he published his *Della Economia Politica del Medio Evo*; in 1840, his *Storia della Monarchia di Savoia*; and in 1847, his *Storia di Torino*. In 1852 he was made Minister of Public Instruction, and ultimately, in 1855, Minister of Foreign Affairs. He wrote many other works on history, numismatics, and miscellaneous subjects. He died 1st October 1870. See the Life by Odovici (1873).

**Cicada**, a large genus of hemipterous insects, typical of the sub-order Homoptera, with uniform wings. They are well known for the noise made by the males, and for the 'Manna' (q.v.) or sap which their incisions cause to exude from trees. Specially abundant in warm countries, some eighteen species of cicada occur in the vine-bearing regions of Europe. Some people are so fond of the chirping that they keep the cicadas in little cages. Several large South American species are said to chirp 'loud enough to be heard at the distance of a mile.' The noise is caused by the vibrations of membranes at the openings of two respiratory tubes (tracheæ) on the last joint of the thorax, and the volume of sound is increased by two complex resonating cavities a little farther back. The apparatus is rudimentary in the females; which in this case at least cannot be blamed for noise. The commonest South European species is *Cicada orni*, feeding especially on ash-trees. *C. plebeia* is a somewhat larger form. *C. mannafera* causes abundant 'manna' in Brazil. *C. septemdecim* is the North American 'seventeen years' locust,' or harvest-fly, said to occur in special abundance every seventeen years; though they probably appear in some part of the country every year. The males of the species perform the act of reproduction and soon die, probably taking no nourishment in the perfect state. The females deposit about 500 eggs in the twigs of trees, and die immediately after. The larvæ drop and bore their way into the ground, where they are supposed to remain for seventeen years, sucking the juices of the roots of trees and plants. There is also a thirteen years' variety or brood. When the pupæ emerge, the ground sometimes seems honeycombed by their numbers. The larvæ are devoured in great quantities by birds, frogs, and swine. The damage done by the larvæ in their long underground career is nothing as compared with that inflicted on the foliage by the perfect insect (female) during its short life. See Bulletin



Cicada.

No. 8 (1885) of the United States Department of Agriculture. *C. hæmatodes*, a small species, is recorded from the New Forest in Hampshire. The family to which the cicadas belong is often known as that of the *stridulant* insects, and includes about five hundred species. An even larger closely allied family is that of the Cicadellidæ, including the common Froth-fly (q.v.). The name Cicada has sometimes been applied to another hemipterous insect, a common bug named *Halticus pallicornis* or *C. aptera* of Linnæus. It need hardly be said that the cicadas are not crickets, or locusts, or grasshoppers. See LOCUST.

**Cicatrization** (Lat. *cicatrix*, 'a scar'), the process of healing or skinning over of an ulcer or broken surface in the skin or in a mucous membrane, by which a fibrous material of a dense resisting character, covered by a protecting layer of epithelium, is substituted for the lost texture. The new tissue in such a case is called the cicatrix, and usually resembles to a considerable extent the structure which it replaces; it is, however, less elastic, and from its shrinking in volume may produce an appearance of puckering. This shrinking sometimes leads to serious results, especially after extensive Burns (q.v.). The glands and other special structures of the original tissue are wanting in the cicatrix, which, however, performs perfectly well, in most instances, the office of protection to the parts below the surface. See INFLAMMATION and ULCERS.

**Cicely** (*Myrrhis*). See under CHERVIL.

**Cicer.** See CHICK PEA.

**Cicero, MARCUS TULLIUS**, 106–43 B.C., the foremost orator of ancient Rome, one of her leading statesmen, and the most brilliant and accomplished of her men of letters, lived in those stirring later days of the Roman republic, that age of revolution and civil wars, in which an old and decaying order of things was passing away. It was the age of great and daring spirits, of Catiline, Cæsar, Pompey, Antony, with whose history Cicero's life is closely intertwined. Born 106 B.C. at an old Italian town, Arpinum in Latium, of a good family, and inheriting from his father, who was a man of considerable culture, a moderate estate, he went as a boy to Rome, and there, under the best teachers and professors, he learned law and oratory, Greek philosophy, and Greek literature, acquiring in fact the universal knowledge which he himself says in his essay 'on the orator' (*De Oratore*) an orator ought to possess. An orator in the ancient world, we should bear in mind, was first and chiefly a pleader of causes, causes both legal and political—a speaker alike, as we should say, at the bar and in parliament. Hence the necessity for knowledge and information of every kind. Cicero's first important speech, in his twenty-sixth year, was the successful defence in a criminal trial of a client against one of the favourites of the all-powerful Sulla, then dictator. After a visit to Athens, and a tour in Asia Minor, where he profited by the society of eminent professors of rhetoric and men of letters, he returned to Rome, and at thirty years of age he was in the highest repute at the Roman bar.

In 76 B.C., having been elected quæstor (a financial secretary, as we may say) by a unanimous popular vote, he held an appointment in Sicily, where he won the good opinion of two highly important interests, apt at times to conflict, the traders and the revenue collectors. To this he owed the glory of his successful impeachment of the infamous Verres in 70 B.C., which he undertook at the request of the Sicilian provincials. The bad man who had so hideously misgoverned them felt himself crushed by Cicero's opening speech, and went into

voluntary exile. Cicero was now a power in the state, and his rise up the official ladder was sure and rapid: in 66 B.C. he was prætor, and supported in a great political speech (*Pro Lege Manilia*) the appointment of Pompey to the conduct of the war with Mithridates, which in fact carried with it the supreme control of Asia and of the East. In 63 B.C., at the age of forty-four, he was consul, the highest dignity attainable to a Roman; in that memorable year he foiled, by a bold promptitude, the revolutionary plot of Catiline, in which many distinguished Romans—Cæsar, it was even said, among them—were implicated. He was now at the height of his fame; 'father of his country' he was actually called; for a brief space he was with all classes the great man of the day. But the tide soon turned; Cicero might have saved the country, but in saving it, it was said, he had violated the constitution, according to which a Roman citizen could not be capitally punished but by the sentence of the people in regular assembly. As it was, Roman citizens guilty of complicity with Catiline had, at Cicero's instigation, been put to death simply by an order of the senate; this, it was said, was a dangerous precedent, and Cicero must be held responsible for it. His bitter enemy, Clodius, now tribune, pressed the charge against him in inflammatory speeches specially addressed to the lowest class of citizens, and Cicero in despair left Rome in 58 B.C., and took refuge at Thessalonica. That same year saw 'the father of his country' condemned to exile by a vote of the Roman people, and his house at Rome and his country houses at Formiæ and Tusculum plundered and ruined.

But in those revolutionary days the events of one year were reversed by those of the next; in 57 B.C., with new consuls and new tribunes, the people almost unanimously voted the recall of the exile, and Cicero was welcomed back to Rome amid an outburst of popular enthusiasm. But he was no longer a power in the world of politics; he could not see his way clearly; and he was so nervously sensitive to the fluctuations of public opinion that he could not decide between Pompey and the aristocracy on one hand, and Cæsar and the new democracy on the other. His leanings had hitherto been towards Pompey and the senate and the old republic; but as time went on he felt that Pompey was a half-hearted man, who could not be trusted, and that he would have ultimately to succumb to his far abler and more far-sighted rival, Cæsar. The result was that he lost the esteem of both parties, and came to be regarded as a mere trimmer and time-server. There was all that political indecision about him which may be often observed in eminent lawyers and men of letters. The age wanted strong men such as Cæsar; this Cicero certainly was not. He was gentle, amiable, very clever, and highly cultivated, but the last man in the world to succeed in politics.

The later years of his life were spent chiefly in pleading at the bar and in writing essays. In 52 B.C. he composed one of his finest speeches in defence of Milo, who had killed Clodius in a riot, and was then standing for the consulship; in this he was acting quite against the wishes of Pompey. In the following year (51–50 B.C.) he was in Asia, as governor of the province of Cilicia, and here the best side of his character showed itself in his just and sympathetic treatment of the provincials. In 49–48 B.C. he was with Pompey's army in Greece to fight for the old cause, of which, however, he was well-nigh despairing, and after the decisive battle of Pharsalia, at which he was not present, he threw himself on the conqueror's mercy. Cæsar, who had certainly nothing to fear from him, received him kindly, and was a great friend to him from that day: but Cicero was not a happy man now that

he could no longer make speeches in the senate or in the courts; to all this Cæsar's victory had for the time at least put an end. In the years 46, 45, and 44 B.C. he wrote most of his chief works on rhetoric and philosophy, living in retirement and brooding mournfully over his griefs and disappointments. In 43 B.C., the year after Cæsar's death, he had once again the delight of having his eloquence applauded by the senate. In that year his famous speeches against Antony—Philippics, as he called them after the title of Demosthenes' orations against Philip of Macedon—were delivered. These cost him his life. As soon as Antony, Octavius (afterwards the emperor Augustus), and Lepidus had leagued themselves together in the so-called triumvirate for the settlement of the state, they followed the precedent of former revolutions and published a proscription-list of their political enemies. All such were outlawed and given up to destruction. Cicero's name was in the fatal list. Old and feeble, he fled to his villa at Formiæ, pursued by the soldiers of Antony, and was overtaken by them as he was being carried in a litter down to the shore, where it had been his intention to embark. With a calm courage, which (to quote Macaulay's words) 'has half redeemed his fame,' he put his head out of the litter and bade the murderers strike. He died in the December of 43 B.C., in the sixty-third year of his age.

As an orator and a pleader Cicero undoubtedly stands in the first rank. Many of his speeches have come down to us. Of these the most famous and perhaps the finest are his speeches against Verres and against Catiline. Eloquence in those days of furious faction and revolution was a greater force than it is with us. As a politician he failed because he did not distinctly realise to himself that the old republic, the government of the senate and of the nobles, had been tried and had been found wanting. He had not the courage to face the great changes which he felt were impending. Pompey, the champion of the old order, was not a leader to whom he could look up with confidence. And so he wavered, and half acquiesced in Cæsar's triumph, even though he suspected that with that triumph the Rome which he had known and loved would pass away. To us it is as an essayist and as the writer of a multitude of letters to friends, full of miscellaneous information, that Cicero is particularly attractive; there is a gracefulness and refinement and elevation of tone about his writings which cannot fail to incline the reader to say with Erasmus, 'I feel a better man for reading Cicero.' His essays on 'old age,' and 'on friendship,' his *De Officiis* or 'whole duty of man,' are good and pleasant reading such as we can all enjoy; and his more abstruse writings on philosophy, his Tusculan disputations, his treatises on the 'nature of the gods,' and on the 'true ends of human life' (*De Finibus*), if they do not show any very original thought, at least give us an insight into the teachings of the ancient philosophical schools.

See the works ed. Baiter and Kayser (1869); the Epistles ed. Tyrrell and Purser; Merquet's Cicero lexicon (Jena, 1877–94); works by Middleton (1741), Forsyth (1864), Jeans (1880), Trollope (1880), Lucas Collins (1871), Teuffel (1889), Weissenfels (1892), Strachan-Davidson (1903), Gaston Boissier (trans. 1897), Sihler (1914), Pettersson (1920).

**Cicero'ne** (from Cicero, 'the orator' or 'speaker'), a name given by the Italians to the guides who show travellers the antiquities of the country. Cicero'nes are to be found of all degrees of knowledge or respectability, from distinguished local archæologists to the humble *laquais de place*, who, though quite indispensable on a first arrival, is too often both incompetent and dishonest.

**Cicho'rium.** See CHICORY and ENDIVE.

**Cicindela**, a genus of beetles in the section Pentamera, and type of a family with some 300 species. They are very active, and occur abundantly on sandy places. *C. campestris* is a common British species of a green colour.

**Cicisbeo**, a professed gallant who waits with fantastic devotion upon a married lady. In the higher ranks of Italian society it was at one time considered unfashionable for the husband to associate with his wife anywhere except in his own house; and in society, or at public places of amusement, the wife was accompanied by her cicisbeo. Cicisbeo is synonymous with *cavaliere servente*.

**Cicu'ta**. See HEMLOCK.

**Cidaris**, a genus of Sea-urchins (q.v.), and type of a family (Cidaridae) with very long spines. The most of the members of the family are fossil forms, but over a score of living species are known. *Dorocidaris papillata* is occasionally dredged to the north of Scotland, and its beautifully marked spines in some instances measure over six inches in length, being often twice as long as the cross diameter of the shell. It is sometimes popularly called the *Piper* from a fanciful resemblance to bagpipes.

**Cid Campeador**, the name, or rather names, by which the most renowned Spanish warrior of the 11th century is best known. By his Moorish vassals he was called 'Sid-i' ('my lord'), which the Spaniards translated by Mio Cid, and a victory in his youth over a Navarrese champion in single combat gave him the title of Campeador. His real name was Rodrigo, or Ruy, Diaz (i.e. 'son of Diego'). He was a Castilian noble by birth, seventh in descent from Nuño Rasura, who was also ancestor of the royal line of Castile. He was born either at Burgos or at Bivar near it, about the year 1040. From 1065 to 1072 he was nominally alférez, or 'ancient,' but virtually commander of the forces to Sancho II. of Castile in the wars in which that king wrested the kingdoms of León and Galicia from his brothers. In 1072 Sancho was treacherously slain at the siege of Zamora, and as he left no heir the Castilians had to acknowledge Alfonso, the banished king of León. As a conciliatory measure Alfonso gave his cousin Ximena, daughter of the count of Oviedo, to the Cid in marriage, but afterwards, in 1081, when he found himself firmly seated on the throne, yielding to his own feelings of resentment, and incited by the Leonese nobles, he banished him from the kingdom. According to tradition he never forgave the Cid for having, as leader of the Castilians, compelled him to swear that he had no hand in the murder of his brother Sancho, but there is no need to look for any cause beyond the hereditary animosity between the Castilians and the Leonese, now intensified in the latter by recent defeat and humiliation, for which they held the Cid responsible. At the head of a large body of followers the Cid betook himself to Mocradír of the Beni Hud, the so-called king of Saragossa, to whom, and to his son and grandson, he rendered important services against their enemies the king of Aragon and the count of Barcelona. In conjunction with Mostain, grandson of Mocradír, he invaded Valencia in 1088, but afterwards carried on operations on his own account, and finally, after a long siege, made himself master of the city in June 1094. The Almoravides then in possession of south and central Spain, twice sent large armies against him, but were each time routed with great loss. For five years he reigned like an independent sovereign over the fairest and richest territory in the Peninsula, but in July 1099 he died suddenly, of grief, the Arabic annals say, at the news that some of his men had been defeated. His widow held out for two years longer, and then retired, carrying with

her the embalmed body of the Cid, which for ten years sat enthroned beside the high altar at San Pedro de Cardena, near Burgos.

The Cid's career cannot be better summed up than in the words of a contemporary and an enemy, Ibn Bassam of Seville, who wrote only ten years after his death, and could cite the testimony of one who knew him and was an eye-witness of his deeds in Valencia. Of the Cid—whom he calls 'a Galician dog, one Roderic, surnamed the Canbitur, the scourge of the country'—he says: 'It was the Beni Hud who raised him out of obscurity, and they delivered over to him diverse provinces of the Peninsula, so that he overran the plains like a conqueror, and planted his banner in the fairest cities. His power grew very great, nor was there any district that he did not ravage. Nevertheless this man, the scourge of his time, was, in his love of glory, strength of character, and heroic courage, one of the marvels of the Lord. Victory always followed his banner—God's curse be on him.' The character of the Cid was, however, a somewhat complex one. There can be no doubt of his cruelty, rapacity, and duplicity, for the statements of the Moorish authorities are substantially confirmed by the Spanish, the *Cronicas*, the *Gesta Roderici Campidocti*, and even the *Poema* itself. But it may be said for him that to strike terror was one of the necessities of his position, outnumbered as he was by a hundred to one; and had he not made plunder his prime object the army he led would soon have melted away. Unscrupulous *condottiere* as he was, fighting for paymaster or plunder, he was nevertheless a staunch patriot at heart. Ibn Bassam had it from one who heard him that he said: 'This peninsula was conquered under one Roderic, but another Roderic shall deliver it.' He was an imperfect hero; but he was a born leader of men, and it was only natural that a career like his should take a strong hold of the popular imagination, and in an age when minstrelsy flourished become a favourite theme with the jongleurs and trovadores. These, when facts began to run short, met the demand by drawing upon their invention, and treated the Cid precisely as they treated Charlemagne. As they invented the journey to Jerusalem, the expedition to Galicia, the Bridge of Mantible, and the Emir Balan for Charlemagne, so they devised an invasion of France for the Cid, made him defy the emperor Henry, beard the pope, cut off the head of the count of Gormaz and marry his daughter; and to allow time for all, they put back his birth twenty years, and even extended the life of his charger Baviaca to sixty. They also married his daughters to the Infantes of Carrion, princes of the blood-royal of León. Historically, the Cid's daughters were married, one to a count of Barcelona, the other to a prince of Navarre, a union by which his blood passed into the royal line of Castile, and thence into the Bourbon, Hapsburg, and our own royal families. Alfonso X. adopted all the amplifications of the minstrels in the *Cronica General*, from which they found their way almost unquestioned into the history of Spain; and their inconsistencies and absurdities have in some instances led uncritical and somewhat indolent historians like Masdeu and Dr Dunham to treat the whole story of the Cid as a fable, and himself as no better than a creature of popular fancy.

Of the Cid literature it is impossible to give more than a summary here. By far the most important in every way of the works belonging to it is the *Poem*, written undoubtedly in the last half of the 12th century, and probably the oldest document in the Spanish language. It is more properly an epic than a chanson de geste, and unquestionably the most Homeric piece of medieval poetry in existence.

There are editions by Pidal; by Vollmöller, with introduction and notes; by Damas Hinard, with a French prose translation; and by A. M. Huntington, with translation and notes (Hisp. Soc. of Am. 1907-8). It has been translated into German by O. L. B. Wolff, and into English with introduction and notes by John Ormsby. The translated fragments by J. H. Freie do little justice to the dignity, sense, and spirit of the old Spanish poem. The *Cronica Ramada*, a very inferior work of a much later date, deals mainly with the apocryphal invasion of France. The prose *Cronica del Cid* (Burgos, 1512) is merely that part of the *Cronica General* which refers to the Cid, with some additions and corrections. Southey's admirable *Chronicle of the Cid* is a composite work made up of portions of the *Cronica* and of the Poem, skilfully interwoven so as to give the story of the Cid as the old storytellers told it. Risco's *Castilla* (1792) contains, besides a life of the Cid, the original Latin text of his marriage-settlement, dated 1074, the Santiago Genealogy, and the *Gesta Roderici Campidocti*; both written before 1238. Of more modern works the most notable are Malo de Molina's *Rodrigo el Campeador* (1857), Professor Dozy's *Le Cid d'après des nouveaux Documents* (1860), and H. Butler Clarke's *The Cid Campeador* (1897). The Cid ballads, so numerous in the old cancioneros and romanceros, were collected and printed in a romancero by themselves by Escobar in 1612. The fullest and best *Romancero del Cid* is that of Carolina Michaelis (1872), which contains no less than 205 ballads. Only a few, however, of the Cid ballads are of high excellence, or to be regarded as specimens of genuine traditional popular poetry. The greater number are comparatively modern, many are merely portions of the Chronicles put into verse, and not a few are artificial ballad imitations of the 16th and 17th centuries.

**Cider**, or **CYDER**, is the fermented juice of apples, and is extensively prepared in Devonshire, Herefordshire, Gloucestershire, and other parts of England, and in northern France and southern Germany, and elsewhere. The apples commonly used for making cider are by no means tempting to the palate, are in fact unfit either for eating raw or ordinary cooking. Three kinds may be used—viz. the bitter, the sweet, and the sour; but the first are generally preferred, and are specially cultivated in the cider orchards. These bitter apples contain a considerable amount of sugar, but it is masked to the palate by the extractive matter also present. Late apples afford much better cider than early ones. The apples after gathering are left for some days to mellow or mature. This has the further advantage of showing the unsound apples, which are rejected, as giving the whole an incurably musty flavour. By some authorities it is considered that a certain proportion of decaying fruit improves the flavour; probably they act by hastening or modifying the fermentation. The apples are crushed by passing them between fluted rollers, or in mills of various kinds. Some improved cider-mills grind the fruit to a perfectly homogeneous pulp. These mills give an increase in quantity, with a falling-off in quality of the product. The pulp thus obtained is placed in tubs or vats with or without a little water, and left for about a day. During this time fermentation commences and assists in breaking up the cells of the pulp. Or the pulp is more completely broken up at once. The pulp is next placed in coarse canvas or haircloth bags, or on a wicker-work or perforated frame for the juice to drain into a tub or vat. This juice is reserved for the best quality of cider. The remaining juice is removed by squeezing the bags and their contents in a press. The old process of laying up the pulp or pomace in

straw for pressure gives a good quality of juice. The greater the pressure the coarser the flavour, due to that of the pips and skins, but of course the quantity is increased by additional pressure.

The next process is the full fermentation. This is usually effected in casks with large bung-holes. The casks being filled with juice, much of it froths over during fermentation, and therefore the casks are placed over open tubs which catch it. Care is necessary to keep the casks full, so that the excess of yeast may thus be continually removed, such excess promoting acetic fermentation. This is continued from three to eight or ten days according to the alcoholic strength required. It is then racked off from the sediment into clean casks and stored in a cellar or other place with cool and equable temperature. In the following spring this racked cider is re-racked, and is then ready for use or sale.

A weaker cider, used as a common beverage for farm labourers, is made by adding about half its weight of water to the marc or pressed pulp and fermenting this as above. The refuse pulp or 'apple cheese' is used as food for pigs and cattle.

Cider contains from 4 to 10 per cent. of absolute alcohol—i.e. 8 to 20 per cent. of proof spirit, according to quality. This depends upon the quantity of sugar originally in the juice, and upon the care in fermentation, especially in respect to temperature, which should be about 50° F. This is too commonly neglected, and the fermentation left to the accidents of weather. Much acetic acid is thus formed when the autumn is warm, rendering the cider rough. Sweet cider is that in which only a small proportion of the sugar has been converted by fermentation into alcohol or acetic acid. The best cider is mellow and vinous, neither sweet nor acid. The bottling of cider demands much care. Only clear samples are fit for bottling, and they should be at least twelve months old and free from hardness or acidity. Good mellow or slightly sweet cider carefully bottled before fermentation is fully completed constitutes champagne cider, and is used as a basis of factitious champagne.

**Cienfuegos**, a port of Cuba, on the south coast, on the Bahía de Jagua, 140 miles ESE. of Havana, with which, as with all the north-west of the island, it has railway communication. The exports are chiefly sugar, molasses, rum, and wax. Pop. 96,000.

**Cieszyn**, the Polish name of Teschen (q.v.).

**Cieza**, a town of Spain, 26 miles NW. of Murcia; pop. 15,000.

**Cigars and Cigarettes**. See TOBACCO.

**Cigar-tree**. See CATALPA.

**Cigoli** (properly LUDOVICO CARDI), a painter of the later Florentine school, was born at Cigoli, near Florence, in 1559. His models were Andrea del Sarto and Correggio; but he has his own style, marked by expression and fine colour. He was invited by Clement VII. to Rome, where he died in 1613. Cigoli was also held in high estimation as an architect.

**Cilia** (Lat., 'eyelashes'), hair-like lashes borne by cells. They are mobile modifications of the living matter of the cell, and exhibit alternate bending and straightening. Their occurrence is very wide—e.g. on the active stages of many unicellular plants; in great perfection on the ciliated Infusorians; on the free-swimming embryos of sponges, Coelenterates, worms, echinoderms, and molluscs; on the outer surface of many lower animals such as simple worms; on the lining of the alimentary cavity, and in most of the tubular organs of Invertebrates; and more restrictedly, though not less markedly, in some regions (such as trachea) of higher forms. They are absent throughout the Arthropods (with one possible exception), a fact

probably to be associated with the predominance of Chitin (q.v.). In many cases, normal, pathological, and artificial cilia may sink down into less motile amœboid processes. A single lash with an undulating movement is distinguished as a *flagellum*; and Ray Lankester emphasises the useful distinction between a flagellum such as that of a bacterium, or the tail of a spermatozoon, which acts 'like a tadpole's tail' and drives the cell before it, and the motive process of a flagellate Infusorian which carries the cell behind it. See CELL.

**Cilicia**, an ancient division of Asia Minor, now included in the Turkish province of Adana, which lay between the Taurus range and the Cilician Sea, while the Amanus range separated it from Syria. The eastern portion of Cilicia was fertile in grain, wine, &c.; the western and more mountainous portion furnished inexhaustible supplies of timber to the ancients. The pass called by the Turks Golek Boghaz (anciently *Pylæ Ciliciæ*) is that by which Alexander the Great entered Cilicia. In early ages Cilicia was ruled by its own kings, the people, who were probably akin to Syrians and Phœnicians, being notorious pirates. The country fell successively under Persian, Macedonian, and Syrian rule, and was made a Roman province by Pompey in 67 B.C. See ASIA MINOR.

**Cimabue**, GIOVANNI, the first of the restorers of the art of painting in Italy, which had fallen into neglect during the barbarism of the dark ages, was born at Florence in 1240. At this time the fine arts were practised in Italy chiefly by Byzantines, though there were such native artists as Guido di Siena and Giunto di Pisa; and painting had degenerated into a worn-out mechanical conventionalism. Cimabue at first adopted traditional forms, but he soon turned to nature, painting a St Francis from the living model, 'a new thing in these times,' as Vasari tells us, infusing life and individuality into the worn-out types of his predecessors, and leading the way to the naturalism of the works of his great successor Giotto (q.v.). In the stiff forms of his draperies he made little progress upon former practice, but he softened his outlines, improved his flesh-tints, and gave projection and a sense of rotundity to his forms. Two remarkable pictures of the Madonna in Florence have been attributed to Cimabue—one in the Academy; the other, displaying a more purely original genius, in the church of Santa Maria Novella. It was said that this latter work in the time of Cimabue was admired as a miracle of art, and was carried to the church in a sort of triumphal procession. It is the first great production of the Florentine school which culminated in Michelangelo, Raphael, and Leonardo. Cimabue executed several important frescoes in the south transept of the lower church of San Francesco at Assisi, and in the north transept of the upper church there; and during his later years he was appointed *capo maestro* of the mosaics of the Duomo of Pisa, his works in this method ranking as the finest of the period. His mosaic of Christ in glory in the apse was probably his last work; and his easel-picture of a Madonna and Child in the Louvre was executed for San Francesco at Pisa. He died about 1302.

**Cimarosa**, DOMENICO, an Italian composer of operas, was born either at Aversa, 17th December 1749, or more probably at Naples in 1755. He was educated at Naples, in music under Sacchini, in the conservatory of Santa Maria di Loreto. His first pieces were the *Sacrificio di Abramo* and the *Olympiade*. When barely twenty-two he had achieved a reputation in all the leading Italian theatres. He was then called to St Petersburg as composer to the Empress Catharine II., where he resided four years. Afterwards he lived at various

German courts; thence he proceeded to Vienna, where he became imperial *kapellmeister*; and finally he returned to Italy. At Naples, his comic opera, *Il Matrimonio Segreto*, composed at Vienna, 1791, was repeated seventy times in succession. Cimarosa died at Venice, 11th January 1801. His comic operas are remarkable for their novelty, spirit, whimsicality, and liveliness of idea, as well as for their great knowledge of stage-effect.

**Cimbri**, or KIMBRI, a people who issued from the north of Germany in conjunction with the Teutones, and first came into hostile contact with the Romans in the province of Noricum (Cainthia and Carniola) in 113 B.C. They were victorious in several great engagements, and were only prevented from devastating Italy by a terrible defeat they suffered from Marius on the Raudii Campi, near Verona, or, according to others, near Vercelli, in August 101 B.C. They fought with desperate courage, and when the battle was lost, their women killed themselves and their children. It is not till long afterwards, when the Romans themselves penetrated into Germany, that the name of the Cimbri again appears. Cæsar represents the Aduatici of Belgium as the descendants of the Cimbri and Teutones. Tacitus speaks of a people bearing the name of Cimbri, few in number, but of great reputation, that sent ambassadors to Augustus. This people lived in the extreme north of Germany, on the borders of the ocean; according to Pliny and Ptolemy, at the extremity of the peninsula called from them the Cimbric Chersonese, now Jutland. The ethnology of the Cimbri is doubtful. Greek writers associated them groundlessly with the Cimærians; Sallust calls them Gauls; Cæsar, Tacitus, Plutarch, and most moderns look upon them as Germans. Some, however, have maintained that they were Celtic, and have tried to fortify their argument by a desperate analogy with the name *Cymry*.

**Cimex**. See BUG.

**Cimmerians**, or CIMMERII, in Homer, a legendary people dwelling 'beyond the ocean stream, where the sun never shines, and perpetual darkness reigns.' The name was also applied to a fabulous people who dwelt in caves between Bactæ and Cumæ. Hence the common phrase, 'Cimmerian darkness.' The historic Cimmerii were a people whose country lay between the Borysthenes (Dnieper) and the Tanais (Don), including also the Tauric Chersonesus (Crimea). The Cimmerian Bosphorus (Strait of Yenikale) derived its name from them. Being driven out by the Scythians, they migrated to Asia Minor, dwelt there for some time, plundered Sardis, failed in an attempt upon Miletus, and were finally routed and expelled by the Lydian king Alyattes, some time after 617 B.C.

**Cimolite**, is akin to Fullers' Earth (q.v.).

**Cimon**, an Athenian commander, was the son of the great Miltiades, the conqueror at Marathon. Being unable to pay the fine of 50 talents from which his father escaped by dying, he was kept in prison until the fine was paid by the wealthy Callias who had married his sister. Young Cimon enjoyed the patronage of Aristides, and soon distinguished himself in the patriotic struggle against the Persians. In conjunction with Aristides he was placed over the Athenian contingent to the allied fleet, which, under the supreme command of the Spartan Pausanias, continued the war against the Persians (477 B.C.). He effected the important conquest of Eion, a town on the river Strymon, then garrisoned by the Persians. His greatest exploit was his encounter with a Persian fleet of 350 ships at the river Eurymedon (466), when he destroyed or captured 300, and defeated the land-

forces on the same day. He succeeded likewise in driving the Persians from Thrace, Caria, and Lycia; and expended much of the money which he had obtained by the recovery of his patrimony in Thrace upon the improvement of the city of Athens. The lavish bounty with which he opened his gardens and the honours of his table, together with his cheerful temper and patience, endeared him to his fellow-citizens. At this period he appears to have been the most influential of the Athenians. The hereditary enemy of Persia, it was his policy to advocate a close alliance with Sparta; and when the Helots revolted, he twice led an army to the support of the Spartan troops; but on the latter occasion, having lost the confidence of his allies, he was ignominiously dismissed. After his return to Athens his policy was opposed by the democracy, headed by Pericles, who procured his banishment by ostracism. He was recalled in the fifth year of his exile, and was instrumental in obtaining a five years' armistice between the Spartans and the Athenians. He died in the year 449 B.C., at the siege of a Cyprian town.

**Cincho'na** (properly CHINCHONA), a most important genus of trees of the order Rubiaceæ (sub-order Cinchonaceæ), yielding the bark so much valued in medicine, which has been variously known as Peruvian Bark, Jesuits' Bark, China Bark, Quina, Quinquina, Cinchona Bark, &c., and from which the important alkaloids quinine and its congeners are obtained. The species of this genus are sometimes trees of great magnitude; but an aftergrowth springing from their roots when they have been felled, they often appear only as large shrubs; and some of them in the highest mountain-regions in which they are found are low trees with stems only 8 or 10 feet in height. They are natives of South America between 20° S. lat. and 10° N. lat., and chiefly on the eastern slope of the Cordilleras. The best cinchona formerly came from the province of Loxa in Ecuador. The range of altitude of course diminishes as we recede from the equator, but may be averaged at from 8000 to 5000 feet for the best varieties. The climate of these regions is extremely variable, and this seems to have more effect upon the trees and their product than differences in soil. All the cinchonas are evergreen trees, with laurel-like, entire, opposite leaves; stipules which soon fall off; and panicles of flowers, which, in general appearance, are not unlike those of lilac or privet. The flowers are white, rose-coloured, or purplish, and very fragrant.

Such difficulty has been found in determining the species of cinchona and the different varieties of bark known in commerce that a voluminous special literature of 'quinology' has been called into existence. This difficulty is due partly to the large number and great variability of the species, and even of individual specimens of bark, as also to the difficulty of obtaining specimens of flowers and leaves along with particular kinds of bark. The most important species are *C. officinalis* of Ecuador and Peru, *C. Calisaya* of Bolivia and south-east Peru, and *C. succirubra* of the western slope of Chimborazo; but others (Carthagena Bark, Columbian Bark, &c.) are also of importance, while the varieties are too numerous to mention. The barks of allied species which, although more or less bitter and even febrifugal, contain no quinine are apt to be used as substitutes or adulterations.

The cutting and peeling of cinchona-trees is a laborious and difficult operation carried on by Indians during the dry season. They build a hut, which serves both for their abode and for drying the bark. The trees are felled as near the root as possible, that none of the bark may be lost; and the bark being stripped off, is carefully

dried and packed; the quilled form of the thinner bark is acquired in drying.

This wasteful and costly mode of collection from almost impassable forests, in which, moreover, the



*Cinchona lancifolia*.

tree was becoming exterminated, and this in face of an increasing demand, gradually roused the attention of European botanists to the desirability of inaugurating a regular culture in similar regions and climates of the Old World; but the successful introduction of cinchona-seeds into Europe was only effected by Weddell in 1848, and his seedlings were sent from the Jardin des Plantes to Algiers in 1850, and to Java in 1852. The Dutch government also imported a few living plants from Peru in 1854. The credit of really solving the difficult problem of acclimatisation is, however, due to Sir Clements R. Markham. Himself going to Peru and Bolivia for *C. Calisaya*, he secured the services of Spruce, a well-known collector then resident in Ecuador (who was similarly successful in obtaining *C. succirubra*), and others. The expedition was attended by much difficulty, and its narrative has earned a place in the history of botanical travel. Plantations were formed in the Neigherry Hills, and thence spread to Sikkim, to Burma, and to Ceylon. Ceylon and Java grew such quantities that the price dropped from 12s. to 1s. an ounce; but in consequence of attention given in Java to the improvement of the bark, the cultivation died out in Ceylon, and by 1900 two-thirds of the world's supply came from Java.

The Indians of Peru call the cinchona-trees *Kina*, from whence are derived the names *Quina*, *China*, &c. But there is no evidence that they knew the use of the bark before the arrival of the Spaniards, nor will they even yet employ it in their native medicine. It was first imported into Europe in 1639, by the Countess of Chinchón, the wife of the viceroy of Peru, who had been cured of an obstinate intermittent fever by means of it, and who thereafter habitually distributed it to those suffering from fever. Upon this account it was named *C. Bark* and *Countess's Powder* (*Pulvis comitissæ*). The Jesuit missionaries afterwards carried it to Rome, and distributed it through their several stations, and thus it acquired the name of *Jesuits' Bark* and *Pulvis patrum*. Cardinal Juan de Lugo having been particularly active in recommending and distributing it, it was also known as *Cardinal de Lugo's Powder*. It attained great celebrity in Spain and Italy, being at first distributed to the poor, but later sold at high prices by

the Jesuits, by whom it was lauded as an infallible remedy, while by most of the orthodox physicians it was coldly received, and by the Protestants altogether repudiated. Falling thus into practical disuse in Europe, it was again brought into notice by Robert Talbot or Talbot, an English apothecary, who acquired great celebrity through the cure of intermittents by its use. In 1678 he was appointed physician in ordinary and knighted by Charles II., whom he next year cured of a tertian fever. In 1679 he similarly cured the Dauphin and other eminent personages on the Continent, and thus induced Louis XIV. to purchase his secret. The adoption of the drug was henceforth assured, despite the exceeding jealousy of the profession in England and France of both the success and fortune of the irregular practitioner, who did not, however, live much longer to enjoy his reward. The Parisian faculty of medicine held out bravely, a corroboration, if any were needed, of Molière's account of them, but the example and authority of Morton and Sydenham at length gained respectability to the side of science. As it came into general use, it became a most important article of export from Peru; and in order to the maintenance of a commercial monopoly, although no attention was ever paid to its culture, extraordinary methods were employed to prevent it from becoming known at a comparatively recent period of Spanish rule in America. The discovery of the alkaloids on which its properties chiefly depend constitutes a new era in the history of this medicine, and did not take place till the beginning of the 19th century.

An account of these alkaloids—which include quinine, cinchonine, and cinchonidine—and their physiological and therapeutical action will be found in the article QUININE (q.v.); see also ALKALOIDS. On various aspects of the subject—the botany, cultivation, preparation, and medicinal action of the plant—see Markham, *Peruvian Bark* (1880); King, *Cinchona Cultivation in India* (1876); Van Gorkhom, *Cinchona Culture* (1882); Kuntze, *Cinchona* (Leip 1878); Mueller, *Extra-tropical Plants* (Melbourne, 1895); Lambert, *The Genus Cinchona* (1897); Reimer's *Les Quinquinas de Culture* (1900).

**Cincinnati**, the second city of Ohio and sixteenth in the American Union, stands on the north bank of the river Ohio, 270 miles SE. of Chicago, 765 miles from New York, opposite the cities of Covington and Newport in Kentucky, and the smaller towns of Dayton, Bellevue, and Ludlow. Steam-ferries and lofty bridges connect the city with the Kentucky shore. Cincinnati occupies an exceedingly broken and irregular site, the more densely built parts being inclosed between the river and steep hills. This lower portion includes the principal business streets, for the most part wide and well finished; but the lowest level is devoted largely to warehouses and manufacturing establishments, and at high stages of water is sometimes liable to be flooded. A second terrace is 50 or 60 feet higher, and is densely occupied. A district between the hills and the Miami Canal is known as 'over the Rhine,' and is appropriated to the large German colony. But the most interesting portions of the city are the suburbs, which are singularly beautiful. They are built on a succession of irregular hills, by whose steepness the beautiful suburban district has been broken into a succession of comparatively isolated villages, interspersed with parks (including Eden Park, of 216 acres), and approached at various points by noble winding avenues, which have been developed into a system. The principal way of access, however, is by inclined steam-railways and tramways, or, in one instance, by wagon and passenger elevators. This suburban region, and in fact a considerable part of the southwestern angle of the state, is of that geological epoch in which the highly characteristic rocks of

the so-called 'Cincinnati group' were deposited. They are richly fossiliferous, and are the highest beds of what are known as the Lower Silurian rocks, corresponding nearly with the Upper Cambrian beds of British geologists. There are more than twenty-five such suburbs; Clifton and Walnut Hills, the latter looking out over Kentucky, are especially striking, and Spring Grove has a fine cemetery of some 600 acres.

The city has an area of 72 sq. m., is well built and well drained, and the water-supply from the Ohio is ample. Among the principal public buildings are the post-office, an imposing structure; a massive and very admirable Chamber of Commerce; a large art museum; an art school, and a college of music (1878), of high repute; a music-hall, with noted organ; masonic and Oddfellows' temples; a commodious city building; and a court-house. There are more than 300 churches, several of them large and architecturally noteworthy, including a Roman Catholic cathedral; besides many handsome theatres, hotels, and public halls. The city has several ample hospitals and infirmaries (public and private), a large asylum for the insane, and many other institutions for charity and correction. There are public and private schools of every grade, among them several high schools, a normal school, a school of design, and a technical school. The numerous professional schools include schools of medicine, of law, and of divinity, one of which (Lane Theological Seminary, Presbyterian) has a wide reputation. Cincinnati University is free in certain departments to citizens of Cincinnati, and to it the Cincinnati Observatory and Astronomical School are affiliated. Of several important libraries, one (the Free Public Library) has some 600,000 books and pamphlets. There is a Zoological Garden; and the Historical and Philosophical Society, the Cincinnati Museum Association, and other societies have considerable collections. Finally, Cincinnati is well known as a centre of musical and art culture, and its decorative pottery and wood-carving have a national reputation.

Besides its large river traffic, the city transacts a great amount of business by rail. A large number of railways converge to this place, and it is a receiving and distributing centre of great importance. The Miami and Erie Canal (1827), extending northward from Cincinnati (246 miles) to Toledo, is also the channel of a considerable trade. A very large proportion of Cincinnati's staples of trade are manufactured in the city, or its near vicinity. The industrial establishments are many and varied, the principal manufactures being soap, clothing, iron and steel, machinery, boots and shoes and other leather goods, furniture, tobacco and cigars—not to speak of slaughtering and pork-packing. Wagons and carriages, steamboats and barges, are built. The city has a clearing-house, a board of trade, a chamber of commerce and merchant's exchange, and other similar organisations. The condition of the labouring classes is in general very good. There are many building associations, which greatly facilitate the ownership of houses by working-men. The book-trade is represented by several first-class and a number of minor publishing-houses. The slaughter-houses, stock-yards, and grain-elevators are very extensive.

Cincinnati was first settled by white men in 1780, and was permanently occupied in 1788. Its name was given in honour of the Society of the Cincinnati. It is believed that a portion of its site was occupied before the historic period by a considerable aboriginal population. Mounds containing various relics appear to confirm this opinion. It was incorporated as a city in 1819, and from its prosperity and attractiveness, it early attained the name of 'the queen city of the west.' The sobri-

quet of 'Porkopolis' commemorates its immense trade in pork and other hog products, it being one of the great centres of this business. The first steamboat reached Cincinnati in 1811, descending the river from Pittsburgh; and the first railway from the city was opened in 1845. Its first Roman Catholic bishop was consecrated in 1822, and the see became archiepiscopal and metropolitan in 1850. In the same year the lower part of the city suffered much from a great flood. Cincinnati very early became prominent for its social culture, and for a long time it was almost the literary capital or headquarters of the whole region west of the Alleghanies. A taste for the fine arts and for music was likewise noticeable at an early date, and is still characteristic of the town. Great riots in 1844 were with difficulty suppressed by the military. Pop. (1800) 750; (1850) 115,436; (1870) 216,239; (1890) 296,908; (1900) 325,902; (1910) 364,463; (1920) 401,247. See the history by Greve (1904).

**Cincinnati**, a society or order in the United States of North America, established by the officers of the revolutionary army in 1783 'to perpetuate their friendship, and to raise a fund for relieving the widows and orphans of those who had fallen during the war.' 'The Cincinnatiates' were regarded with suspicion by Jefferson and many of the leaders of the democracy as aristocratic in tendency; now most of the original thirteen states have state societies of Cincinnati.

**Cincinna'tus**, LUCIUS QUINCTIUS, a favourite hero of the Roman republic, was in 458 B.C. called from ploughing to be dictator. Having rescued the consul Minucius, defeated by the Æqui, he laid down his dictatorship and returned to his farm. In 439, at the age of eighty, he was once more made dictator to deal with the plebeians.

**Cineas**, a Thessalian, the friend, minister, and ambassador of Pyrrhus (q.v.), was the most eloquent man of his time (died 270 B.C.).

**Cinematograph**. See KINEMATOGRAPH.

**Cineraria**, a large and widely distributed genus of annual or perennial herbaceous composites, very closely allied to Senecio (Groundsel, Ragwort, &c.), of which it is indeed often reckoned a subgenus. Two small species are natives of the southern parts of Britain. The flowers of some are very pretty. *C. maritima*, from the Mediterranean shores, is a handsome garden perennial, and many Cinerarias are also grown in green-houses in Britain; these, however, are mostly florists' flowers, produced by cultivation and hybridising. The most important parent plant of these is *C. cruenta*, a native of Tenerife.

**Cinery Urns**. See URNS.  
**Cingalese**. See CEYLON.

**Cinna**, LUCIUS CORNELIUS, a Roman patrician,

one of the principal supporters of Marius. Sulla, before setting out on his expedition against Mithridates, allowed Cinna to be elected to the consulship on condition of his swearing not to disturb the constitution as then existing. No sooner, however, had he entered upon that office (87 B.C.) than he impeached Sulla, endeavoured to form an interest among the citizens who had been added after the Social War, and agitated for the recall of Marius (q.v.). Cinna and Marius next declared themselves consuls after a massacre in which some of the most eminent citizens were slain. In 84 B.C. Cinna prepared to meet Sulla, then on his way from the East to take vengeance upon his enemies, but was slain by his disaffected troops at Brundisium. During his fourth consulate his daughter Cornelia had been married to Julius Cæsar.

**Cinnabar**, a mercuric sulphide, from which almost all the mercury of commerce is obtained, whether in Spain, India, California, or elsewhere. It occurs both crystalline and massive, and the powder of it is the pigment vermilion.

**Cinnamon** is the aromatic bark of certain species of the genus *Cinnamomum*, in the natural order Lauraceæ, natives of tropical and subtropical parts of the East. The finest kind is produced by *Cinnamomum Zeylanicum* or the Ceylon cinnamon-tree. The tree naturally attains the height of 20-30 feet, and is sometimes 1½ foot in thickness, but the cultivated trees are not allowed to grow higher than 10 feet. Its bark is of a grayish-brown colour, internally of a yellowish red. The leaves are oval, 4-6 inches long, with a blunt point, and marked with three principal nerves. They have the taste of cloves. The flowers are of a silky gray on the outside, and a pale-yellowish colour internally. The fruit is somewhat like an acorn in shape; it is a small drupe, brown when ripe. The branches of 3-5 years' growth are cut down, the bark ripped up longitudinally with a knife, and gradually loosened till it can be taken off. The slices are then exposed to the sun, when, as it dries, it curls up into quills, in which shape it is exported. The smell, particularly of the thinnest pieces, is delightfully fragrant, and the taste pungent and aromatic, with a mixture of sweetness and astringency. Its virtues depend chiefly upon the essential oil which it contains, oil of cinnamon. Cinnamic acid is the acid corresponding to the oil of cinnamon, and exists in the free state in the balsams of Tolu and Peru, in liquid storax, and in gum benzoin. The Ceylon species is now cultivated on the Malabar coast, in Java, the West Indies, Brazil, and Egypt. For 'Chinese cinnamon,' see CASSIA; and for another *Cinnamomum*, see CAMPHOR.



Cinnamon  
(*Cinnamomum Zeylanicum*).

**Cinnamon-stone**, a variety of Garnet (q.v.), varying from hyacinth red to orange yellow; when pure it is transparent. It is composed

essentially of silica, alumina, and lime. It is found chiefly in Ceylon.

**Cinnyris.** See SUN-BIRDS.

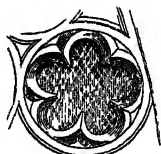
**Cinq-Mars,** HENRI COIFFIER DE RUZÉ, MARQUIS DE, an ill-fated favourite of Louis XIII., was the second son of the Marquis d'Effiat, Marshal of France, and was born in 1620. While yet a boy he was placed at court by Cardinal Richelieu, and here his handsome figure and fascinating manners soon secured him the warm affection of the royal household. At nineteen he was chief-equerry to the king, but his ambition could not brook the delay of waiting for the further stages of the most rapid promotion, but already in his dreams he was a duke and peer of France, and husband of the Princess Maria of Gonzaga. Finding his ambitious projects merely derided by Richelieu, he joined with the king's brother, Duke Gaston of Orleans, in a plot to murder the great cardinal. With this was combined a wider plot with Spain for the destruction of the cardinal's power by arms. The conspiracy was discovered, and Cinq-Mars, with his friend De Thou, was executed at Lyons, 12th September 1642. His story was woven by De Vigny into the well-known romance *Cinq-Mars* (1826).

**Cinqué Cento** (Ital., 'five hundred'; but really a contraction for 'one thousand five hundred') is a current term for the style alike in art and in literature which arose in Italy about or before the year 1500, and which therefore belongs mainly to the 16th century. It is characterised by the revival of classical taste in all departments of culture, and is frequently used in the same sense as the word *renaissance*, especially as applied to decoration. Among the great *cinquecentisti* in art are Michelangelo, Raphael, Correggio, Titian, Leonardo da Vinci, and Benvenuto Cellini; in poetry the notable names are those of Berni, Ariosto, and Tasso. See ITALY, ITALIAN ARCHITECTURE, RENAISSANCE.

**Cinquefoil,** a common bearing in Heraldry, representing a flower with five petals borne full-faced and without a stalk. If pierced—i.e. perforated in the centre, it should be so blazoned.



Cinquefoil :  
in Heraldry.



Cinquefoil :  
in Architecture.

Gules, a cinquefoil pierced ermine, was the coat of the old earls of Leicester; and gules, three cinquefoils argent (sometimes ermine), that of the house of Hamilton in Scotland.—Cinquefoil, in Architecture, is an ornamental foliation in five compartments, used in the tracery of windows, panellings, and the like. The cinquefoil is often represented in a circular form, the spaces between points or cusps representing the five leaves, as in the accompanying illustration.

**Cinquefoil,** in Botany. See POTENTILLA.

**Cinque Ports.** The five great ports on the coast of Kent and Sussex lying opposite to France—Sandwich, Dover, Hythe, Romney, and Hastings—were of considerable importance during the Anglo-Saxon period; and in a charter of Edward I. we find reference to a previous document granted them by Edward the Confessor. But it was subsequent to the battle of Hastings that the Conqueror, in order that he might wield the resources

of the seaports with greater vigour, constituted this whole line of coast into a jurisdiction entirely separate from the counties of Kent and Sussex, and erected it into a sort of county palatine, under a warden or guardian, the seat of whose administration was in Dover Castle. The warden, whose office corresponded to that of the ancient Count of the Saxon coast (*Comes littoris Saxonici*), exercised jurisdiction, civil, military, and naval, uniting in his single person the functions of sheiff, *custos rotulorum*, lord-lieutenant, and admiral. Privileges equal to those originally bestowed on the Cinque Ports were subsequently extended to the so-called *ancient towns* of Winchelsea and Rye; and all the seven municipal towns except Winchelsea had subordinate ports and towns attached to them, which were called *limbs* or *members*. In place of the Saxon terms of *aldermen* and *freemen*, those of *jurats* and *barons* were introduced, and the latter term has always been applied to the representatives of the Cinque Ports in parliament. Their chief function in early times was to furnish such shipping as was required for the purposes of the state, the crown having possessed no permanent navy previous to the reign of Henry VII. In the time of Edward I. they were bound to provide no less than fifty-seven ships, fully equipped and manned at their own cost; though the weight of this heavy burden was somewhat lessened by the provision that the period of gratuitous service should be limited to fifteen days. The ports, moreover, enjoyed in return for their services many privileges, such as exemption from tax and tallage, the right to make their own bylaws, &c. In consequence of the wallike navy which they were thus compelled to maintain, the Cinque Ports became so confident and audacious as not only to undertake piratical expeditions, but even to make war and form confederacies as independent states. Previous to the Revolution of 1688, the lord-wardens nominated one and sometimes both of the parliamentary representatives for each of the Cinque Ports; but in 1689 an act was passed to 'declare the right and freedom of election of members to serve in parliament for the Cinque Ports.' The Acts of 1832 and 1885 reduced the number of members sent to parliament by the Cinque Ports from sixteen to three, and the Municipal Reform Act has broken up the ancient organisation of the ports, and assimilated their internal arrangements to those of other English municipalities. The ancient courts of Shepway, Brotherhood, and Guestling are still occasionally held, but their powers scarcely extend beyond matters of form. The lord-warden's jurisdiction, in relation to civil suits and proceedings, was abolished in 1835; but he still presides in the court of Shepway, and appoints the justices of peace within the jurisdiction of the Cinque Ports. His official residence is Walmer Castle (q.v.), near Deal, where, as warden, the Duke of Wellington lived every autumn from 1829 till his death there (1852). See Montagu Burrows, *Cinque Ports* (1888); F. M. Hueffer, *The Cinque Ports* (1900).

**Cintra,** a small but picturesquely situated town in Portugal, in the province of Estremadura, 17 miles WNW. of Lisbon, with a population of 6000. It stands on the declivity of the Serra de Cintra, and is surrounded by country residences. There is a palace at Cintra, a strange mixture of Moorish and Christian architecture, anciently occupied by the Moorish kings, and subsequently a favourite summer-resort of the Christian monarchs. On another hill-top stands the palace of La Penha, once a convent. In the neighbourhood is the Cork Convent, which derives its name from the cells—which are cut out of the rock—having been lined with cork. Montserrat palace has a magnificent park. Cintra is historically remarkable for the

*Convention* concluded in August 1808, between the English and French, by which the latter agreed to evacuate Portugal, on condition of not being treated as prisoners of war, but landed on the coast of France, retaining their arms and effects. This convention excited the greatest public indignation both in the Peninsula and in England; and the British ministry were obliged to have the generals who signed the convention tried by a court-martial, which, however, resulted in their acquittal. According to Oman, the military advantages of the Convention outweighed its grave political defects.

**Ciotat**, LA, a coast-town in the French department of Bouches-du-Rhône, 23 miles SE. of Marseilles by rail. It has a good and commodious harbour, and a great coral-fishery. Pop. 11,000.

**Cipher**. See CRYPTOGRAPHY and MONOGRAM.

**Cipriani**, GIAMBATTISTA, history-painter and designer, was born at Florence in 1727, of an old Pistoja family. He received some instruction from Hugford, a Florentine painter of English parentage, and he studied for three years in Rome. In 1755 he was induced by Sir William Chambers and Wilton the sculptor to settle in London, where his graceful drawings, which were reproduced by the graver of Bartolozzi, gained great popularity, and exercised a favourable influence upon the English school of figure-painters. He was a member of the St Martin's Lane Academy, and in 1768 was elected a foundation member of the Royal Academy, to whose exhibitions he contributed till 1779, and whose diploma he designed in 1768. His pictures, of which some are preserved at Houghton, are less successful than his designs, being feeble, poor in colour, and with little expression. As an etcher he is known by a few plates in Hollis's *Memoirs*. He married in 1761 an English lady of fortune, and died at Hammersmith, 14th December 1785.

**Circæa**, a small and unimportant but widely distributed genus of rather pretty little Onagraceous herbs. *C. lutetiana*, frequent in shady situations, bears the book-names of Enchanter's Nightshade, and in Germany Hexenkraut (Witches' Herb). The origin of these names is not easily explained, as the plant possesses no remarkable properties, being merely a little astingent.

**Circars**, THE NORTHERN (*Sarkâr*, 'a government'), is the historical name for an Indian territory lying along the coast of the Bay of Bengal, from 18 to 100 miles wide, with an area of 17,000 miles. It nearly corresponds with the present Madras districts of Ganjam, Vizagapatam, Godavari, Kistna, Guntur, and parts of Nellore and Karnûl. In 1757 the Circars were ceded to the French by the subahdar of the Deccan; but after a struggle, in which Lord Clive had the chief part, the Delhi court in 1766 granted the Circars to the East India Company; but not till 1823 did they become really a British possession.

**Circassia**, a territory on both sides of the western Caucasus. See CAUCASUS.

**Circassians**, in the wide sense of the term, is the name given to all the formerly independent tribes of the Caucasus; in a narrower sense, it denotes the tribes (called by themselves *Adighê*, by the Turks and Russians, *Tcherkesses*) who inhabited the north-western wing of the Caucasus, with a government half patriarchal and feudal, and half constitutional. In 1858-65, rather than submit to Russian government, nearly the whole nation of fifteen tribes, to the number of nearly half a million persons, left their country for the Turkish possessions in Asia Minor, or the mountainous parts of Bulgaria, carrying with them their in-

subordinate spirit and marauding habits, which added to the horror of the Bulgarian massacres of 1876 and 1877.

The Circassian nobles are principally Moham-medans, whilst the great mass of the people profess a corrupt Christianity, which shows strange survivals of earlier heathenism in its sacrifices and sacred trees, joined to the celebration of Easter, the sign of the cross, and processions with lights. The Circassians are proverbially handsome—for generations their daughters have adorned the harems of the wealthy Turks; they are also strong, active, brave, and temperate. As a nation they made their first historical appearance during the middle ages. They are, however, chiefly known through their long struggles to maintain their independence against the domination of Russia. See article CAUCASUS, and Ernest Chantier's magnificent work, *Recherches anthropologiques dans le Caucase* (5 vols. folio, Paris-Lyons, 1885-87). The first volume contains an exhaustive bibliography; the fifth, a detailed account of the peoples of the Caucasus. See also Deniker, *Les Races de l'Europe*.

**Circe**, a sorceress of ancient Greek story, described in the *Odyssey* as 'fair-haired, a clever goddess, possessing human speech,' sister of 'all-wise Æetes,' daughter of 'the Sun, who gives light to mortals, and of Perse, whom Ocean begot as his daughter.' Round her palace in Ææa were numbers of human beings, whom she had changed into the shapes of wolves and lions by her drugs and incantations. She changed two-and-twenty of the companions of Ulysses into swine; but that hero, having obtained from Mercury the herb *Moly*, went boldly to the palace of the sorceress, remained uninjured by her drugs, and induced her to disenchant his comrades. He remained with her for a year; and when he departed, she instructed him how to avoid the dangers which he would encounter on his homeward voyage. Ovid relates how, when she was jealous of Scylla, whose love was sought by Glaucus, she poured the juice of poisonous herbs into that part of the sea where her rival was accustomed to bathe, and so changed her into a hideous monster.

**Circle**, a plane figure bounded by a curved line called its *circumference*, which is everywhere equally distant from a point within it called the *centre*. The circumference is sometimes itself called the circle, but in geometry that term is properly applied only to the surface or area bounded by the curve. Any line drawn through the centre, and terminated by the circumference is a *diameter*, which is therefore bisected in the centre (see ARC, CHORD). In Co-ordinate Geometry, the circle ranks as a curve of the second order, and belongs to the class of the conic sections. It is got from the right cone by cutting the cone by a plane perpendicular to its axis. The circle may be described mechanically with a pair of compasses, fixing one foot in the centre, and tracing out the curve with the other held at a fixed distance. The following are some of its leading properties:

1. Of all plane figures having the same perimeter, the circle contains the greatest area.
2. Of all plane curves, the circle alone has the same curvature at every point.
3. The circumference of a circle bears a certain constant ratio to its diameter. This constant ratio, which mathematicians usually denote by the Greek letter  $\pi$  (perimeter), has been determined to be 3.14159, nearly, so that, if the diameter of a circle is 1 foot, its circumference is 3.14159 feet; if the diameter is 5 feet, the circumference is  $5 \times 3.14159$ ; and, in general, if the diameter is expressed by  $2r$  (twice the radius),

then  $c$  (circumference)  $= 2r \times \pi$ . Archimedes, in his book *De Dimensione Circuli*, showed that the ratio is nearly that of 7 to 22. Various closer approximations in large numbers were afterwards made, as, for instance, the ratio of 1815 to 5702, 1010 to 3173; or the excellent one of Adriaen Anthonisz—viz. 113 to 355. Vieta in 1579 showed that if the diameter be 1000, the circumference will be greater than 3141.5926535, and less than 3141.5926537. This approximation he made by ascertaining the perimeters of the inscribed and circumscribed polygons of 393,216 sides. By increasing the number of the sides of the polygons, their perimeters are brought more and more nearly into coincidence with the circumference of the circle; but this operose method was long ago superseded by easier modes derived from the higher mathematics. Suffice it to say that various series were formed expressing its value; by taking more and more of the terms of which into account, a closer and closer approach to the value can be obtained by ordinary arithmetic. We subjoin some examples:

$$(1) \pi = 4 \left( 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \frac{1}{13} - \frac{1}{15} + \dots \right).$$

$$(2) \pi = 8 \left( \frac{1}{1.3} + \frac{1}{3.5} - \frac{1}{3.5.7} + \frac{1}{5.7.9} - \frac{1}{7.9.11} + \&c. \right).$$

$$(3) \pi = 16 \left( n - \frac{n^3}{3} + \frac{n^5}{5} - \frac{n^7}{7} + \dots \right) - 4 \left( m - \frac{m^3}{3} + \dots \right)$$

where  $n = \frac{1}{5}$  and  $m = \frac{1}{239}$ .

$$(4) \pi^2 = 6 \left( \frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots \right)$$

$$= 8 \left( \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \frac{1}{7^2} + \dots \right).$$

Series (3), or one of its modifications, is the most expeditious mode yet known of extending the approximation to the ratio  $\pi$ . It has now been calculated to 707 places of decimals, and verified to over 600. The number  $\pi$ , though fixed in value, cannot be exactly expressed in figures, being *incommensurable* (see COMMENSURABLE). Finally, the multiplier  $(3 - .008 - .000,007) (1 + \frac{1}{2\pi})$  gives a close approximation, useful to the practical arithmetician.

4. The area of a circle is equal to  $\pi$  multiplied by the square of the radius ( $= \pi r^2$ ); or to the square of the diameter multiplied by  $\frac{\pi}{4}$ ; i.e. by .7854. Archimedes proved this by showing that the area is equal to that of a triangle whose base is the circumference, and perpendicular height the radius of the circle.

5. It follows that different circles are to one another as the squares of their radii or diameters, and that their circumferences are as the radii or diameters.

The circle is almost always employed in measuring or comparing angles, from the fact demonstrated in Euclid (Book vi. Prop. 33), that angles at the centre of a circle are proportional to the arcs on which they stand. It follows from this, that if circles of the same radii be described from the vertices of angles as centres, the arcs intercepted between the sides of the angles are always proportional to the angles. The easiest subdivision of a circumference is into six equal parts, because then the chord of the arcs is equal to the radius. Divide one of these arcs into sixty equal parts, and we thus obtain the unit of the *sexagesimal scale*, called a *degree*. Each degree is divided into 60 *seconds*, and each second into 60 *thirds*, and so on. According to this scale, 90° represents a right angle; 180°, two right angles,

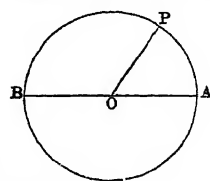
or a semicircle; and 360°, four right angles, or the whole circumference—the unit in the scale being the  $\frac{1}{360}$ th of a right angle. As the divisions of the angles at the centre, effected by drawing lines from the centre to the different points of graduation of the circumference, are obviously independent of the magnitude of the radius, and therefore of the circumference, these divisions of the circumference of the circle may be spoken of as being actually divisions of angles. By laying a graduated circle over an angle, and noticing the number of degrees, &c. lying on the circumference between the lines including the angle, we at once know the magnitude of the angle. Suppose the lines to include between them 3 degrees, 45 minutes, 17 seconds, the angle in this scale would be written 3° 45' 17".

The sexagesimal measurement of circumferences and angles is the most ancient, and still recommends itself universally to practical mathematicians. A second mode was proposed at the French Revolution, but though adopted by Laplace in the *Mécanique Céleste*, has long been abandoned even in France. By this scale, called the *centesimal*, the right angle is divided into 100 degrees, while each degree is divided into one hundred parts, and so on. Such a quantity as 3° 45' 17" is expressed in this notation by 3.4517, the only mark required being the decimal point to separate the degrees from the parts. Of course, in this illustration, 3° means 3 centesimal divisions of the right angle, and 45' means 45 centesimal minutes, and so on. If we want to translate ordinary degrees into the centesimal notation, we must multiply by 100, and divide by 90. To translate minutes in the same way, multiply by 100, and divide by 54; and for seconds, multiply by 250, and divide by 81.

There is also a theoretical method of measuring angles, which, though indispensable in advanced trigonometry and other branches of analysis, is scarcely required in elementary mathematics. For the *circular measure*, as it is called, the unit angle is thus found: Let POA be an angle at the centre O of a circle, the radius of which is  $r$ ; APB a semicircle whose arc accordingly  $= \pi r$ ; and let the length of the arc AP  $= a$ . Then, by Euclid,

$$\frac{\text{angle POA}}{2 \text{ right angles}} = \frac{a}{\pi r}; \text{ and } \angle \text{POA} = \frac{2 \text{ right angles}}{3.14159, \&c.} \cdot \frac{a}{r}.$$

Now, supposing  $a$  and  $r$  to be given, although the angle POA will be determined, yet its numerical value will not be settled unless we make some convention as to what angle we shall call unity. We therefore choose such a one as will render the preceding equation the most simple. It is made



most simple if we take  $\frac{2 \text{ right angles}}{3.14159..} = 1$ . We

shall then have (denoting the numerical value of the angle POA by  $\theta$ )  $\theta = \frac{a}{r}$ . The result of our con-

vention is, that the numerical value of two right angles is  $\pi$ , instead of 180°, as in the method of angular measurement first alluded to; and the unit of angle, instead of being the ninetieth part of a right angle, is  $\frac{2 \text{ right angles}}{3.14159..}$ , or 57° 17' 44" 48"

nearly. Making  $\theta = 1$  in the equation  $\theta = \frac{a}{r}$ , we have  $a$  (or AP)  $= r$  (or AO), which shows that in the circular measure the unit of angle is that angle which is subtended by an arc of length equal to

radius. Thus the circular measure of  $180^\circ$  is  $\pi$ , or 3.14159, &c.,  $90^\circ = \frac{1}{2}\pi$ ,  $60^\circ = \frac{1}{3}\pi$ ,  $45^\circ = \frac{1}{4}\pi$ , and so on; and since  $\pi$  is a fixed number, any angle is thus represented *absolutely*, and not as a part or multiple of another angle—i.e. an abstract number will as exactly denote an angle as it does the length of a line. If we say  $\theta = 3$ , then in degrees  $\theta = 3 \times (57^\circ 17' 45'')$ ; if  $\phi = \frac{1}{3}$ , then  $\phi = \frac{1}{3} \times (57^\circ 17' 45'')$  sexagesimally. For the squaring or quadrature of the circle, see QUADRATURE; for the circles of the sphere, see ARMILLARY SPHERE; see also MURAL CIRCLE.

**Circle, MAGIC**, a space in which sorcerers were wont to protect themselves from the fury of the evil spirits they had raised. This circle was usually formed on a piece of ground about nine feet square (in the East seven feet appears to have been considered sufficient), in the midst of some dark forest, churchyard, vault, or other lonely and dismal spot. It was described at midnight in certain conditions of the moon and weather. Inside the outer circle was another somewhat less, in the centre of which the sorcerer had his seat. The spaces between the circles, as well as between the parallel lines which inclosed the larger one, were filled 'with all the holy names of God,' and a variety of other characters supposed to be potent against the powers of evil. Without the protection of this circle, the magician, it was believed, would have been carried off by the spirits, as he would have been had he by chance got out of the charmed space. Another figure which, described upon the ground, could bar the passage of a demon was the *pentagram* (see PENTACLE). Readers of *Faust* will remember its effect upon Mephistopheles.

**Circles, STONE.** See STONE CIRCLES, STANDING STONES, STONEHENGE, CALLERNISH.

**Circuits.** See ASSIZE.

**Circular Notes** are bank-notes specially adapted for the use of travellers in foreign countries; and being, in fact, bills personal to the bearer, they are believed to be more safe as travelling money than ordinary notes or coin. Circular notes of the value of £10 and upwards are furnished by or through the chief banking-houses. Along with these notes is given a 'letter of indication.' This letter (a lithographed form in French) is addressed to foreign bankers, requesting them to pay the notes presented by the bearer, whom they name, and to aid him in any way in their power. On the back of the letter there is a long list of foreign bankers, extending all over Europe, any of whom will cash one of the circular notes on being presented and indorsed by the bearer. In paying these notes the money of the country is given according to the rate of exchange, and free of any charge for commission. For security, the letter and the notes should not be carried together, in case of their being stolen or lost. A corresponding certificate issued by the bankers in the United States for the use of travellers, is called Letter of Credit. See CREDIT.

**Circular Numbers** are numbers whose powers end on the same figure as they do themselves: such are numbers ending in 0, 1, 5, 6.

**Circulating Library.** See LIBRARY.

**Circulation**, in Anatomy and Physiology, is the term used to designate the course of the blood from the heart to the most minute blood-vessels (the Capillaries, q.v.), and from these back to the heart. To simplify the consideration of the subject, we shall consider—(I.) the General Anatomy, (II.) the Comparative Anatomy, (III.) the Physiology, and (IV.) the History.

I. The organs of circulation consist of the heart, arteries, veins, and capillaries. The course of the blood through these organs will be best elucidated

by the aid of a diagram, which is equally applicable for all other mammals as well as for man, and for birds. The dark parts

of fig. 1 represent the course of the impure or venous blood, while the lighter portions represent the course of the pure or arterial blood. Two of the four chambers of the heart (A and C) receive the inflowing blood, and are termed the *auricles*; while the other two chambers (B and D) drive the blood to the lungs and to the general system respectively, and are termed the *ventricles*. The vessels that bring blood to the auricles are termed *veins*, and the vessels through which the blood is driven from the ventricles are known as Arteries (q.v.). We will now trace the course of the blood, as indicated by the arrows of the diagram, commencing with the right auricle, A. The right auricle contracting upon the venous or impure blood with which we suppose it to be filled, drives this into the right ventricle, B, through an opening guarded by a triple (or tricuspid) valve, which almost entirely prevents the regurgitation of the blood from the ventricle into the auricle. The ventricle, B, being now filled, contracts, and as the blood cannot return into the auricle, it is driven along the dark vessel, c, which is the pulmonary artery, conveying the blood to the lungs. At its commencement it is guarded by crescent-shaped (semilunar) valves, which entirely prevent the blood which has once been propelled into the pulmonary artery from re-entering the ventricle. The pulmonary artery gradually divides into smaller and smaller branches, which ultimately emerge into capillaries freely distributed over the interior of the air-cells of the lungs. There the blood gives off carbonic acid gas, and absorbs oxygen, becoming thereby 'pure.' The capillaries, in which the blood is purified, gradually unite to form larger vessels, and finally the blood is collected into the pulmonary veins, which pour their contents into the left auricle, C. Thence it is propelled into the left ventricle, D, through an opening guarded by a double (mitral or bicuspid) valve, which entirely prevents the reflux of the blood. The left ventricle contracts and drives its contents into the large artery, e, or Aorta (q.v.), which by means of its various branches supplies the whole body with pure blood. From the aorta and its various subdividing branches the blood passes into the capillaries, J, H, which occur in every part of the system. In these capillaries it parts with its oxygen to the tissues, and becomes charged with the waste carbonic acid gas. The capillaries unite into larger veins, and these gradually unite to form two large trunks, a, b, the superior and inferior *venae cavae*, which pour their contents into the right auricle—the point from which we started. The diagram also shows how the venous blood from the viscera, G, instead of passing directly into the

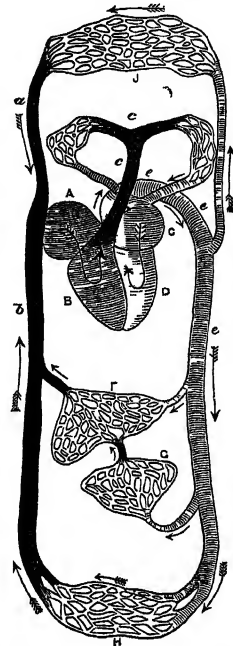


Fig. 1.—Diagram of Circulating System (from Leunis).

vena cava, goes through the liver, F, in what is known as the hepatic-portal system.

Before passing to the comparative study of the circulation, we must notice a few of the above

facts in greater detail.

The Heart (q.v.) is described in a separate article. Since all the arterial blood leaves the heart through the aorta, to trace the circulation of the pure blood involves following the branches of that great vessel. For this see AORTA. It is sufficient, without further anatomical details, to say that the ramifications of the arteries distribute the arterial blood to the Capillaries (q.v.) which pervade every part of the body. It is already evident that the pulmonary arteries from the right ventricle carry impure blood to the lungs, and that pure blood returns from the lungs to the left auricle by the pulmonary veins.

The veins, like the arteries, are found in nearly every tissue; they commence in minute networks

which communicate with the capillaries. Branches from these networks uniting together, form veins, which, by joining, increase in size as they pass onward towards the heart. If we except certain venous structures (called *sinuses*) occurring in the interior of the skull, we may divide the veins into two sets—the *superficial* or *cutaneous*, and the *deep* veins. The deep veins accompany the arteries, and are usually inclosed in the same sheath of tissue. In the case of the smaller arteries they generally exist in pairs, one on each side of the artery, while the larger arteries have usually only one accompanying vein. The superficial veins occur immediately beneath the integument; they not only return the blood from the skin and adjacent structures, but communicate with the deep veins. All the veins finally lead by two large trunks, the *superior* and *inferior vena cava*, into the right auricle of the heart. The superior vena cava is formed by the union of the veins from the head and neck (the jugulars) with those from the arms (the subclavians), while the inferior vena cava brings back the blood from the lower extremities, the trunk, and the viscera.

We must refer to the article VEIN for the structure of the walls of this part of the circulatory system. There is only one point that imperatively requires notice here—viz. that while the arterial system presents no valves except at the points where the two great trunks leave the heart, the veins contain a great number of valves, which are formed by a doubling of their lining membrane, and resemble pocket-like folds or pouches, which allow the blood free passage toward the heart, but prevent its reflux. The veins are much less elastic than the arteries, and their total capacity is much greater.

There is one part of the venous circulation which, from its great importance, requires special notice

—viz. that of the spleen, pancreas, stomach, and intestinal canal. The blood supplied to these organs by the coeliac and the two mesenteric arteries is not returned directly to the inferior vena cava, but passes by several veins into one large vessel—the portal vein, which enters the liver, and breaks up into a capillary network. There the blood undergoes important changes associated with the bile-secreting and glycogen-forming functions of the liver. The blood, entering the liver from two sources, from the portal vein and from the hepatic artery, leaves it by the hepatic veins, which join the inferior vena cava. It is also important to notice the entirely distinct set of vessels known as lymphatics, which conduct the products of digestion into the veins (see LYMPH).

The above-described double circulation (through the lungs and through the body) is exhibited by the blood from the time of birth during the whole period of life. The circulation of the blood, however, begins before birth—indeed, at a very early period of intra-uterine or fetal existence; and the circumstance that before birth the lungs do not act as organs of respiration induces a very important modification in the course of the blood in fetal life which will be described under FŒTUS.

II. *Comparative.*—The circulatory system in man, as above described, may serve as type of the highest development, differing but slightly from that of other mammals, or that of birds. It is convenient now to begin at the other end, and to note briefly the salient steps of progress in the gradual evolution of the system throughout the animal series. In the unicellular animals the movement of the protoplasm and the special activity of 'contractile vacuoles,' represent, to some extent at least, a circulatory function before the appearance of any system. The canals which so completely irrigate a sponge, likewise illustrate in low expression a circulatory system not yet separated off from the others. In Coelenterates, too, the system is still unseparated: 'gastro-vascular' prolongations of the alimentary cavity penetrate the body, as may be very well seen in the disc of a common jelly-fish. In the lower worm-types also, where no distinct body-cavity is yet developed, the nutritive fluid simply diffuses through the body, and no vascular system is differentiated. But in higher worms there is generally a body-cavity, and with it the gradual appearance of a definite vascular system. In some we simply find a fluid moving in the body-cavity, occasionally clear, usually with corpuscles; in others, portions of the body-cavity are separated off as blood-spaces, or eventually as blood-vessels; these may remain in connection with the general cavity, or may at length form a closed system. The manifold worm-types afford abundant illustration of all the stages in this differentiation. In the bristle-footed worms (Chaetopods, q.v.), and in some others, the perfecting of the blood-driving mechanism may be instructively traced. Often a dorsal vessel is diffusely contractile, less frequently the ventral; or there may be contractile connecting loops between dorsal and ventral vessels, as in the earthworm; or, lastly, a special region in the dorsal vessel may become the main seat of the vascular contractility. Such a *dorsal* heart is found from this point onwards throughout the Arthropods and Molluscs. (The well-developed and very difficult vascular system of Echinoderms, which co-exists with an abundant body-cavity fluid with relatively few corpuscles, has no special interest for this general survey.) In crustaceans, the dorsal heart, usually inclosed in a special space or 'pericardial sinus,' drives blood by more or less well-developed arteries through the body. The rest of the system is best described as lacunar.

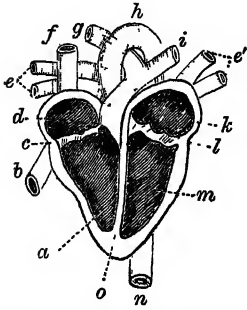


Fig. 2.—Theoretical Section of the Human Heart:

f b, the two *venae cavae*, opening into d, the right auricle; c, the tricuspid valve; a, the right ventricle, from which proceeds the pulmonary artery, dividing into branches q and r, going to the right and left lung respectively; e, e', the pulmonary veins (two from either lung), entering into the left auricle; k; l, the mitral valve; m, the left ventricle, from which proceeds the aorta, whose arch is indicated by h, and the descending portion by n, none of its branches being indicated in this figure; o, the partition, or septum, between the right and left hearts.

The venous blood passes along body-cavity spaces to the gills for purification, thence returns to the pericardial sinus, and entering the heart is redistributed. In insects a chambered dorsal heart, inclosed in a sinus as before, drives the blood forward, but as one would expect from the very efficient respiratory apparatus, the general vascular system is but slightly differentiated. The blood, purified by diffusion from the everywhere present air-tubes, passes back by venous channels into the sides of the pericardium and heart. In myriapods, scorpions, and king-crab, the system is more definitely developed, but illustrates no new advance except that of more complete establishment and wider extension of vessels. In molluscs, however, some progress is observable. Except in the Elephants' Tooth Shell (*Dentalium*), a heart is present, and the arterial system is often very well developed, even to the extent of capillaries in some cuttle-fishes and snails. Usually, however, the venous blood travels along lacunae, though gradual transitions occur between these and true veins. The blood purified in the gills or pulmonary chamber passes back into a special portion of the body-cavity—the pericardium, and thence into the heart. In certain worm-types, several contractile lateral vessels may often be observed to enter the dorsal vessel; in the Pearly Nautilus, which has four gills, four efferent vessels dilating into four indistinct auricles, enter the median dorsal heart or ventricle; in almost all bivalves the entrant dilatations or auricles are reduced to two, one on each side; while in most Gasteropods and Pteropods the specialisation has gone further, and the heart consists of a single auricle and a thicker muscular ventricle. The latter drives the blood through the body by a single or double aorta.

Passing now with equal brevity through the vertebrate series, we notice first that the heart arises as a dilatation no longer of a dorsal, but of a ventral vessel. Up to and including amphibians, the heart begins as a specialisation of the 'sub-intestinal vein' in the throat region; in most, if not all higher vertebrates, it arises from the fusion of two vessels. It always lies in a pericardial sac.

(1) Among the degenerate Tunicata there is considerable variety in the vascular system. In one case no heart is present; in several there are no definite vessels or blood-corpuscles. The main point, however, is that in most cases a tubular ventral heart drives blood to the respiratory pharynx. In all cases where the heart has been observed, the direction of its beats has been seen to undergo reversal at regular short intervals, a phenomenon which has also been noticed as a rarity in certain worm-types.

(2) The vascular system of the lancelet or amphioxus is of a peculiarly diffuse and undifferentiated nature. It has in one sense no heart, in another sense many; for while there is no main centre of contractility, there are small pulsating dilatations at the bases of the vessels passing to the gill-slits, while the portal vein and ventral vessel in the anterior pharyngeal region are both said to be contractile. In general course, the circulation is like that of a fish; the blood passes from ventral vessel to respiratory region, thence to dorsal aorta, thence to body, thence by united sub-intestinal veins to the liver cæcum, and thence to the ventral vessel from which it started.

(3) In the Round Mouths (Cyclostomata) the typical fish-circulation is established. The muscular ventricle drives the blood by a ventral vessel ('ventral aorta') to the gill-sacs; thence the purified blood is gathered into efferent dorsal vessels, which form in uniting the 'dorsal aorta.' The latter gives off branches to the greater part

of the body, the head-region being directly supplied from the anterior efferent branchials. The blood returns from the anterior and posterior regions into a uniting vessel behind the heart ('the *sinus venosus*'), thence into the receiving auricle, and from that to the muscular ventricle.

(4) It is enough after the above to notice in regard to the fishes proper, that with the exception of the double-breathing mud-fish (Dipnoi), the heart never contains anything but impure blood, that it drives this wholly to the respiratory organs, and is in no direct degree 'systemic.' The 'dorsal aorta' supplying most of the body is formed from the union of efferent branchials, and does not arise, as in higher vertebrates, from the heart. It is important to notice that the five or so arches which spring from the ventral aorta are almost all quite alike, and arise (except in Dipnoi) at slight intervals from one another. A great part of the differentiation in higher vertebrates obviously concerns these aortic arches, which are seen in Cyclostomata and fishes in primitive uniformity, but become modified in higher vertebrates into the carotids, sub-clavians, aortic arches, and pulmonary arteries. The heart of a fish consists of the *sinus venosus* or general junction, running transversely behind the heart (persisting hence onwards, except in adult birds and mammals), of the auricle and ventricle, and except in Teleostei of a specialised contractile portion of the latter

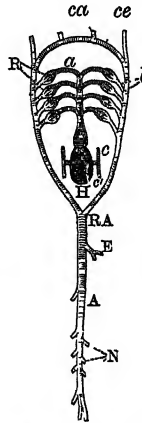


Fig. 3.—Arterial System of Fish:

H, heart; a and a', anterior and posterior cardinal veins; a, branchial arteries; R, capillaries of the branchial vessels; b, branchial veins, ce, head circle; ca, carotids; RA, root of the aorta; A, dorsal aorta; E, artery to viscera (coelaco-mesenteric); N, renal arteries. (After Wiedersheim.)

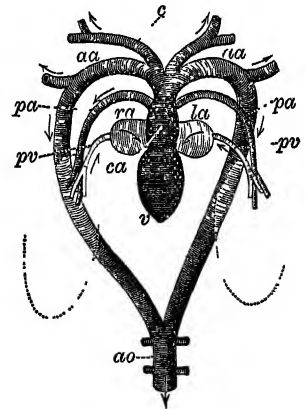


Fig. 4.—Arterial System of Amphibian:

ra, right auricle; la, left auricle; v, ventricle; aa, conus arteriosus; c, carotid arteries; aa, aortic arches; ao, dorsal aorta; pa, pulmonary artery; pv, pulmonary vein; ra receives venous blood from body; both the pulmonary arteries enter la. (After Nuhn.)

known as the *conus arteriosus*. A dilatation of the beginning of the ventral aorta is distinguished as the *bulbus arteriosus*. In regard to the general system, it is worth noticing that in fishes (as in amphibians and all reptiles except Chelonians) there is a renal portal, as well as an hepatic portal system. Veins from the caudal region of the fish come into the same relations with the kidneys as the portal veins do in regard to the liver. The hepatic veins returning from the liver do not unite with the other posterior veins, but enter the *sinus venosus* independently. Thus fishes have no *inferior vena cava*. (4a) The Dipnoi are interesting as leading on to amphibians. The

heart receives pure as well as impure blood, drives blood to lungs in addition to gills, is in part systemic (driving pure blood in *Protopterus* and *Lepidosiren* through the first two pairs of arches), has the roots of the aortic arches close together, and is practically three-chambered. In these respects it reaches forward to the condition seen in those amphibians which retain their gills.

(5) The heart of amphibians is three-chambered, a right auricle receiving impure blood from the body, a left auricle receiving purified blood from the lungs or from the lungs and gills, a single ventricle which drives the blood, mingling less than might be supposed, to head or body or respiratory organs. In some cases, as one would expect, the partition between right and left auricle is imperfect. In the tadpoles at the fish-like stage there are four aortic arches, of which the first three supply gills. Where gills persist, such supply is always of course in some degree maintained. In such a metamorphosis as that of the frog, where all trace of gills is lost, the first branchial arch becomes the carotid; the second is the systemic, which forms, by uniting with its fellow, the dorsal aorta; the third dwindles away; the fourth supplies the lungs. The same is generally true of the higher vertebrates, except that it is usually the third branchial which forms the pulmonary artery. An inferior *vena cava* is definitely established in amphibians; there is a renal portal as well as an hepatic portal system; special lymph hearts are sometimes present connecting the lymph system with the vascular.

(6) Among the reptiles, the differentiation of the heart goes a step further. In Chelonians, *Lacertilia*, and *Ophidia*, a strong muscular ridge forms an incomplete partition, dividing the ventricle into a right portion containing purely venous blood,

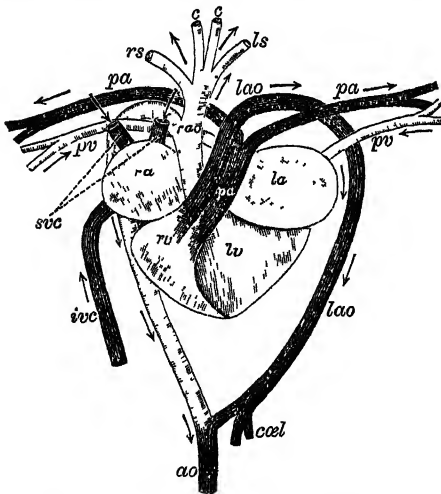


Fig. 5.—Circulation of a Reptile (Tortoise):

ra, right auricle; la, left auricle; rv, right (venous) portion of ventricle; lv, left (arterial) portion of ventricle; lao, left (venous) aortic arch; pa, pulmonary artery; rao, right (arterial) aortic arch; rs, ls, branches to fore-limbs; ca, carotids; pv, pulmonary veins; svc, superior vena cava; ivc, inferior vena cava; ao, dorsal aorta; cel, coeliac artery to viscera. (After Nuhn.)

and a left portion containing mixed and arterial blood. The pulmonary artery rising from the right cavity takes purely venous blood to the lungs; of the two aortic arches rising from the left cavity, the left aorta contains more venous than arterial blood, the right aorta more arterial than venous. In *Crocodylia*, however, there is a complete septum

in the ventricle, and thus for the first time a four-chambered heart, though it is not certain that the division is exactly comparable to that of birds and mammals. From the right or venous ventricle rise the pulmonary artery and left aortic arch (taking venous, not mixed, blood to the viscera); from the left or arterial ventricle rises the right aorta, with pure blood to the greater part of the body. Though the division of arterial and venous chambers brings the crocodilian heart to the bird or mammal level, there are two aortic arches, one venous, the other arterial, which unite as usual, and also communicate by a foramen at their roots. In all reptiles there are two superior *venae cavae*, an inferior *vena cava* formed from the union of the two efferent renals, and a renal portal system except in *Chelonina*. In birds and mammals a single aortic arch forms the dorsal aorta, not two or more as in reptiles. In birds the aorta goes to the right, in mammals to the left, but except in this variation and in the structure of the Heart (q.v.), the circulation in Birds (q.v.) and mammals (*supra*) is practically identical.

III. *Physiology*.—The most important conditions of circulatory function are (1) a general constancy and rapidity of flow, and (2) a power of adapting this to special needs. The conditions of the former are mainly mechanical and physical—those of the latter depend upon the nervous system.

(1) *The Mechanism of Circulation* chiefly depends upon the rhythmic contractility of the heart, the elasticity of the vessels, and the friction in the small arteries and capillaries. The heart is a muscular pump contracting under the influence of its automatic nervous mechanism, but also responding in the nature of its beat to the conditions of the body. The human heart usually beats about seventy-two times a minute, and in the eight-tenths of a second occupied by each beat, three distinct events occur—the contraction (*systole*) of the ventricles, a 'passive interval' of relaxation (*diastole*) of both auricles and ventricles, and the decidedly briefer contraction of the auricles. The pumping action of the heart is thus obviously an intermittent force which drives the blood through the closed series of elastic tubes formed by the blood-vessels. To the latter attention must now be directed.

The *arteries* are surrounded by muscular tissue, and are contractile as well as highly elastic. As they break up into branches from the aorta to the capillaries, the capacity for holding blood is continually increasing. The flow of blood within them, though continuous, comes in gushes corresponding to the heart-beats. The velocity of the stream is greatest the nearer the heart. The *veins* are much less elastic than the arteries, and have a much greater total capacity for holding blood. As they unite from the capillaries to the *venae cavae*, the total capacity is continually diminishing. The flow of blood within them is continuous, but with relatively little force and small velocity. The *capillaries* have a very small calibre, but are both elastic and contractile. They are permeable by fluids, and also allow the corpuscles to pass through their walls. The velocity of the flow is here at its minimum. The resistance to the flow of blood, due to the friction of these minute passages, works back along the arterial system to the heart, and is one of the most important factors in determining the nature of the circulation.

To return now to the actual mechanism, it is only necessary to note (a) that the whole system is always over-filled with blood, which consequently causes a pressure on the walls; (b) that the cause of the circulation is the difference of pressure between the blood in the aorta and pulmonary arteries on the one hand and the *venae cavae* and pulmonary veins on the other; (c) that this difference of

pressure is due to the contraction of the heart; and (d) that the interrupted current, which would naturally arise from the intermittent action of the heart, becomes continuous because of the rapidity of the beats, the resistance in the small arteries and capillaries, and the elasticity of the arterial walls.

(2) *The Control of the Circulation.*—The phenomena referred to above are mainly physical and mechanical, and in their essential features can be readily reproduced on a model. But in a complex living organism there is a constant necessity for modifiability. The organs vary in their requirements, and the external conditions are frequently changing. Modifications in the circulation are brought about by changes in the heart's beat, and in the calibre and resistance of the small arteries. Both these changes are under the direct control of the Nervous System (q.v.). Modifications of less importance also occur in the capillary resistance and in the total quantity of blood; but the important point is simply the general fact that the requirements of the organism are met by the dominion of the nervous system over the circulation.

IV. *History.*—Aristotle and the ancients thought of the heart as a blood-fountain, but had no conception of circulation. Galen (131–201) disproved the prevalent notion that the arteries contained air, Calvin's contemporary Servetus demonstrated the pulmonary circulation, and various physiologists had a distinct notion of the centrifugal flow. In 1628 William Harvey published his *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus*, in which his discovery of the real nature of the circulation was expounded. Soon after, the use of the microscope revealed to Malpighi (1661) and Leeuwenhoek (1674) what Harvey had been unable to trace—the capillary connection between arteries and veins. Since those days the detailed problems of circulation, the hydraulic mechanism, the action of the heart and its valves, and the nervous control have been worked at by many of the greatest physiologists.

See AORTA, BLOOD, HEART, VEIN, &c.; the physiological text-books of Foster, Hermann, Huxley, Landou, Stirling, &c., for human circulation; works on comparative anatomy, for the gradual evolution of the system; Willis's *William Harvey*, for earlier notions.

**Circulation of Sap.** See PLANT, PHYSIOLOGY (VEGETABLE).

**Circumcision** (Lat., 'a cutting round'), the cutting off the foreskin, a rite widely diffused among ancient and modern nations. Palæolithic engravings seem to show that circumcision, or something like it, was practised by the Magdalenians. Three thousand years before Christ it was familiar to the Egyptians, who circumcised boys between the sixth and fourteenth year, though it is not certain whether it was extended to all males, or confined to the priestly caste and others who were connected in some special way with the religious mysteries. The ceremony is clearly portrayed on a temple at Karnak, in a drawing copied by Ebers, who adds that most of the male mummies which have been examined are found to have been circumcised. It was known to the Colchians, to some at least of the Phœnicians (compare Ezek. xxviii. 10 with Herodot. ii. 104), and apparently also to the Edomites, Ammonites, and Moabites (see Jerem. ix. 25, 26). Further, it appears among Kaffirs, among many negro tribes, among Mexicans, Indians of South America, certain New South Wales tribes in Australia, and among the islanders of the Pacific Ocean. The distinguishing characteristic of Jewish circumcision is the performance of the rite in infancy. Its original significance is uncertain, and possibly it may have arisen from different motives in different places. Sanitary reasons, considering

the primitive nature of the nations in which it is found, are out of the question, and of other theories which have been advanced two only are plausible. It may have served like the tattoo to mark and stamp the circumcised person as a member of the tribe, and qualified to take part in its sacred rites, or, which is much more likely, it may have had a sacrificial character, the object being to propitiate the god or spirit by blood, and induce him to spare the life. The former theory is illustrated and defended by Stade, who regards it as having been originally the rite of initiation into manhood and the full rights of citizenship; the latter by Réville. Stade's view finds some support in Ezek. xxviii. 10, xxxi. 18, when he who dies uncircumcised is excluded from communion with the dead who have received this token of initiation. But, in fact, as Réville points out, primitive nations constantly substitute some partial mutilation for the sacrifice of the whole person. See the instructive story, Exod. iv. 24–26. We may add that in some parts of Africa an analogous operation is inflicted upon young females.

The Scripture account of the origin of circumcision amongst the Israelites is given in Gen. xvii. 7–14; but it is plain from what has just been said that circumcision could not have been in itself a sign of distinction between the Israelites and the neighbouring nations; and hence in the books of Judges and Samuel it is the Philistines, and the Philistines only, who are taunted with being uncircumcised; while in Joshua, v. 9, it is implied that the uncircumcised state of the Israelites who had grown up in the desert was 'a reproach' to them in the eyes of the Egyptians. But after the exile circumcision assumed a new prominence, because the nations under whose sway Israel then lived—the Babylonians and Persians—practised no such rite. A deep religious meaning was given to it. It became the sign of the covenant between God and his chosen people, and their devotion to it grew in proportion to the contempt which it excited in their Greek and Roman oppressors.

According to the Levitical law every Jewish male must be circumcised on the eighth day under penalty of being cut off from the congregation of Israel. The same law applied to foreign slaves bought by a Jew or born in his house. Strangers also must circumcise their males if they wished to partake of the Passover (Exod. xii. 48). The rite was performed by the father of the house or by some other Israelite, in case of necessity even by women (1 Macc. i. 60). Modern Jews employ a *mohel* or official who has the requisite surgical skill. The child is brought to the door of the room and handed to the *mohel*, who after prayer circumcises the child, and having drunk a glass of wine, gives it its name (Gen. xxi. 3, 4; Luke, i. 59, ii. 21), and placing his hand on its head blesses it. The Jewish ritual contains special prayers for the feast which follows. Circumcision was excluded from the Christian community after a memorable struggle, in which St Paul was the great champion of spiritual religion. Many of the Jewish converts wished to impose circumcision on the Gentile Christians, not only as a condition of equality, but as an essential to salvation. The result of the first struggle after a conference at Jerusalem was a mutual compromise: circumcision was not to be imposed on the Gentiles, who in return were asked to abstain from meats offered to idols, from blood, from things strangled, and from fornication. Later on, however, circumcision was urged on converts as a counsel of perfection, and it was long before Jewish Christians could be brought to recognise that it was not necessary to the Christian life. St Paul speaks of his party (Phil. iii. 3) as the 'true circumcision,' and by a bold metaphor applies to it the

word *concision* (*katatomē*), which in the Septuagint was applied only to mutilations and incisions forbidden by the Mosaic law. The contrast of the material and spiritual circumcision occurs elsewhere in St Paul (Rom. ii. 25-29; Col. ii. 11). The use made in the Old Testament of the image of circumcision, as a metaphor for purity, had prepared the way for the apostle's application—compare the circumcision of the heart (Lev. xxvi. 41), of the ear (Jer. vi. 10), of the lips (Ex. vi. 12, 30). The Abyssinian Church now alone among Christian bodies recognises it as a religious rite. It existed among the Arabs before the time of the Prophet, and though never mentioned in the Koran, is practised with much pomp and great rejoicings in all Mohammedan populations. The Arabs in the towns of Egypt have their boys circumcised at the age of five or six; among the peasants the age varies from twelve to fourteen. A vivid account of the ceremonies is given in Lane's *Modern Egyptians*.

See a paper by Paul Lafargue in the Bull. Soc. d'Anthrop. de Paris (tome x., 3<sup>e</sup> série, 1887); Schechter, *Studies in Judaism* (1896); Asher, *The Jewish Rite of Circumcision* (1873); Schurer, *The Jewish People in the Time of Christ*, Glassberg, *Die Beschneidung* (1896).

**Circumcision**, **FEAST OF**, a festival in honour of Christ's circumcision, observed on 1st January in the Roman Church since about 487 A.D., and in the Anglican since 1549. See **NEW-YEAR'S DAY**.

**Circumference**, or **PERIPHERY**, the curve which incloses a circle, ellipse, oval, cardioid, or other plane figure. In figures bounded by straight lines, as the triangle, square, and polygon, the term *perimeter* is employed to designate the sum of all the bounding lines taken together. The length of the circumference depends partly on the nature of the curve; thus, that of the Circle (q.v.) =  $2\pi r = \pi d$ ; and that of the Ellipse (q.v.)

$$= 2\pi a \left\{ 1 - \left(\frac{1}{2}\right)^2 \frac{e^2}{1} - \left(\frac{1.3}{2.4}\right)^2 \frac{e^4}{3} - \left(\frac{1.3.5}{2.4.6}\right)^2 \frac{e^6}{5} - \&c. \right\}$$

where  $a$  is the semi-axis major, and  $e$  the eccentricity.

**Circumlocution Office**, the name under which Dickens, in *Little Dorrit*, satirised the Civil Service.

**Circumnavigation**, the term usually applied to the act of sailing round the world, its literal meaning being simply 'a sailing round.' The circumnavigation of the globe was at one time considered a great feat, but it is now one of the most commonplace affairs in a sailor's experience. The first to circumnavigate the globe was Sebastian del Cano, lieutenant of Magellan (1519-22); fifteen years afterwards it was accomplished by two Spanish seamen, Grijalva and Alvaradi; and in 1577-80 by the illustrious Englishman, Sir Francis Drake. The most celebrated of circumnavigators was Captain James Cook, who, between 1768 and 1779, made three voyages round the world.

**Circumstantial Evidence**. See **EVIDENCE**.

**Circumvallation**, **LINES OF**, form a chain of works surrounding an army engaged in besieging a fortress, but facing outwards towards the country so as to guard against all attempts at relief by a field army. Redoubts, either isolated or connected by a line of parapet, were much used for this purpose in the sieges of the ancient and middle ages; but the greater mobility of modern armies makes it preferable to meet such attempts in the open field, many miles from the position occupied by the investing force. At Sebastopol, owing to the smallness of the besieging force compared with that of the besieged, an outer circuit of redoubts and lines was necessary to keep off the Russian field army, which at Inkermann

very nearly succeeded in penetrating this external defence. See **CONTRAVALATION**, **SIEGE**.

**Circus**, in ancient Rome, was a large oblong building adapted for chariot-races and horse-races, and used also for the exhibition of athletic exercises, mock-contests, and conflicts of wild beasts. The Circensian Games were alleged by tradition to have originated in the time of Romulus; and Tarquinius Priscus celebrated a notable victory by games. The games continued to be held annually, and a permanent edifice was soon afterwards constructed. This was distinguished, subsequent to the erection of the Flaminian and other large circi, as the Circus Maximus. It must have been altered and enlarged at various times. Dionysius says it could hold 150,000 persons; Pliny, 260,000; and P. Victor, 385,000. Its extent also has been variously estimated. In the time of Julius Cæsar it was three stadia or 1875 feet long, and one stadium or 625 feet wide, while the depth of the buildings surrounding the open space was half a stadium, or about 312 feet. The plan was oblong, rounded at one end and square at the other. Along the sides and at the curved end were ascending ranges of stone seats for the spectators. At the other end were the *carceres* or stalls in which the horses and chariots were kept, until, on a given signal, the gates were simultaneously flung open. In the centre was the *spina*, a long and broad wall round which the charioteers drove, terminating at both ends at the *metae* or goals—conical pillars which marked the turnings of the course. Julius Cæsar made an *euripus* or canal round the course to protect the spectators more effectually during the conflicts of wild beasts.

The circus was especially adapted for chariot-races, an amusement of which the Romans were passionately fond. The length of a race was seven circuits round the *spina*, and twenty-five races were run in each day. The number of chariots was usually four. The athletic exercises, such as boxing and wrestling, sometimes terminated fatally. A regular battle was sometimes represented (*Pugna Equestris et Pedestris*). By the formation of canals and the introduction of vessels, a *Navemachia*, or sea-fight, was occasionally exhibited; but, under the empire, this species of exhibition, as well as the *Venatio*, was gradually transferred to the Amphitheatre (q.v.). Animals for the *Venatio* or hunting were procured from every available part of the Roman empire, including Africa and Asia. The exhibition not only afforded an opportunity for the display of private munificence or ostentation, but attained the importance of a political engine, which none who aspired to popularity could afford to overlook. The turbulent classes often demanded doles of bread and circus games (*panem et circenses*) from candidates. When Pompey opened his new theatre he is said to have given public exhibitions in the circus for five days, during which five hundred lions and twenty elephants were destroyed. The Greek *hippodrome* was very similar in its arrangements to the Roman circus.

In modern times the circus survives but as the shadow of a name. It is about the same size as the modern theatre, and is employed principally for the exhibition of feats of horsemanship and for acrobatic displays. Modern circuses are of two kinds—those that hold performances in permanent buildings, of which there are only a comparatively small number in Britain and the United States, and those that 'tent' or occupy temporary erections in spring and summer, and return to buildings in winter. A circus manager on a tour must have a plentiful supply of novelties in the shape of graceful and daring riders, conjurers, and performing horses. A stud of highly trained performing horses, often of great value, is an important feature in every

well-appointed circus. English and American equestrians are superior to those of any other nationality, and their services are eagerly sought for on the Continent, where the bulk of the performers are English. Astley (q.v.) was the most famous of English circus-managers. The Paris hippodrome is celebrated. But the circus in connection with Barnum (q.v.) and Bailey's 'Greatest Show on Earth' was probably the most important ever organised, including a whole army of performers, 'mid-air artists,' and male and female equestrians.

**Cirencester**, a town of Gloucestershire, amid the Coteswold Hills, on the Churn, a headstream of the Thames, and on the Thames and Severn Canal, 14 miles SSE. of Cheltenham, and 18 by rail NW. of Swindon. It has a very fine Perpendicular church (restored 1867), a public hall (1863), some remains of an abbey (1117), and, 1 mile distant, an agricultural college (1846) of Bistol University (see AGRICULTURE). Near this is the handsome seat of Eall Bathurst. There is a considerable trade in wool and agricultural produce, and the town is a hunting-centre. Till 1867 it returned two members, till 1885 one. Pop. 7000. Cirencester (pronounced *Sis'seter*) was the Roman *Corinium*, at the junction of five Roman roads; and there is a good collection of Roman antiquities, including the town wall, which is also partly pre-Roman. Cnut held a council here in 1020. Rupert stormed Cirencester in 1642 and 1643. Richard (q.v.) of Cirencester was a native.

**Cirrhosis**, the drunkard's liver. See LIVER, ALCOHOLISM.

**Cirripedia** (Lat., 'curl-footed'), a degenerate sub-class of Crustacea, including the numerous forms of Barnacles and Acorn-shells (q.v.). *Cirrhopoda* was a false Greek form of the name once commonly in use.

**Cirrus**. See CLOUDS.

**Cirrus**, **CIRRUS**, in Botany, see TENDRIL, CLIMBING-PLANTS. The term cirrus, in Zoology, may designate any curled filament, and has been applied to the curiously modified abdominal limbs of the Cirripedia (q.v.).

**Cirta**, the capital of ancient Numidia, now Constantine (q.v.).

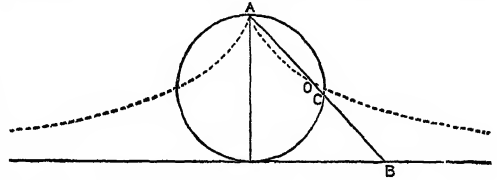
**Cis**, a Latin preposition, meaning 'on this side' (as opposed to *trans* or *ultra*, 'beyond'), which is often prefixed to names of rivers and mountains to form adjectives; Cisalpine, Cispadane, 'on this side of the Alps,' of the Po.' As most of these words are of Roman origin, Rome is usually the point of view; but in Ultramontane (q.v.) it is otherwise, as also in Cisleithania (see AUSTRIA-HUNGARY).

**Cisalpine Republic**. After the battle of Lodi, in May 1796, General Bonaparte proceeded to organise two states—one on the south of the Po, the Cispadane Republic, and one on the north, the Transpadane. These two were on 9th July 1797 united into one under the title of the Cisalpine Republic, which embraced Lombardy, Mantua, Bergamo, Brescia, Cremona, Verona, and Rovigo, the duchy of Modena, the principalities of Massa and Carrara, and the three legations of Bologna, Ferrara, and the Romagna. The republic had a territory of more than 16,000 sq. m., and a population of 3½ millions. Milan was the seat of the government or Directory. The army consisted of 20,000 French troops, paid by the republic. The republic was dissolved for a time in 1799 by the victories of the Russians and Austrians, but was restored by Bonaparte after the victory of Marengo, with some modifications of constitution and increase of territory. In 1802 it took the name of the

Italian Republic, and chose Bonaparte for its president. A deputation from the republic in 1805 conferred on the Emperor Napoleon the title of King of Italy; after which it formed the kingdom of Italy till 1814. See ITALY.

**Cissampelos**, a genus of Menispermaceæ, of which one species, *C. Pareira*, was formerly regarded as the source of the drug known as *Pareira Brava* (q.v.), also called *Butua Root*.

**Cissoid** (Gr., 'ivy-like,' from the shape), a plane curve consisting of two infinite branches symmetrically placed with reference to the diameter of a circle, so that at one of its extremities they form a Cusp (q.v.), while the tangent to the circle at the other extremity is their common asymptote. It was invented by Diocles of Alexandria to solve the problem of finding two mean proportionals; but Newton first showed how to describe the curve by continuous motion. The area included between the two branches and the asymptote is exactly equal to thrice the generating circle. In later times the term has been generalised to comprise higher curves described by the same law, but where the generating curve is not a circle. When the asymptote is vertical, the circular cissoid seems to



grow towards it as ivy does to a wall, &c. Draw any straight line AB to the tangent. Measure AO = BC, and thus O traces the curve.

**Cissus**. See VITACEÆ.

**Cis-Sutlej States**, a term first given to the Sikh principalities which arose south of the Sutlej in the end of the 18th century, and now includes the British districts of Umballa (Ambala), Ludhiana, Firozpur, Hissar, and the native states of Patiala, Jind, and Nabha.

**Cist**. See COFFIN, BARROW, BURIAL.

**Cistercians**, a monastic order founded by the Benedictine abbot Robert of Champagne, in France, who, after repeated attempts—at first in the forest of Molesme—at a reformation of the secularised monastic life, established in 1098, in the forest of Cîteaux (Cistercium), a small hamlet near Dijon, along with twenty companions, a monastery for the purpose of carrying out the strictest observance of the rule of St Benedict. By command of the pope Robert returned in 1099 to Molesme, where he died in 1108; but his successor, Alberic (who died in 1109) succeeded in gaining the pope's favour and the confirmation of the order, and drew up the *Instituta Monachorum Cisterciensium*, which represented the new foundation as the only true Benedictinism. His successor, Stephen Harding, ruled in the same spirit, and still further stamped the order with its distinctive character of austerity. Yet Cîteaux was near extinction when the famous St Bernard, together with thirty companions, joined the Cistercians in 1113. Two years afterwards he became the first abbot of Clairvaux, which thenceforward was the centre of the influence he wielded throughout Europe. In 1119 the Abbot Stephen issued a new rule, the 'Charter of Charity,' for the monks of the order, which was already augmented by two additional monasteries. It gained great accessions in Spain and Portugal, as well as in France, where the Cistercians now also bore the name of Bernardines. Before the end of the 12th

century the order had 800 abbeys in different countries of Europe, and by the middle of the 13th its establishments had reached the number of 1800. But as riches increased, the old austerity and unity decayed; the Spanish abbots seceded, and even in France and Italy arose separate congregations, such as the Feuillans and the Trappists. The Cistercians did little for the progress of the sciences; but they rendered valuable service in the development of agriculture, and in the 12th and 13th centuries they were consistent promoters of Gothic architecture.

The Cistercians were distinguished from the order of Clugny (q.v.) by their severer rule and stricter poverty, avoiding everything like splendour in their churches, even gold and silver crosses; by being submissive to the jurisdiction of the bishops, at least till after the death of St Bernard; by not meddling with the cure of souls; by wearing a white robe with a black scapulary; and by their peculiar form of government, which was introduced by Innocent III. in 1215 into all the monastic orders. In England their earliest establishment was Waverley Abbey (1128), near Farnham, in Surrey. The number of Cistercian abbeys in England in the reign of Henry VIII. was 75, besides 26 Cistercian nunneries. In Scotland there were 11 abbeys and 7 nunneries. Among the English abbeys were Woburn, Tintern, Furness, Fountains, Kirkstall, and Rievaulx; among the Scottish, Melrose, Dundrennan, Kinloss, Glenluce, Culross, Deer, Balmerino, and Sweetheart or New Abbey. The chief French abbeys, 'the four eldest daughters of Cîteaux,' as they were called, were La Ferté, Pontigny, Clairvaux, and Morimond, the last of these having itself 700 dependent benefices. Port Royal des Champs was the most celebrated of the Cistercian nunneries. Riches and indolence brought this powerful order, as well as others, into decay. Even before the Reformation many of their convents had ceased to exist. The French Revolution reduced the Cistercians to a few convents in Spain, Poland, Austria, and Saxony. The last remnant of the order in France was expelled in 1880. At Mount St Bernard, near Coalville, Leicestershire, they have a 'mitred' abbey built

by Pugin the elder. See Manrique, *Annales Cistercienses* (4 vols. Lyons, 1642); *The Cistercian Saints of England* (ed. by Newman, 1844); Sharpe, *The Architecture of the Cistercians* (1874); Janaschek, *Origines Cisterciensium* (1877); G. G. Coulton, *Five Centuries of Religion* (i. 1923); also the articles BENEDICTINES, MONACHISM.

**Cistus** (Gr.), or ROCK-ROSE, a genus of archichlamydeous dicotyledons, which gives its name to the Cistaceæ, an order allied to Cruciferae and Capparidæ, and containing about four genera and 160 species of shrubs and herbs, chiefly Mediterranean. Many

twigs of some species of *Cistus*, natives of southern Europe and the Levant, particularly *C. creticus*, *C. cypricus*, and *C. ladaniferus*, the resinous substance called *Ladanum* (q.v.) is obtained, which is used as a stimulant, chiefly in plasters, but has become obsolete in modern medical practice. Many species of *Cistus* are much cultivated for the beauty of their large wild-roselike flowers, which are red, white, lilac, yellow, or frequently of two colours. Most of the larger kinds require in Britain some protection in winter. The common yellow Rock-roses of our dry hillsides are species of *Helianthemum*, chiefly *H. vulgare*. Many pretty varieties of this and other species are grown in gardens, especially on rock-work. Several kinds are North American.

**Citation**, the act of calling a party into court to answer to an action, to give evidence, or to perform some other judicial act. In England the term citation is applied particularly to process in the spiritual, probate, and matrimonial courts. In Scotland, a citation is given in the Court of Session by an officer of court, or by a Messenger-at-arms (q.v.), under authority either of a summons passing the Signet (q.v.), or of a warrant by the court. Where no messenger-at-arms is resident in the district, it may be done by a sheriff-officer. Citation is made either personally, by delivery of a copy of the writ, together with a schedule of citation, to the party cited; or at the dwelling-place, when the party cannot be found in person. There must be one witness (in pointings two witnesses) to the execution of a warrant of citation. Parties resident out of Scotland, and tutors and curators of minors, are cited edictally—i.e. by delivery of the warrant at the office of the Keeper of Edictal Citations at the General Register House in Edinburgh. The officer who executes the citation returns a certificate, called the *Execution*, of the manner in which it has been done. A new form of citation was introduced by the Citation Amendment Act of 1882, by which any officer authorised under the older law, or any enrolled law-agent, may execute a warrant of citation, by sending a registered letter to the known residence or place of business of the person to be cited, containing a copy of the summons or other document to be served with the citation subjoined.

In criminal cases the party cannot appear voluntarily in court; he must be cited, and can plead any omission in form, which cannot be obviated even by consent. This form of citation is regulated by the Criminal Procedure (Scotland) Act, 1887. Under this act the sheriff-clerk, for cases in the Sheriff Court, and the Clerk of Justiciary, for cases in the High Court, issue warrants in the form of a schedule appended to the act. Service of the indictment and citation on these warrants may be made by any macer, messenger-at-arms, sheriff-officer, or officer of police. When the accused is in prison, it must be made by a governor or warder.

**Cîteaux**. See CISTERCIANS.

**Cithæron**. See ATTICA.

**Cithara** (Gr.), an ancient instrument closely resembling the Guitar (q.v.). See also ZITHER.

**Citizen** (Fr. *citoyen*, Lat. *civis*) ordinarily means an inhabitant of an important town or urban community enjoying rights as such; but in another sense it means an inhabitant of a state enjoying rights as such. A citizen is defined by Aristotle to be one to whom belongs the right of taking part both in the deliberative, or legislative, and the judicial proceedings of the community of which he is a member (*Politics*, iii. 1). A citizen, therefore, in this sense can exist only in a free state. Between a citizen and a subject there is this distinction, that whilst the latter merely is governed, the former also governs; and thus, though every citizen is a subject, many subjects are not citizens.



Common Rock-rose  
(*Helianthemum vulgare*).

species are more or less resinous; and from the

At first the rights of citizenship in Athens and other Greek communities were readily attained by those who were not born to them; but at a later period, when the organisation of Greek civic life had reached a high degree of perfection, admission to the roll of citizens was procured with great difficulty. In Rome, under the early law, there were different classes of citizens; that which peculiarly distinguished the higher class was the right to vote in a tribe, and the capacity of exercising magistracy. Only the private rights of citizenship (*jus connubii* and *jus commercii*) belonged to the citizens of the lower class. Latini and peregrini who were Roman subjects were not citizens, but the former class enjoyed *jus commercii*.

Roman citizenship was acquired most commonly by birth, but for this it was requisite that both father and mother should be citizens. If a citizen married a Latina or a peregrina, even believing her to be a citizen, the children begotten of the marriage followed the status of the mother. During the republic citizenship could be conferred on foreigners only by means of a *lex*—i.e. by a vote of the people assembled in one or other of the Comitia. When the imperial power was established, however, the public rights which formed the chief characteristic of the full Roman citizenship became little more than empty names; and the only value which thenceforth attached to it consisted in the private rights which it conferred. Such as it was, the constitution of Caracalla (A.D. 212) extended it to the free-born inhabitants of the whole Roman empire with certain exceptions, and under Justinian practically the only division of Roman subjects was into citizens and slaves.

In France, during the Revolution, the word citizen was adopted by the republicans as the most appropriate term to express the grand principle of *liberté, égalité, et fraternité*. It took the place of *Monsieur*. Every Frenchman became *Citoyen* in relation to other Frenchmen, the highest in official station being so addressed by the lowest, and *vice versa*. This usage gradually died out after the assumption of imperial power by Napoleon. In its modern use, the term citizen is applied in Great Britain and elsewhere either specifically to a dweller in a town, or to any one who either is born in the country or has become legally naturalised in it.

In the United States the word 'citizens' and 'people' are synonymous terms. From the point of view of American constitutional law, a citizen being a member of the political community to which he belongs, every person born in the United States and subject to its jurisdiction falls within the definition. An alien may become a citizen by being naturalised under the Acts of Congress. Again, a citizen of the United States residing in any state of the Union is a citizen of that state. There being a government in each of the several states, as well as a government of the United States, a person may be at the same time a citizen of both, but his rights as a citizen under one of these governments differ from those under the other. Thus, although the government of the United States is supreme and paramount to the states, it cannot secure to the citizen rights or privileges which are not placed under its jurisdiction by the constitution. On the other hand, a person may be a citizen of the United States and not be a citizen of any particular state, as an inhabitant of the District of Columbia, or one having his residence in one of the territories, or not having a fixed residence in any state. Citizens of each state are entitled to all privileges and immunities of citizens in the several states, and citizens of all other states have the right to go into any state and carry on business, to hold property and be protected like the citizens of that state in their rights. See NATURALISATION, ALIEN,

BOROUGH, BURGESS; and Fustel de Coulanges, *La Cité antique* (1864).

**Citole**, an obsolete mediæval musical instrument, perhaps the same as the psaltery.

**Citric Acid**,  $\text{H}_3\text{C}_6\text{H}_5\text{O}_7$ , is the acid to which lemon and lime juice owe their sourness. It also occurs, in some cases along with tartaric acid, in oranges, cherries, currants, gooseberries, and other fruits having a subacid taste. For practical purposes it is always obtained from lemon, lime, or bergamot juice, which contain it in large quantity. The first named of these contains from 20 to 40 grains of citric acid in each fluid ounce.

Citric acid is prepared from these juices by a very simple process. The juice, having been heated to the boiling-point to clarify it from albumen, mucilage, &c., is mixed with chalk,  $\text{CaCO}_3$ , which, combining with the citric acid, falls to the bottom as citrate of calcium. The supernatant liquid being drawn off, sulphuric acid is added to the precipitate, decomposing it, with the formation of citric acid and sulphate of lime,  $\text{CaSO}_4$ . By crystallisation it may be obtained pure in the form of colourless, odourless prisms, which effloresce in dry air, and possess an agreeable acid taste and an acid reaction. It is readily soluble in water and alcohol, but almost insoluble in ether and chloroform. A solution of it in water cannot be kept owing to its tendency to ferment. Dissolved in syrup it keeps much longer, and is used largely in the manufacture of lemonade and other aerated beverages, communicating an acid, fruity taste. When heated, the crystals melt, then decompose, and are finally reduced to a combustible form of charcoal. In addition to its employment as a flavouring agent it is largely used in the manufactures. Calico-printers employ it for discharging the mordant from the cloth in patterns, and it is used in dyeing silk with safflower, &c.

Citric acid may also be prepared artificially, but the process is too complex ever to come into practical use. Glycerine and hydrochloric acid form the starting-point of the synthesis, and after many operations citric acid is obtained.

Citric acid is a powerful tribasic acid (see ACIDS), and the solution in water readily dissolves zinc and iron. It forms a class of salts called Citrates, many of which are employed in medicine.

The so-called *Citrate of Magnesia*, a granular substance, which effervesces on the addition of water, and is very popular as a gentle aperient, is not really a citrate at all, but consists of a mixture of tartaric and citric acids, bicarbonate of soda, and sugar, with perhaps a trace of some magnesium salt to justify the name. The granulating is effected by mixing the powders and placing them in a pan heated by steam, when, in proportion to the citric acid present, the powders run together into a pasty mass. This is forced through a coarse riddle, and the granules are dried by a gentle heat.

*Citrate of Potash*,  $\text{K}_3\text{C}_6\text{H}_5\text{O}_7 \cdot \text{H}_2\text{O}$ , is prepared by neutralising citric acid with bicarbonate of potash. It forms a white, granular, deliquescent powder, which acts as a cooling diaphoretic in cases of fever. Dissolved in lemon-juice it is of much value in rheumatism. It is given in doses of 20 to 30 gr.

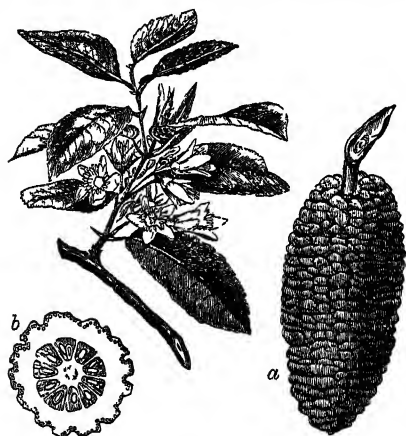
*Citrate of Soda*,  $\text{Na}_3\text{C}_6\text{H}_5\text{O}_7 \cdot 11\text{H}_2\text{O}$ , resembles citrate of potash in its properties, and is employed for the prevention of clotting of milk in the stomach. In infant-feeding 1 to 3 grains are added per fluid ounce of milk.

*Citrate of Ammonia* can only be obtained in solution, as when this is evaporated decomposition takes place and ammonia escapes. It is employed as a mild expectorant and diuretic.

*Citrate of Iron and Citrate of Iron and Quinine* are but examples of a large number of compounds

obtained in the form of brown or greenish-brown scales which are largely used in medicine. In these the medicinal value lies not in the citric acid, but in the iron or quinine with which it is associated, although the acid has doubtless a subsidiary action. A peculiarity about these 'scale preparations,' as they are called, is that the inky taste, so characteristic of iron in the form of steel drops, is in great measure removed. Citric acid also forms a series of organic salts called citric ethers, of which citrate of ethyl is an example. Lemon-juice, in which citric acid is the most active ingredient, is most valuable in scurvy, and when it cannot be obtained the acid may be used as a substitute. Citric acid in solution does not, however, appear to be nearly so effective as the juice itself. Compounds with bismuth are used in many forms in medicine.

**Citron** (*Citrus medica*), a tree cultivated in the south of Europe and other warm temperate or subtropical countries for its fruit; a native of northern India. By many botanists the lemon (*C. Limonium*), the lime (*C. Limetta*), and the bergamot (*C. Bergamea*) are reckoned varieties; but it at any rate avoids confusion to describe these separately. The fruit is large, warty, and furrowed. The pulp is acid and cooling, and is used in the preparation of syrups, lemonade, &c.; but the part chiefly valued is the thick and tender rind,



Citron (*Citrus medica*):  
a, fruit; b, transverse section of fruit.

which has a delicious odour and flavour, and is preserved or candied. From this also the fragrant Oil of Citron, or Oil of Cedrate, used by perfumers, is procured. In Germany the name cedrate is extended to all kinds of citron, and the name citron is usually given to the lemon. The fruit of the largest kinds (var. *macrocarpa*) sometimes weighs 5 lb. In the United States the name citron is applied to different varieties of the melon, especially one made into preserves or pickles.

**Citronella.** See GRASS-OIL.

**Citronwood,** or CITRUS-WOOD, the most costly furniture-wood of Roman antiquity, is improbably regarded as derived from *Biota* (*Thuja*) *orientalis*, or almost certainly from *Callitris quadrivalvis*, allied coniferous trees, both popularly known as *Arbor Vitæ* (oriental and African). Cicero is said to have paid an enormous sum for a table of this wood.

**Citrus**, a genus of Rutaceæ, trees and shrubs of tropical, subtropical, and warm temperate Asia, but many of them now cultivated in all similar climates for their fruit. To it belong the Orange, Citron, Lemon, Lime, Bergamot, Shaddock, Forbidden Fruit, &c. See separate articles.

**Città di Castello**, a town of Central Italy, on the Tiber, 25 miles NNW. of Perugia. It has a castle, a cathedral, and several palaces rich in works of art. In the church of Santa Trinità is preserved Raphael's first commission, a guild-banner. Pop. 7000.

**Cittavecchia.** See MALTA, STARIGRAD.

**City** (Fr. *cité*, Lat. *civitas*). In the sense in which it was first used in the Romanic languages of modern Europe, the word *city*, like its Latin original, was probably equivalent to state (*res-publica*) rather than to town or borough (*urbs*, *municipium*). This usage may be contrasted with that of the Greek term *polis*, which, originally denoting merely a town or collection of households, came afterwards to be frequently used as synonymous with *politeia*, a state or free community. Perhaps the nearest example in the present day to the city in the above sense is to be found in such of the cantons of Switzerland as consist chiefly of a town and its surroundings—for example, Geneva. It is difficult to find any precise meaning attached to the word city in medieval times. In his glossary of medieval Latin terms Ducange defines *civitas* as *urbs episcopalis*—that is, a town in which there exists an episcopal see; but this restricted use of the word, though commonly accepted, rests on no sufficient ground (see CATHEDRAL). It would seem, in fact, that from a very early period in English history towns have been denominated either *civitas*, *villa*, or *burgum*, and the inhabitants thereof *cives*, *homines*, and *burgenses*, indifferently. Thus in Domesday Book we find mention of the city (*civitas*) of Norwich, of Exeter, and of Coventry, but town (*villa*) of Ipswich, of Bedford, and of Shrewsbury; while Gloucester and Leicester are styled both city and borough (*burgum*).

In its modern sense the term city usually signifies a large and important town. In a narrower sense, as used in the United Kingdom, it is generally applied to all towns which are incorporated and either are or have been sees of bishops.

In the United States a city is an incorporated town, invested with the highest municipal privileges and rights. In some states 10,000 inhabitants are requisite to constitute a city, in others fewer. A city has power to legislate upon local matters pertaining to it in accordance with the provisions of its charter granted by the sovereign power of the people through the legislature of a state. In several of the western states cities are organised under a general law, all having over 15,000 inhabitants being designated cities of the first class; under 15,000 and over 2000, cities of the second class; and all villages with less than 2000, cities of the third class.

In the case of towns which have grown greatly beyond their original dimensions, the name of city has been sometimes given to the space which they originally occupied. See BOROUGH, CITIZEN.

**City of Refuge.** By the Jewish law with regard to unintentional manslaughter, indicated in Exod. xxi. 13, and fully set forth in Num. xxxv., Deut. xix., and Josh. xx., the parts of Palestine to the west and east of the Jordan were each divided into three districts, and in each district was a city in which the manslayer should at once with all speed seek refuge. If the elders of the city of refuge recognised the manslayer's claim to the right of asylum, he was provisionally secure from the *goël* or avenger. He was then set before the community (represented by its elders) in the midst of which the deed was done, that they might decide judicially whether the right of asylum should be further extended to him. In that event he was free to return

and sojourn in the city of refuge; and afterwards, if the goel found him outside it, he had a *right* (though not the *duty*) to kill him. Not till the death of the high-priest might he return home. See BLOOD (AVENGER OF), HITTITES (*Trade and Religion*); and for usage elsewhere, SANCTUARY.

**Ciudad Bolívar.** See ANGOSTURA.

**Ciudad de la,** a seaport (formerly capital) of the island of Minorca, on the west coast, with a cathedral, ruined fortifications, and exports of cattle, wool, cheese, and building-stone; pop. 10,000.

**Ciudad Juárez,** formerly EL PASO DEL NORTE, a town of the Mexican state of Chihuahua, on the Rio Grande, opposite the Texan city of El Paso. The district is fertile, and produces much wine and brandy. Pop. 6000.

**Ciudad Real,** a town of Spain, capital of the province of the same name—area, 7500 sq. m.; population, 427,000—on a plain between the rivers Guadiana and Jabalón, 105 miles S. of Madrid by rail. A poor, dull place, it has a fine Gothic church, remains of old town-walls, with one handsome gateway, small textile manufactures, and a trade in agricultural produce. Pop. 20,000.

**Ciudad Rodrigo** ('Roderic's Town'), a fortified town of Spain, 17 miles from the Portuguese frontier, and 56 SW. of Salamanca by rail, on a steep hill above the river Agueda, which is here crossed by a fine bridge. It is a poor, dirty town, with a Gothic cathedral. It was taken by the English (1706) and French (1707) in the War of the Spanish Succession, but is chiefly of interest for its sieges during the Peninsular war. In the spring of 1810 the French under Massena invested the town, and after a gallant defence by the Spaniards, it was forced to surrender on the 10th July. Meanwhile Wellington was gaining time to strengthen his lines at Torres Vedras; and in January 1812 he pounced down on Ciudad Rodrigo, and after a siege of eleven days, took the place by assault. For this brilliant achievement he was created an English earl, and, by the Spanish Cortes, Duke of Ciudad Rodrigo. Pop. 10,000.

**Civet** (*Viverra*), a genus of cat-like carnivores. Besides several species of *Viverra* proper, there are sundry other closely related forms, such as the *Genettes*, which some regard as separate genera.



Civet.

The long, thin body, the pointed head, the short legs, and small hairy feet are external characteristics. The larger species, such as the two first named below, are rather larger than a fox, but the *Viverricula*, the *Genettes*, &c. are often decidedly smaller. They are active and fierce carnivores. The civets are best known in connection with the strong perfume obtained from two (per-

meal) glands near the anus. Such glands are common enough: it is only their penetrating fragrance which is peculiar. The civet perfume of commerce is obtained from *V. civetta*, the African civet or civet cat; from *V. zibetta*, the Indian civet of Bengal, China, and the Malayan region; from *V. tangalunga*, similar in distribution to the last; and from *Viverricula malaccensis*, the Rasse of India, China, Java, and Sumatra. Civets are often kept in confinement for the sake of the perfume, which is removed from the glands about twice a week by means of a small spatula, and is obtained most abundantly from the male, especially after he has been irritated. A dram is a large quantity to obtain at a time. Abyssinia is one of the principal seats of the trade, and Java another. The perfume is most used in the East.

**Civil Damage Acts,** passed in several of the United States, giving to husbands, wives, children, parents, guardians, employers, and others who have sustained injury in person or property or means of support, by any intoxicated person in consequence of such intoxication, the right of action against the person who sold or gave away the liquor which caused such intoxication, have been held to be constitutional. In some cases the right of action was extended to the owner of the premises where such intoxicating liquor had been obtained.

**Civil Death.** See DEATH (CIVIL).

**Civil Engineer.** See ENGINEERING

**Civilian** is either a person whose pursuits are civil—i.e. neither military nor naval; or one who is skilled in the civil law—a student, professor, or doctor of the Roman civil law.

**Civilisation.** See ANTHROPOLOGY, ARCHAEOLOGY, ART, GOVERNMENT.

**Civil Law.** See LAW.

**Civil List.** Down to the period of the Restoration in 1660, notwithstanding an attempt at negotiation between James I. and the parliament for the commutation of the hereditary revenues of the crown, the whole expenses of the government of England, civil and military, were included in one list, or rather they were defrayed out of what was called the royal revenue. This revenue, which arose partly from crown-lands, partly from the hereditary excise and other hereditary revenues, and partly from the ordinary excise, was for a long period after the Conquest really at the disposal of the crown. Even after the supplies were provided by parliament, the specific mode of their expenditure continued to be free from parliamentary control. But at the Restoration a distinction was made (by statute 12 Charles II.) between the extraordinary expenses occasioned by war, and the ordinary cost of the civil establishments of the country. For the latter the needful funds were provided, partly from such crown-lands as were still unalienated, and partly from taxes which parliament voted for the purpose at the commencement of each reign. These were called the hereditary or civil list revenues, the amount of which was in 1689 fixed at £600,000 per annum. During the reign of William III. the civil list was twice raised, and in 1698, after the war with France, stood at £700,000. To provide the additional sum a new subsidy of customs was granted to the king for life. The branches of expenditure included under this head were the following: (1) The royal household; (2) the privy purse; (3) the royal palaces; (4) the salaries of the chancellor, judges, great officers of state, and ambassadors; (5) the incomes given to the other members of the royal family; (6) the secret-service money, pensions, and other irregular claims. The support of the army and navy was,

however, provided for by an annual vote of the House of Commons, and the interest of the national debt was never charged against the civil list. During Queen Anne's reign matters remained nearly on their former footing; the civil list remaining at £700,000, provided for out of the excise on liquors, the new subsidy of customs of 1698, and the land revenues of the crown. This was also the amount during the reign of George I., but on the accession of George II. it was raised to £800,000; and again in the fifty-fifth year of the reign of George III. it had to be further raised to £1,030,000. George III. surrendered some portions of the hereditary revenue of the crown which had been retained by his predecessors, and the annuities to members of the royal family were now paid out of the Consolidated Fund to the amount of £260,000. When George IV. succeeded to the throne, £255,000 of expenditure was transferred to other funds, and the civil list was fixed at £850,000 per annum. The crown enjoyed, in addition, the hereditary revenue of Scotland, amounting to about £110,000, and a separate civil list was kept up for Ireland of £207,000. Against these large sums, however, were still placed many charges which belonged to the nation rather than the crown; and it was not till the 15th November 1830 that Sir Henry Parnell, afterwards Lord Congleton, carried a motion for the appointment of a select committee for the purpose of separating the proper expenses of the crown from all other charges. The result of this measure was the act, 1 Will. IV. c. 25, for the regulation of the civil list. The sum of £510,000 was in 1831 granted to his majesty, and exclusively devoted to the privy purse, the salaries and expenses of the royal household, secret-service money, and pensions. The separate list for Ireland was discontinued, and the Scottish hereditary revenues and other items were directed to be paid into the Exchequer. The change was rather a redistribution, which enabled the country to look more closely into its expenditure, than a real reduction of the civil list.

On the accession of Queen Victoria, the civil list, which had long been of the nature of a permanent compact between the monarch and the parliament, and as such beyond the control of parliament during the life of the sovereign was settled by 1 and 2 Vict. chap. 2. The Queen surrendered the hereditary revenues of the crown for life, in consideration of a yearly sum of £385,000, charged against the Consolidated Fund, to be devoted solely to the support of Her Majesty's household, and the honour and dignity of the crown. The application of this sum was intrusted to the Lords of the Treasury, who were directed to pay yearly (1) to the Queen's privy purse, £60,000; (2) salaries and expenses of the royal household, £231,260; (3) retiring allowances and pensions to officers, &c. of the household, £44,240; (4) for royal bounties, alms, and special services, £36,300; (5) general expenditure of the court, £13,200. This sum of £385,000 did not include annuities of £40,000 to the Prince and £10,000 to the Princess of Wales, nor the other special grants. In the first year of Edward VII. the sum of £470,000 allotted to the civil list in the stricter sense included £110,000 for their majesties' privy purse, £125,800 for salaries and retired allowances for the household, and £193,300 for the expenses of His Majesty's household. The Civil List Act of 1910 continued these grants to George V., and made provision for Queen Alexandra, but not immediately for the Prince of Wales.

In addition, the sovereign has the right of granting new pensions 'to persons who have just claims on the royal beneficence, or who, by their personal services to the crown, by the performance of duties

to the public, or by their useful discoveries in science, and attainments in literature and the arts, have merited the gracious consideration of their sovereign and the gratitude of their country.' These pensions amount to about £18,000 per annum.

**Civil Service** in any country is the organised aggregate of persons employed in the service of the central government for purposes of administration or regulation not directly military or naval. It does not in the United Kingdom include the judicial service or the diplomatic service. There is also a large body of clerks and other administrative officers serving in the colonies under the Colonial Office, and paid out of the revenue of the colonies, who are civil servants of the crown, but do not form part of the civil service of the United Kingdom. The civil services of the self-governing dominions are not included in this survey.

The main body of the civil service is organised in departments, the greater number of which are severally under the direct control of one of his Majesty's ministers of state, who are responsible to the king and to parliament each for his own department; there are also a few which have a more independent status, though all are alike responsible to the king, to his ministers, and to parliament. In the latter class are such departments as the department of the Auditor-general and the Civil Service Commission. In the former class, the first is the Treasury, in which the authority is nominally in the hands of a commission, but the supreme power rests with the First Lord of the Treasury, who is generally also Prime Minister, and the direct control is exercised by the Chancellor of the Exchequer and the Parliamentary Financial Secretary to the Treasury. The Treasury exercises a general power of supervision and regulation over the other departments, especially over their expenditure, and the numbers, pay, and status of their staffs. It revises their estimates, and has customary powers to vary within certain limits the allocation of money voted to them by parliament. The great collecting departments, the Inland Revenue and the department of Customs and Excise, are branches of the Treasury. Next to the Treasury in dignity come the departments governed by Secretaries of State—the Home Office, the Foreign Office, the War Office, the India Office, and the Admiralty, under its First Lord. Then comes the department of the Postmaster-general, which employs more persons on an established and an unestablished footing than all the other departments put together. Then come departments of more recent creation—the Board of Trade, the Board of Agriculture and Fisheries, the Board of Education, the Ministry of Health, the Ministry of Transport, &c. In these departments the authority of the conventional board, if any, is only nominal, and it seldom, if ever, meets; the real authority is in the hands of the President. In some of the other departments, however, the board has a real existence and a real share in the power; the Lords of the Admiralty, the Army Council, the Council of the Secretary of State for India, have such co-ordinate or subordinate authority.

Scotland is governed through the Scottish Office, under the Secretary for Scotland. Scotland has her offices in London and in Edinburgh; she has also a separate Education Department with offices in both cities, and has recently acquired a separate Board of Agriculture.

The Irish civil service was under the Lord Lieutenant, but received a new status under the Irish Constitution Act (1922); see IRELAND.

There are a great number of minor departments and boards, many of which rank as branches of the

Treasury, though some are apparently detached, and exercise their legal powers in no very clear relation to the central government.

The staff of the civil service may be variously classified. The first great division is into established and unestablished. Established officers have a more secure tenure of their posts, and are entitled to a pension at the end of their service. Their service may be terminated, in ordinary course, at the age of sixty, and must end at the age of sixty-five, unless an extension be allowed; but extension is exceptional. They receive as pension one-sixtieth of the average salary of their last three years for each year of approved service, up to two-thirds of that average salary; or under a recent act a less sum in pension, and a lump sum down on death or retirement. The unestablished are in the position of ordinary wage-earners or salaried officers, and have no right to pension.

Under the Superannuation Act of 1859, as amended in 1914, no civil servant is entitled to a pension unless he has a certificate of fitness from the Civil Service Commissioners. Offices to which the holders are appointed directly by the crown are removed from the control of those commissioners; and promotions 'in ordinary course' are not controlled by them.

The powers and duties of the Civil Service Commission are regulated by orders in council. The order establishing the commission was issued in 1855, and the great experiment of appointment by competitive examination was thus initiated. Competitive examination has, on the whole, succeeded, especially for situations which do not require exceptional personal qualities. It has, at any rate, eliminated not only jobbery and favouritism, but the suspicion of jobbery and favouritism, from all appointments which have been brought within its scope. A further order, dated 1870, laid down the principle of open competition for all situations for which the Treasury, the authorities of the department, and the commissioners agreed in thinking it suitable, and all appointments were brought under fixed rules; though power is given to the commissioners, the Treasury, and the head of the department, acting together, to dispense with rules, and the Civil Service Commissioners can then issue their certificate on any evidence satisfactory to them that the candidate is qualified in respect of age, health, character, knowledge, and ability. Whatever the method of selection, the certificate of fitness issued by the Civil Service Commissioners deals with each of these four points. In 1913, 3890 certificates were issued to candidates selected by open competition, 2809 to candidates selected by limited competition, 9508 to candidates nominated singly, and 1689 under the special dispensing powers. The greater part of candidates nominated singly are postmen and other post-office employees, for whom competition is not thought necessary. Unestablished civil servants sometimes receive certificates, but more frequently they are exempted from this necessity. All the orders in council dealing with the Civil Service Commission and similar matters were consolidated into one order by the order in council of 10th January 1910. The status and privileges of civil servants being for the most part conferred by prerogative, they are properly regulated by order in council; though, as parliament votes the money for salaries, parliament can and often does canvass and criticise scales of salary and methods of appointment.

The established civil service can be further divided into main classes—the clerical staff, whose duties are only in the higher posts administrative, and executive officers, whose varieties are much more numerous. Pending imminent reorganisation, the main classes, almost entirely appointed by open

competition, are five. Class 1 clerks are appointed direct to posts requiring the highest kind of education. These are appointed by a competition of university honours standard, and the age-limits are twenty-two to twenty-four. The intermediate class are appointed by an open competition suitable to boys who have just left or are about to leave secondary schools. The age-limits are eighteen to nineteen and a half. This class has recently been much increased. Its members can rise to the highest posts in their branches or departments without any fresh certificate of qualification. Clerks of the Second Division are appointed between the ages of seventeen and twenty, on a scheme suitable to secondary schoolboys, but not so high as that of the intermediates. Second Division clerks are employed on duties of a superior, though mainly clerical, character; promotion from the Second Division to Class 1 and other well-paid posts is not uncommon, especially in the Post-office and the Inland Revenue. Below the Second Division come the assistant-clerks, who perform the lower clerical duties, and are eligible for promotion to the Second Division after six years' service. They were, until recently, recruited by competition from the registered boy clerks, but recruitment of this class has now ceased. Before the Great War there were about 4900 Second Division clerks, 3500 assistant-clerks, and about 2600 boy clerks in employment in public departments.

The Post-office employs many clerks of the ordinary kinds, but it has also special classes of supplementary clerks, clerical assistants, and women and girl clerks, recruited by competition. Women are extensively employed by the Post-office on counter duty, as sorters, as telegraphists, as typists, and as telephonists. They are also employed in other departments, but chiefly as typists, though women inspectors of various kinds are fairly numerous; and the class of women clerks recruited in the same manner as Post-office women clerks is growing in certain departments.

Among executive officers the Post-office employs all over the kingdom a great number of sorters, sorting-clerks, and telegraphists, recruited chiefly by competition, open or limited, for the post of learner, whence the candidate can rise to high places without further certificate. The customs and excise, formerly separated, now united, employ great numbers of outdoor officers, known as officers of customs and excise, recruited by open competition, between the ages of nineteen and twenty-one. Besides these great classes there are many offices and services which cannot be classed. Postmen, prison warders, and messengers are the most numerous; but inspectors under the Board of Education, under the Home Office, under the Ministry of Health, architects and surveyors, workmen and foremen in the royal dockyards and the royal ordnance factories, also deserve mention. And the great annual competitions for dockyard apprentices affect the future of thousands of lads; the aptest of these apprentices are selected and educated to recruit the highly expert class of naval constructors under the Admiralty.

The numbers of civil servants are constantly increasing, especially in the Education Department, the revenue services, and the Post-office. In recent years the number of civil servants has been greatly increased by the establishment of new departments, the total of which is not yet fixed. Moreover, the main features of the organisation, classification, and recruitment of the civil service of the United Kingdom are under the consideration of the government, and may be changed at no distant date. The Royal Commission of 1912-14, the events and experience of the Great War, and the institution of a National Whitley Council for

the civil service, and of Whitley Councils in the several departments, all point to alterations in spirit and almost certainly in form.

See the Abstract of Rules and Regulations issued by the Civil Service Commissioners; Annual Reports of the Civil Service Commissioners; Reports of the Playfair Royal Commission, 1874-75; Reports of the Bidley Commission, 1887-90; Reports 1-4 of the Royal Commission on the Civil Service, 1912-14; Reports of the National Whitley Council for the Civil Service, 1920.

**CIVIL SERVICE OF THE UNITED STATES.**—In January 1883 Congress passed a law to prevent the abuse of the appointing power of the officers of government. The President was authorised to appoint, with the advice and consent of the Senate, three Civil Service Commissioners, whose duty is to aid the President in preparing suitable rules which shall provide for open competitive examinations for testing the fitness of applicants for the public service, such examinations to be practical in their character, and so far as may be relating to those matters which will fairly test the relative capacity and fitness of the persons examined to discharge the duties of the service. All the offices, places, and employments arranged in classes or grades are to be filled by selections according to grade from among those graded highest as the results of such competitive examinations. The appointments to the public service in the departments at Washington are to be proportioned upon the basis of population to the several states and territories and the District of Columbia. The law provides a period of probation before any absolute appointment is made, and exempts all persons in the public service from all obligation to contribute to any political fund or to render any political service. It forbids any person in the public service using his official authority to coerce the political action of any other person or body. Non-competitive examinations in all proper cases are provided for after notice given of a vacancy, the appointing power to give notice in writing to the Civil Service Commission of the persons selected for appointment among those who have been examined. Power is given this Commission to make regulations for, and to have control of, such examinations, subject to the rules made by the President. The Civil Service Commission has to report annually to the President, for transmission to Congress, its own action, the rules and regulations, and the exceptions thereto in force, the practical objects thereof, and any suggestions for the more effectual accomplishment of the purposes of the law. Provision is made for holding examinations at convenient places twice each year in every state and territory of the United States.

The Commission punishes by fine and imprisonment all in the public service who wilfully defeat, obstruct, or deceive any person in respect to his or her right of examination, or who shall corruptly and falsely mark, grade, estimate, or report upon the proper standing of any person examined, or aid in so doing, or who shall furnish to any person any special or secret information for the purpose of either improving or injuring the prospects of any person so examined being appointed, employed, or promoted. It was provided that after six months from the passing of the act, no officer or clerk was to be appointed until after passing examination, unless specially exempted by the act; and no person in the habit of using intoxicating beverages to excess is to be appointed to or retained in any office, appointment, or employment to which the act applies. This and subsequent legislation has wrought a wonderful change for the better, lessened the number of incompetent politicians, who thrive upon the 'spoils system,' applying for office, and secures a far better class of public servants in all departments of the government.

**Civita Castellana**, a town of Italy (anc. *Falerii*), 25 miles N. of Rome, with a cathedral (1210), and a citadel built under Alexander VI.; pop 5300.

**Civita Vecchia**, an Italian port, 35 miles NW. of Rome. The harbour, commercial and naval, rests on that constructed by Trajan. Population, 20,000. It suffered at the hands of Goths and Saracens, was rebuilt in 889, and was occupied by the French in 1849. It has Roman remains.

**Clackmannan**, the county town of Clackmannanshire, on the Devon, 2 miles E. by S. of Alloa. An eminence rising 100 feet above the Forth is crowned by the ruined tower of the Buices; and there are also an old market-cross, three churches, and a public hall.

**Clackmannanshire**, the smallest county of Scotland, lies between the counties of Perth, Kinross, Fife, and Stirling, and slopes from the green Ochil Hills to the Forth. Its greatest length is 10 miles; area, 55 sq. m. Pop. (1871) 23,747; (1921) 32,523. A ridge of high ground, with inferior soil, often resting on clay, runs west through the middle of Clackmannanshire, between the very fertile alluvial lands resting on the coal-measures in the south and the North Devon valley in the north. The 'Hillfoots' have long been celebrated for their woollen manufactures; ale and glass bottles are largely produced, and there is a trade in iron and shipbuilding. Clackmannan is the county town, but Alloa is the most important place. Clackmannanshire, with east Stirlingshire, returns one member to parliament; since 1895 it includes the parish of Alva, formerly attached to Stirlingshire. See Beveridge, *Between the Forth and the Ochils* (1888), and Wallace, *The Sheriffdom of Clackmannan* (1890).

**Clacton-on-Sea**, an Essex watering-place, 15 miles SE. of Colchester; pop. 17,000.

**Cladode**, or **PHYLLLOCLADE**, a flattened and expanded green shoot which performs the functions, as it assumes the form, of a leaf. In plants which have cladodes the true leaves are reduced to scales. Cladodes are found in plants that have to contend with drought. Owing to their edgewise position towards the sun they transpire less than leaves.

**Clairaut**, **ALEXIS CLAUDE** (1713-65), mathematician, born at Paris, was admitted to the Academy of Sciences when only eighteen years of age. He wrote a great number of scientific papers; but his fame rests principally upon his *Théorie de la Figure de la Terre* (1743), in which he promulgated the theorem that the variation of gravity on the surface of the earth, regarded as an elliptic spheroid, was altogether independent of the law of density; on his explanation of the motion of the lunar apogee; and on his computation of the time of the return of Halley's comet.

**Clairmont**, **CLAIRE**. See **BYRON**, **GODWIN** (**WILLIAM**), **SHELLEY**.

**Clairvaux**, a village of France, on the Aube, 10 miles SE. of Bar-sur-Aube, is remarkable as the site of the once famous Cistercian abbey, founded in 1115 by St Bernard, who presided over it till his death in 1153, when he was buried in the church. The unwholesome swampy valley became the smiling *Clara Vallis* under the efforts of the monks, who at Bernard's death numbered 700; afterwards the founder's ascetic rule was disregarded, and the simple row of cells gave place to a palatial monastery, whose church was reckoned a masterpiece of architecture, but was destroyed at the Restoration. The abbey, which at one time possessed a revenue of 120,000 livres, had been suppressed at the Revolution, and the extensive buildings are now used as a central prison for the thirteen eastern departments of France.

**Clairvoy'ance**, the faculty, attributed to persons in an abnormal state, of seeing objects not present to the bodily senses, whereby the clairvoyant is enabled to describe events passing at a distance. For the scientific estimate of such claims, see ANIMAL MAGNETISM, APPARITIONS.

**Clam** is the common name for bivalves of the genus *Chama* (q.v.) and some other allied genera. The common clam, or soft clam of northern waters, is the *Mya arenaria*, or *Chama arenaria*; it is found especially in gravelly mud, sand, and other soft bottoms, especially between high and low water mark. They are largely used for bait, and in New England are a much relished article of food. Some kinds of clams rival oysters in popularity in New York. The hard clam, or Quahog, is the *Venus mercenaria*. The Giant Clam, the *Tridacna Gigas*, found in East Indian waters, in lagoons, and on coral islands, is of enormous size, the animal (which is edible) without the shell weighing 20 lb., while with the shell it may weigh 500 lb. The shells are used as ornaments for grottoes and fountains, and as bénitiers in Catholic churches.—The BEAR'S PAW CLAM is the *Hippopus maculatus*, a bivalve mollusc of the Indian Ocean, of the family Tridacnidae. The shell is one of the most beautiful of bivalves, alike in form, texture, and colour. It is a favourite shell for ornamental purposes. The margins of the valves are locked together by closely fitting teeth. It is 6 by 10 inches in length, broad in proportion, and transversely by ribs which are roughened by scale-like inequalities. The general colour is white, but there are beautiful spots of purplish-red.

**Clan** (Gael. *clann*, Manx *cloan*, meaning 'children,' i.e. descendants of a common ancestor). This word became incorporated with the English language at least as early as the 17th century, to mean a body of men confederated together by common ancestry or any other tie, and in this sense it is used both by Milton and Dryden. It came to be applied almost exclusively to the several communities of the Scottish Highlanders, as divided from each other topographically and by distinctive surnames. The word has sometimes been applied to those great Irish septa which at one time were a sort of separate states; but these, with their characteristic forms of internal government, were completely broken down by the power of the English predominance, before the word came into familiar use in the English language. In Scotland it was used in the 16th century to designate the freebooters of the Border as well as the Celtic tribes of the Highlands; and there were two characteristics common to both—their predatory habits, and their distribution into communities. The assumption of a common surname was general, but by no means universal. Men of the most various origin were in the habit of enlisting under chiefs as men now enlist in a regiment. Very often they took the chief's name, but very often they did not. It was essentially a military organisation for defensive and predatory purposes; and the adoption of a common name became a mere survival which kept up the idea and theory of patriarchal times long after the old tribal system had in all its essentials disappeared. In the Act of the Scottish parliament of 1587, for instance, which requires landlords to find security for the conduct of their tenants, it is provided that those 'who have their lands lying in far highlands or borders, they making residence themselves in the inlands, and their tenants and inhabitants of their lands being of clans, or dependants on chieftains or the captains of the clans, whom the landlords are noways able to command, but only get their mails (or rents) of them, and no other service or obedience, shall noways be subject

to this act but in manner following.' Then follow provisions for enforcing the law directly on the chieftains or captains of those clans residing in territories where the owner of the soil—generally the merely nominal owner, in terms of some useless charter—had no control. It was always the policy of the old law of Scotland to require all the Highland clans to have some respectable representative—a man of rank and substance, if possible—who should be security at court for their good conduct. Clans that could find no security were called 'broken clans,' and their members were outlaws, who might be hunted down like wild beasts. The Macgregors were a celebrated broken clan, whom the law pursued for centuries with savage ingenuity. Among other inflictions their name was proscribed, and such members of the clan as endeavoured to live by peaceful industry in the Lowlands adopted derivations from it; hence we have the names of Gregor, Gregory, and Gregorson or Grierson.

The clans are never treated in the old Scots acts with any respect, or otherwise than as nests of thieves and cut-throats. The following passage in the Act of 1581 (chap. 112), which virtually authorises any Lowlander, injured by any member of a clan, to take vengeance against all or any of his clansmen, contains a picturesque and striking account by men who knew and had suffered from the system of the Highland clans in the 16th century. 'The saids clans of thieves for the most part are companies of wicked men, coupled in wickedness by occasion of their surnames or near dwellings together, or through keeping society in theft or receipt of theft, not subjected to the ordinary course of justice, nor to any one landlord that will make them answerable to the laws, but commonly dwelling on sundry men's lands against the good-will of their landlords, wherethrough true men oppressed by them can have no remeid at the hands of their masters, but for their defence are oftentimes constrained to seek redress of their skaiths of the hail clan, or such of them as they happen to apprehend. Likewise the hail clan commonly bears feud for the hurt received by any member thereof, whether by execution of laws, or order of justice, or otherwise.' The Highland clans are often spoken of as a feudal institution, and it is undoubtedly true that 'broken men' were settled upon lands in possession of the chiefs on conditions of military service, just as under the more perfected system of Norman feudalism. The men receiving admission into 'rooms,' or small barns, were in the habit of binding themselves to such service by what was called 'Bonds of Man-rent,' under which they engaged to follow their chief in all his feuds and quarrels. But, on the other hand, chiefship might become, and did often become, dissociated from the legal ownership of land, and in such cases the people of the clan were apt to follow their chief, against the will of their landlords. This was the survival of a far more remote system which constituted the great danger and great corruption of the clans. It dissociated the military power of chiefship from the responsibilities of property, and from subordination to settled law. This was the evil struck at and denounced by the parliament of Scotland in repeated statutes. In general the great land-owners were also great chiefs, and the two powers then worked in harmony, and on the whole in the interests of civilisation under very rude conditions of society. But the severance arose not unfrequently from the more definite laws and rules applicable to the legal descent of landed property. Thus it came about, as the acts above quoted explain, that the head of a clan and the owner, according to feudal law, of the estates occupied by it, were two different persons. Clans did not acknowledge the purely feudal hereditary principle,

and occasionally would recognise the chiefship in a brother or an uncle, in preference to the son of a deceased chief. See **KIN**, **TOTEM**, **TRIBE**.

**Clanvowe**, **SIR THOMAS**, a courtier and friend of Prince Hal, ultimately a Lollard, but since 1895 identified by Professor Skeat with the author of *The Cuckoo and the Nightingale*, a poem long attributed to Chaucer, and for its delicacy and rhythm, not unworthy of him. It was apparently written in 1403-10.

**Clanwilliam**, a village (pop. 1000) of the Cape Province of South Africa, gives its name to a division just N. of Capetown.

**Claparède**, **ÉDOUARD** (1832-71), was a Swiss naturalist and professor of Comparative Anatomy at Geneva, who wrote on the Rhizopoda, Infusoria, and Annelida.

**Clapham** is a south-western suburb of London, lying a mile S. of the Thames. For parliamentary and municipal purposes it is divided between the boroughs of Battersea and Wandsworth (there is a Clapham division of Wandsworth). Clapham Common is still an open common of 200 acres. — *Clapham Sect* was a name given by Sydney Smith to the Evangelical party in the Church of England; the Rev. Henry Venn was the vicar of Clapham, and some of the most eminent Evangelicals — Zachary Macaulay and Wilberforce, among others — lived there. Thackeray's *Newcomes* has made the phrase familiar to a later generation.

**Clapperton**, **HUGH**, African explorer, was born at Annan, Dumfriesshire, in 1788. At the age of thirteen he went to sea; and having after a youthful peccadillo been constrained to join a man-of-war, he ultimately distinguished himself by his services at Mauritius, and was appointed to the rank of lieutenant. In 1817 he returned to Scotland on half-pay. Government appointed him and Major Denham to accompany Dr Oudney, who was going as British consul to Bornu, in an exploring expedition. By way of Tripoli and Murzuk, they reached Kuka on Lake Tchad in 1823; and Clapperton proceeded westward, accompanied by Oudney, who died by the way. He still pushed on alone as far as Sokoto, but was here compelled to retrace his steps, and, in company with Denham, returned to England in 1825. The journey had done much for the knowledge of Bornu and the Houssa country, but the great geographical problem of the course of the Niger was still much in the same position. To solve it, if possible, Clapperton — the rank of commander having been conferred upon him — started again in August 1825, in company with Captain Pearce, R.N., Mr Dickson, Dr Morrison, and Richard Lander. They commenced their exploration into the interior from the Bight of Benin. His other companions died early on the journey, but Clapperton and his faithful attendant Lander reached Sokoto. Here the Sultan detained him, and vexation joined to the hardships of the journey so affected his health, that he died at Changary, near Sokoto, April 13, 1827. See the *Narrative* of the first journey (1826); the *Journal* of the second (1829); and the *Records of Clapperton's Last Expedition to Africa*, by Richard Lander (1830).

**Claque** (from Fr. *cliquer*, 'to clap the hands,' or 'applaud') is the name given to an institution for securing the success of a public performance or production, by bestowing upon it preconceived applause, and thus giving the public, who are not in the secret, a false notion of the impression it has made. The claque is of great antiquity, its first invention having been attributed to no less

noted a person than Nero. Its supposed origin in Rome gives the name of *Romains* to the *claqueurs* to this day, who are also named *chevaliers du lustre*, from their position in the middle of the pit. The first regular use of the claque as an organised and paid body seems to have been during the time of the great Napoleon, in the famous struggle between Mademoiselle Georges and Mademoiselle Duchesnois, at the Théâtre Français; and from that time its use became almost universal in Paris. The chief of the claque, who is named *entrepreneur de succes dramatique*, is an official of importance. His business is to attend the last two or three rehearsals of a new play; to arrange the points at which applause, laughter, or tears are to be forthcoming; and to communicate his directions to his *corps*. This is divided into several classes. The main body, whose business it is to applaud, form a solid mass in the centre of the pit; and in various parts of the theatre are placed *rieurs* ('laughers'), *pleureurs*, or rather *pleureuses* ('weepers'), and *bisseurs* (whose business it is to call *bis* or *encore!*). More artistic developments of the *claqueur* are the *sangloteuse*, a female who sobs hysterically; the *pémeuse*, who faints; and the *moucheur*, a well-dressed gentleman who blows his nose with tact at affecting passages.

The members of the claque are generally men who are glad to earn a small sum in any way, but it is also recruited from the ranks of poor *amateurs*, who in return pay a smaller price for their tickets. The Théâtre Français in 1878 abolished the claque, and the Grand Opéra followed the example of the house of Molière. In certain London theatres precautions are taken on first nights which have the same effect as the claque. The organised Cheer (q.v.) of American contestants at sports has come to be called 'the American claque.'

**Clara**. See **CLARE** (ST).

**Clare**, a maritime county in the province of Munster, Ireland, lying between Galway Bay and the Shannon. It is seventh in size of the Irish counties; length, 67 miles; greatest breadth, 43; average, 21; area, 1294 sq. m. — The surface is mostly hilly, with some mountains, bog, marsh, and rugged pasture. There is an undulating plain in the centre, from north to south. In the east the hills reach a height of 1758 feet. The sea-line is high and rocky, in parts precipitous, and occasionally from 400 to 680 feet high, with many isles and fantastic detached rocks. The chief rivers are the Shannon (q.v.) and the Fergus, running south 27 miles through the middle plain, and by an estuary 5 miles broad. The county has about 100 small lakes. Carboniferous limestone is a prevailing formation; the south-west third of the county forms part of the Munster coal-field. There are lead-mines, slate and marble quarries, and many chalybeate springs. The chief crops are oats and potatoes. The chief towns are Ennis (the county town), Kiltrush, Ennistimon, and Killaloe. Pop. (1841) 286,394; (1851) 212,428; (1871) 147,864; (1901) 112,129; (1911) 104,232, all but some 2000 Roman Catholics. The county returns four members to the Free State parliament. There are many cromlechs, raths, remains of abbeys, and old castles or towers, and several round towers, one at Kiltrush being 120 feet high. Till the time of Elizabeth the county was called Thomond; its present name comes from Thomas de Clare, who received part of all the land he might conquer. See books by J. Frost (1893) and Father White (1893).

**Clare**, one of the most interesting of the smaller towns of Suffolk, 68 miles NE. of London by rail, and 19 SSW. of Bury; population, 7000. It has a fine old castle, and gives an earl's title to the British sovereign. See also **CLARENCE**.

**Clare Island**, an island of Ireland, belonging to County Mayo, situated in the Atlantic, at the entrance of Clew Bay. It has a length of 5 miles, with a breadth of 3 miles. On its north-east extremity there is a lighthouse.

**Clare, JOHN**, English peasant poet, the son of a poor labourer, was born at Helpstone, near Peterborough, July 13, 1793. After some scanty schooling, he began to do outdoor work in his seventh year, and for eleven months was an under-gardener at Burghley Park; meanwhile he studied Thomson's *Seasons*, and began to cultivate verse-writing. He enlisted in the militia (1812), associated with gypsies, in 1817 worked at a lime-kiln, but was discharged for wasting his time in scribbling, and had to apply for parish relief. His *Poems, descriptive of Rural Life and Scenery* (1821), had a good reception from critics and the public. Though the Marquis of Exeter and other patrons secured him £45 a year, he continued poor and unfortunate. His *Shepherd's Calendar* (1827) was unsuccessful. His *Rural Muse* (1835) brought him £40, and he received £50 from the Literary Fund. Broken down in body and mind, he died in the county lunatic asylum, Northampton, 20th May 1864. See *Martin's Life* (1865), *Cherry's Life and Remains* (1873), and his *Poems*, ed. Blunden and Porter (1920).

**Clare, ST.**, born in 1193, of a noble family of Assisi, in 1212 retired to the Portiuncula of St Francis, and in the same year founded the order of Franciscan nuns, which spread rapidly through Europe. She died August 11, 1253. Two years afterwards, she was canonised by Alexander IV.; her festival falls on August 12.—The *Nuns of the Order of St Clara* (also called the Poor Clares) at first observed the strictest Benedictine rule, but the austerity of this rule was mitigated by St Francis in 1224, and further modified by Urban IV. in 1265. Several convents adhered to the first and strictest rule; but the large proportion of the nuns became 'Urbanists.' The existing convents are chiefly devoted to the education of girls. See the anonymous *St Clare and her Order* (1912).

**Claremont**, a mansion at Esher, Surrey, 14½ miles SW. of London, originally built for himself by Sir John Vanbrugh. The present house was built in 1768 by Lord Clive for £100,000, from designs by 'Capability' Brown. When the Princess Charlotte was married to Prince Leopold of Saxe-Coburg, Claremont was assigned as their residence, and here in 1817 she died. In 1848 Leopold, then king of Belgium, placed it at the disposal of his father-in-law, ex-king Louis-Philippe, who inhabited it till his death in August 1850. At the death of Leopold in 1865, an act was passed granting it to Queen Victoria for life, after which it was to revert to the country. Queen Victoria in 1882 bought the reversion. Later it was the residence of the Duke of Albany. It was sold in 1922.

**Clarence**, an English ducal title, conferred for the first time in 1362 on Lionel, second son of Edward III. and Philippa. Its origin has by some been traced to Clarence, a French name of the Greek *Klarenza* or *Glarentsa* (Ital. *Chiarenza*), a decayed port on the west coast of the Peloponnesus, 50 miles SW. of Patras. Before the invasion of the Turks it was an important place, and gave the title of duke to the eldest son of the prince of Achaia. That title is said to have come into England through Philippa, daughter of the Count of Hainault, and wife of Edward III. Other authorities derive it from the ancient Suffolk town of Clare (q.v.). The most notable Dukes of Clarence, all royal, are the third son of Henry IV., who fell at the battle of Beaugé (1421); the third son of Richard of York, and brother of King Edward IV. (Shake-

peare's Clarence), who perished in the Tower in 1478—in a butt of Malmsey, according to three contemporary writers; William IV., who was Duke of Clarence before his accession; and Prince Albert-Victor of Wales, who was born 8th January 1864, and died 14th January 1892.

**Clarenceux**, or CLARENCEUX, the list of the two provincial Kings-of-Arms, in England, whose jurisdiction of Clarenceux extends to all England south of the Trent, that of Norroy comprehending the portion to the north. See HERALD.

**Clarendon**, CONSTITUTIONS OF, were laws made by a council of the nobility and prelates held at the hunting lodge of Clarendon, 2 miles SE. of Salisbury, in 1164, whereby King Henry II. checked the power of the church, and greatly narrowed the total exemption which the clergy had claimed from the jurisdiction of the secular magistrate. These famous ordinances, sixteen in number, defined the limits of the patronage, as well as of the jurisdiction, of the pope in England, and provided that the crown should be entitled to interfere in the election to all vacant offices and dignities in the church. The constitutions were unanimously adopted, and Becket, the primate, reluctantly signed them. His subsequent withdrawal of his consent, when Pope Alexander III. declined to ratify them, led to the memorable disputes between Becket and the king (see BECKET). Notwithstanding the personal humiliation to which Henry submitted after Becket's death, most of the provisions of the constitutions of Clarendon, which were part of a great scheme of administrative reform, continued to be a permanent gain to the civil power. See Stubbs, *Constitutional History*, and his *Select Charters*.

**Clarendon, EDWARD HYDE, EARL OF**, historian and statesman, was born 18th February 1608 at Dinton, near Salisbury, the third son of a Wiltshire squire. Destined for the church, he went up to Magdalen Hall in 1622; but the death of his elder brothers left him heir to the property, so in 1625 he quitted Oxford for the Middle Temple, of which his uncle, Sir Nicholas Hyde, the chief justice, then was treasurer. Though he rose in his profession, he loved letters better than law; for his friends he chose such brilliant spirits as Falkland, Ben Jonson, and Chillingworth, and, in his own words, 'was never so proud, or thought himself so good a man, as when he was the worst in the company.' He married twice—in 1629, Ann, daughter of Sir George Ayliffe, whose death six months afterwards 'shook all the frame of his resolutions'; next, in 1632, Frances, daughter of Sir Thomas Aylesbury, Master of Requests and of the Mint. She bore him four sons and two daughters; and with her, till her death in 1667, he 'lived very comfortably in the most uncomfortable times, and very joyfully in those times when matter of joy was administered.'

In 1640 he was returned for Wootton-Bassett to the Short Parliament, for Saltash to the Long; and up to the summer of 1641 he acted heartily with the popular party. Then he drew back. Enough, he deemed, had been done; a victorious oligarchy might prove more formidable than a humbled king; nor could he conceive 'a religion without bishops.' Charles's answer to the Grand Remonstrance was of Hyde's composing, so were most of the subsequent able manifestoes; and though in a midnight interview with the king he declined to take St John's post of solicitor-general, thenceforward, with Falkland and Colepeper, he formed a veritable privy-council. If only they had known everything, if only their advice had always been followed! but no, the attempted arrest of the five members had neither their privacy nor their approval. Still, Hyde headed the royalist opposition

in the Commons, till, in May 1642, he slipped away, and followed Charles into Yorkshire. He witnessed Edgehill; in 1643 was knighted, and made Chancellor of the Exchequer; in March 1645 attended the Prince of Wales to the west of England; and with him a twelvemonth later passed on to Scilly and Jersey. In Scilly, on 18th May 1646, he commenced his history; in Jersey he tarried two whole years. From November 1649 till March 1651 he was engaged in a fruitless embassy to Spain; next for nine years he filled the office of a 'Caleb Balderstone' in the needy, greedy, factious little court of Charles II., sometimes with 'neither clothes nor fire to preserve him from the sharpness of the season, and with not three sous in the world to buy a ragot.'

Charles had made him High Chancellor in 1658, and at the Restoration he was confirmed in that dignity, in November 1660 being created Baron Hyde, and in the following April Earl of Clarendon. To this period belongs the strangest episode in all his autobiography. In November 1659 his daughter Anne (1638-71), then lady-in-waiting to the Princess of Orange, had entered into a secret marriage-contract with the king's brother, James, Duke of York; and nine months later they were privately married at her father's house. He, on learning the news, if news indeed it was, burst into a passion of the coarsest invective against her—it were more charitable to suppose he was acting a part, not really less jealous for his daughter's honour than for the dignity of the royal house. Anyhow, people fancied that in Catherine of Braganza he purposely selected a barren bride for the king, that so his own daughter might some day come to the throne. Nor as chief minister was he otherwise popular. A bigoted churchman, a thorough Conservative, and always a lawyer, he would fain have restored things to the *status quo* of twenty years earlier. He loved a Papist little better than a sectary, so would have nought of Charles's toleration. He looked sourly on Charles's vices, yet stooped to impose Charles's mistress on Charles's queen. He could not satisfy the Cavaliers, who contrasted his opulence with their own broken fortunes; he did more than enough to irritate the Puritans. The sale of Dunkirk, the Dutch war, the very Plague and Great Fire, all heightened his unpopularity; and though in 1663 he weathered Lord Bristol's frivolous charges against him, in August 1667 he fell an easy unlamented victim to a court cabal. The great seal was taken from him; impeachment of high-treason followed; and on 29th November, at Charles's bidding, he quitted the kingdom for France. All but murdered at Evreux by some English seamen, at last the old man settled at Montpellier, where and at Moulins he spent nearly six tranquil years. Then moving to Rouen, he sent a last piteous entreaty that Charles would permit him to 'die in his own country and among his own children'; nay, at Rouen must he die, on 9th December 1674. No monument marks his grave in Westminster Abbey.

Men's estimates of Clarendon have varied widely. Southey calls him 'the wisest, most upright of statesmen'; George Brodie, 'a miserable sycophant and canting hypocrite.' The truth lies somewhere between the two verdicts, but Southey's is much the truer of the two. The failings and merits of the statesman are mirrored in his great *History of the Rebellion in England* (3 vols. 1704-7), with its supplement and continuation, more faulty and less valuable—the *History of the Civil War in Ireland* (1721), and the *Life of Edward, Earl of Clarendon* (3 vols. 1759). An apology more than a history, a vindication of himself and of Charles I., it is not, does not profess to be, impartial; it suppresses the truth, where the truth seemed unfavourable; and

it is grossly inaccurate—the result of a fallible memory. But, Green notwithstanding, it does not 'by deliberate and malignant falsehood' pervert the whole action of Clarendon's adversaries; careless and ungenerous he might be, wilfully dishonest he was not. And what though his style be prolix and redundant, though it 'suffocate us by the length of its periods,' his splendid stateliness, his anecdotic talent, his development of motives, and, above all, his marvellous skill in portraiture (shown best in the character of his dear friend Falkland), have rendered the history a classic, imperishable where dry-as-dust chronicles have perished. The best and latest edition is that by W. Dunn Macray (6 vols. Oxford, Clarendon Press, 1888). We have, besides, twenty-five essays by Clarendon, his *Contemplations on the Psalms* (begun in 1647, and finished, like the *Life*, during his second exile), several controversial writings, and 3 vols. of his State Papers (1767-86; calendared, 1872-76).

See Ranke's able analysis of the History; works cited under CHARLES I. and CHARLES II.; the Hon. Agar-Ellis's *Historical Inquiry respecting the Character of Clarendon* (1827); Lady Theresa Lewis's *Lives of the Friends and Contemporaries of Clarendon* (3 vols. 1852); two articles by Peter Bayne in the *Contemporary Review* (1876); the *Life* by T. H. Lister (3 vols. 1838), and that by Sir H. Craik (1911); J. R. Henslowe's *Anne Hyde* (1915); and Gardiner's *History of the Great Civil War*.

**Clarendon**, GEORGE WILLIAM FREDERICK VILLIERS, 4TH EARL OF, born in London, 12th January 1800, was a descendant of the second son of the Earl of Jersey, who married the heiress of the last Lord Clarendon of the Hyde family (1752), and was made Baron Hyde (1756) and Earl of Clarendon (1776). Having studied at Cambridge, he early entered the diplomatic service, and in 1833 was appointed ambassador at Madrid, where he acquired great influence, which he employed in helping Espartero to establish the government of Spain on a constitutional basis. On the death of his uncle, the third earl of the second creation, without issue, in 1838, he succeeded to the title, and in 1840 was made Lord Privy Seal under Melbourne. When the Whig ministry was broken up in 1841 he became an active member of the opposition; but warmly supported Sir Robert Peel and his own brother, Charles Pelham Villiers, in the agitation for the abolition of the corn laws. Under Lord John Russell's premiership he became President of the Board of Trade in 1846, and the following year was appointed Lord-lieutenant of Ireland. He entered upon his duties in troublous times. The insurrectionary follies of Smith O'Brien and his coadjutors might have set the whole country in a blaze but for the prompt and decisive measures which the new viceroy adopted, and which soon restored general tranquillity. At the same time, his tact and impartiality contributed to allay and reconcile the exasperations of party, though it did not avert the bitter hatred of the Orangemen. He was thanked in the speech from the throne in 1848, and next year received the coveted honour of the garter. When the Russell cabinet resigned in 1852, Clarendon was replaced by the Earl of Eglinton, but on the formation of the Aberdeen ministry next year was intrusted with the portfolio of the Foreign Office. It was thus upon his shoulders that the responsibility for the Crimean war actually fell. Mr Roebuck's resolution in 1855 cost him his office, which, however, he soon resumed at Palmerston's desire, and he sat at the Congress of Paris. Lord John Russell was Foreign Secretary from 1859 to 1865, but became Premier on Palmerston's death, when Clarendon returned to the Foreign Office. Next year he retired with his colleagues, to resume the same office in Gladstone's government in 1868,

which he retained till his death, 27th June 1870. A man of singularly genial and charming manners, he added by his rare tact and temper an unwonted grace to the invidiousness of diplomacy. See the *Lives* by Thornton (1882) and Sir H. Maxwell (1913).

**Clarendon Press.** See BOOK-TRADE.

**Clarens**, a beautiful Swiss village on the Lake of Geneva,  $3\frac{1}{2}$  miles SE. of Vevey by rail.

**Claret** (Fr. *clairet*), a term originally applied to wines of a light-red colour, but which is now used in England as a general name for the red wines of Bordeaux (q.v.). The name as used in England is unknown in France.

**Claretie**, JULES (properly ARSÈNE ARNAUD), a versatile French writer and popular novelist, born at Limoges, 3d December 1840. While still a schoolboy at the Lycée Bonaparte in Paris, he published a novel, and ere long his facile and clever pen made him one of the most important art and dramatic critics and political writers on the Paris press. His short story *Pierrille* (1863) had the honour to be praised by George Sand; and his novels, *Mademoiselle Cachemire* (1865) and *Un Assassin*, renamed later *Robert Burat* (1866), gained general applause. Meantime he continued his career as a journalist, although he suffered sometimes from the imperial censorship. During the Franco-German war he sent a series of remarkable letters to the *Rappel* and *Opinion Nationale*, and acquired the materials for a later series of bright and vigorous anti-German books of an historical character: *Histoire de la Révolution de 1870-71* (new ed. 5 vols. 1875-76); *Les Prussiens chez Eux* (1872); and *Cinq ans Après, l'Alsace et la Lorraine depuis l'Annexion* (1876), and *La Vie à Paris* (1896). He distinguished himself during the siege of Paris, and showed he had high talent for affairs. His more important later novels are *Madeleine Bertin* (1868); *Le Train 17* (1877); *Monsieur le Ministre*, an enormous success (1881); *Le Millon* (1882); *Michel Berthier* (1883); and *Le Prince Zilah* (1884). He first found a firm footing on the stage with his pictures of the great Revolution, *Les Muscadins* (1874), *Le Régiment de Champagne* (1877), and *Les Mirabeau* (1878); and in 1885 he became Director of the Théâtre Français. In 1888 he was admitted to the Academy. He died 23d December 1913. His *Life* of Camille Desmoulins was Englished in 1876.

**Claribel** was the pen-name of Mrs Charlotte Alington Barnard (1830-69; married in 1854 to Charles Cary Barnard), who wrote a hundred songs and ballads, some of which, like 'Come back to Erin' and 'Won't you tell me why, Robin?' were wonderfully popular. She was buried at Dover.

**Clarification** is the process of clearing a fluid from a turbid condition. Natural waters containing much organic matter in mechanical suspension and in chemical solution are clarified by the addition of a little alum, which is precipitated with the organic matter, and the water then becomes healthy and refreshing. Liquids are often clarified by straining through several layers of cloth, or through sand or charcoal. A 'centrifugal' is a circular vessel provided with an outlet in the centre and also at the circumference, and which is capable of being made to revolve at a very high speed. When the muddy liquid is placed in the vessel, and the whole caused to revolve, it is found that the particles of dust, mud, or other matter fly to the circumference, leaving the liquid in the centre practically clear, so that it can be drawn off. See BEER, CLEARING NUT, FILTER, GELATINE, WINE.

**Clarinet**, or CLARINET, a wind-instrument, usually of wood, in which the sound is produced by a single thin reed. It is supposed to have been invented in 1690 by Joseph Christoph Denner, at Nuremberg, though some authorities trace its exist-

ence to medieval times. Since its invention it has undergone many changes and improvements, and the modern clarinet, from the extent, quality, and variety of its tone, is one of the most perfect of wind-instruments. The tube of the instrument is cylindrical, ending in a bell, with holes to be covered by the fingers and left-hand thumb; and keys, generally thirteen in number, to supply the additional tones and half-tones.

The mouthpiece is cone-shaped, flattened on one side to form a table for the reed; in the table is a square opening about an inch long and half an inch wide (*a* in fig.), on which the reed is fastened by the lower and thicker end (*b* in fig.). The table being slightly curved towards the point, a gap is left between the end of the reed and the mouthpiece; and the sound depends on the vibration of the reed against this curved table. The reed is made from the great cane (*Arundo Donax*) got chiefly from Fréjus. The clarinet has two principal registers—viz. the lower, called the chalumeau, from E in the bass stave to B $\flat$  in the treble; and the upper, of a different quality, from B $\sharp$  treble stave to C $\sharp$  above the stave. Another octave higher can be played by cross-fingering, but beyond G the notes are not very effective. The difference between the lower and upper registers is an interval of a twelfth, which gives the clarinet a much greater compass than the flute, for instance, which is an octave-scaled instrument. The upper register is fingered exactly like the lower, except that the B $\flat$  key (the highest on the tube, *c* in fig.) is kept open by the thumb of the left hand. The Boehm modification of fingering (see FLUTE) has been applied to the clarinet, but is not so suitable to it as to octave-scaled instruments.

The ordinary difficulties of the fingering are so much intensified in playing in keys with many sharps or flats, that in orchestras it is usual to have instruments of different pitch to simplify the key. These are usually the A $\sharp$ , B $\flat$ , and C clarinets, though the latter is gradually going out of use.

In military reed-bands the B $\flat$  clarinet is the leading instrument, with the addition of one or two smaller clarinets in E $\flat$  to assist in the sharper passages (see BAND). Clarinets in various other keys have been introduced but seldom used.

Mozart, Beethoven, Mendelssohn, Weber, Meyerbeer, Spohr, and Rossini, and notably the Russians, have made extensive use of the clarinet in their orchestral compositions, though some of the parts written for the instrument—as in the overtures to *Semiramide*, *Otello*, and *Gasza Ladra* by Rossini—are so difficult as to be almost unplayable.

A tenor clarinet, known as the Bass-Horn (q.v.), is also used in orchestral music. The Bass Clarinet is an instrument of the same construction as the ordinary clarinet, an octave lower, usually pitched in B $\flat$ . It is also used in orchestral and military bands.

**Clark**, SIR ANDREW, physician, was born at Wolfhill in Cargill, Perthshire, 28th October 1826, and educated at Aberdeen and Edinburgh. After a brilliant career as a student of medicine at Edinburgh, he assisted Dr Hughes Bennett and Dr Robert Knox the anatomist, and next had charge



Clarinet :  
a, mouthpiece, back view, with reed removed; b, the same with reed attached.

for four years of the pathological department at the Haslar Naval Hospital. After graduating at Aberdeen in 1854, he settled in London, where he acquired a high reputation for his skill in the treatment of diseases affecting the respiratory, renal, and digestive organs. Among his patients were some of the most eminent men in the political and literary world of his time, and he will live in remembrance as the 'beloved physician' of George Eliot. President of the Royal College of Physicians, Honorary Fellow of the Royal College of Physicians in Ireland, and Consulting Physician to the London Hospital, he was besides LL.D. of Edinburgh and Aberdeen, a Fellow of the Royal Society, and a baronet since 1883. His favourite work was clinical teaching at the London Hospital, for which Holl painted his portrait. He died (of paralysis—induced doubtless by ten years of self-devoting overwork) on the 7th November 1893. Although his professional success left him scant leisure for writing, he made numerous important contributions to medical science, both in papers contributed to the special journals and in such books as *Evidences of the Arrestment of Phthisis, Lectures on the Anatomy of the Lung, The Theory of Asthma, The History of Dry Pleurisy in relation to Lung Disease, Renal Inadequacy, The Anæmia of Girls*. See Life by MacColl and Allchin (1896).

**Clark, SIR JAMES**, physician, was born at Cullen, Banffshire, 14th December 1788. He took the degree of M.A. at King's College, Aberdeen, studied medicine at Edinburgh and London, and entered as a navy surgeon in 1809—a position he held until 1815. At Rome he practised eight years as a physician; but in 1826 he settled in London. On the accession of Queen Victoria, Clark, who for two years previously had acted as physician to the Duchess of Kent, was appointed physician in ordinary to Her Majesty, in 1838 being created a baronet. He was author of a work *On the Influence of Climate in the Cure of Chronic Diseases* (1829), and *A Treatise on Pulmonary Consumption* (1835). He died June 29, 1870.

**Clark, THOMAS**, chemist, was born at Ayr in 1801, and studied at Ayr Academy. He became a chemist in Glasgow, lectured on chemistry there, and in 1833 became professor at Marischal College, Aberdeen. He fell into ill-health in 1843, and died 27th November 1867. His name is specially remembered for his discovery of the soap-test for hardness in waters, and his method of softening water by means of caustic lime. See WATER.

**Clark, WILLIAM GEORGE**, an eminent scholar and man of letters, was born in March 1821, and educated at Sedbergh and Shrewsbury under Kennedy. He entered Trinity College, Cambridge, in 1840, and, graduating second classic in 1844, was elected fellow of his college, where he resided till his retirement in 1873. He had been ordained in 1853, but wrote to his bishop resigning his orders in 1869, and published his reasons in a remarkable pamphlet, *The Present Dangers of the Church of England*. He acted long as tutor in his college, and was public orator in the university from 1857 to 1869. He died at York, 6th November 1878, bequeathing to Trinity College property to endow a lectureship on English literature, of which Mr Gosse was the first holder (1883). Clark travelled in Spain, Greece, Italy, and Poland, during the long vacations, and published lively accounts of his experiences. In 1850 he helped to edit the *Sabrina Corolla*, himself contributing some of the most finished versions therein. He also edited the first series of *Cambridge Essays* (1855), and long acted as one of the editors of the *Journal of Philology*. Other works were his edition of George Brimley's *Essays* (1858), and *Lec-*

*tures on the Middle Ages and the Revival of Learning* (1872). His greatest work was the famous *Cambridge Shakespeare* (9 vols. 1863-66), planned by Clark, and prepared in collaboration with Mr Glover and afterwards Mr Aldis Wright. Its text was reprinted in the popular 'Globe Edition' (1864). Clark's projected edition of Aristophanes was unhappily left unfinished.

**Clarke, ADAM**, Wesleyan divine, was born about 1762, at Moybeg in County Londonderry. Under John Wesley's influence he studied at Kingswood, near Bristol, and began to preach in 1782. Like his brethren, he moved from place to place, from the Channel Islands to Shetland, but after 1805 lived mostly in London. Although peripatetic preaching is scarcely conducive to scholarship, Clarke contrived to find time for extensive study of the classics, the Fathers, oriental languages, and natural science. Aberdeen gave him the degree of LL.D. in 1808, and many learned societies admitted him to membership. His first work was a *Bibliographical Dictionary* (8 vols. 1802-6). The Board of Commissioners on the Public Records selected him to edit Rymers *Fœdera*, but his health obliged him to abandon the work before he had finished the second volume. He also edited and abridged several other works, but the great work of his life was his edition of the Holy Scriptures (8 vols. 1810-26) with a commentary, into which were compressed all the results of his varied reading. While orthodox in essentials, Clarke had some unusual notions. Thus, he denied the eternal sonship of Christ while maintaining his divinity; held that Judas repented unto salvation, and that the tempter of Eve was a baboon, not a serpent. He died August 26, 1832. See his Life (3 vols. 1833).

**Clarke, CHARLES AND MARY COWDEN**, one of the most amiable among the pairs of English writers. Charles was born 15th December 1787, at Enfield, Middlesex, where his father kept a school at which Keats was a pupil. His name is imperishably linked with the dawning genius of the poet—but seven years younger than himself—who in a poetical epistle (1816) addresses Clarke as 'you who first taught me all the sweets of song.' He early imbibed a passion for the theatre, and after his parents' retirement to Ramsgate, continued to pay frequent visits to London, where he formed the friendship of Leigh Hunt, Shelley, Hazlitt, Charles and Mary Lamb. After his father's death in 1820, he became a bookseller in London, and ere long partner as music publisher with Alfred Novello, whose sister, Mary Victoria (born 1809), he married in July 1828. A year later Mrs Cowden Clarke began her famous *Concordance to Shakespeare's Plays*, published after sixteen years' toil in 1845. The married life of the pair was exceptionally happy, and they enjoyed the warm friendship of most London men of letters, from Lamb and Hazlitt down to Douglas Jerrold, Macready, and Charles Dickens. In 1834 Clarke began that twenty years' course of public lectures on Shakespeare and other dramatists and poets which brought him so much celebrity and profit. He read admirably, and put the fruit of much sound study and profound thought into the preparation of the lectures. Some of his courses of lectures were published, as his *Shakespeare Characters, chiefly those Subordinate* (1863), and *Molière Characters* (1865). In 1859 he published *Carmina Minora*, a volume of fair original verse, and in 1863 he edited the poems of George Herbert. The joint productions of the pair were the valuable *Shakespeare Key* (1879); an edition of Shakespeare's works with good if somewhat verbose annotations (1869), now re-issued as *Cassell's Illustrated Shakespeare*; and *Recollections*

of *Writers* (1878), a charming and genial book, full of reminiscences of Keats, Lamb, and other famous men. In 1856 they went to live at Nice, but removed in 1861 to Genoa, where Charles died, 13th March 1877. Mrs Cowden Clarke, who died at Genoa, 12th January 1898, alone wrote novels, volumes of verse, &c.—the best known being *The Girlhood of Shakespeare's Heroines* (1850) and *World-noted Women* (1857). See her *Sketch* of her husband (1887) and an *Autobiographic Sketch* (1897).

**Clarke, EDWARD DANIEL**, traveller and author, born at Willington in Sussex in 1769, studied at Cambridge, and from 1790 to 1799 was employed as tutor and travelling companion in several noblemen's families, making the tour of Great Britain, France, Italy, Switzerland, and Germany. In 1799 he set out on an extensive tour with a young man of fortune; they traversed Denmark, Norway, Sweden, Lapland, Finland, Russia, the country of the Don-Cossacks, Tartary, Asia Minor, Syria, Egypt, Greece, and did not return to England till 1802. In 1808 Clarke was made first professor of mineralogy at Cambridge. He presented to the university library a number of valuable marbles collected during his travels; his manuscripts he sold to Oxford; and the university of Cambridge purchased his collection of minerals. Ordained in 1805, he held two livings from 1809 until his death, 9th March 1822. His *Travels* (6 vols. 1810-23) were received with extraordinary favour; his other works, chiefly on antiquarian subjects and mineralogy, are now of little value. See his *Life*, by Bishop Otter (1825).

**Clarke, HYDE**, an English financier and philologist, born in London in 1815, was employed as a civil engineer in the improvement of Morecambe Bay and Barrow, and next in the promotion of telegraph and railway service in Upper India. He became cotton councillor in Turkey, and in 1868 founded the Council of Foreign Bondholders, whose affairs he administered for years. A promoter of the Anthropological Institute and the Press Fund, he died 1st March 1895. His writings include books and pamphlets on railways, foreign loans, banking, mythology, and comparative philology, especially the native American languages and their supposed connection with those of the Old World. Unfortunately his views are much more original than sound, and most of his generalisations have failed to commend themselves to really scientific philologists. Among his books are *The Pre-Hellenic Inhabitants of Asia Minor* (1864), *The Mediterranean Populations from Autonomous Coins* (1882), &c.

**Clarke, JAMES FREEMAN**, theologian, was born in Hanover, N.H., 4th April 1810, and studied at Harvard and Cambridge Divinity School. He became a Unitarian pastor, and in 1841 founded the Church of the Disciples at Boston. From 1867 to 1871 he held a chair of Natural Theology in Harvard University. He died 8th June 1888. He assisted in preparing the memoirs of the Marchioness Ossoli; and among his numerous works are books on the forgiveness of sin, on prayer, and on orthodoxy, *Steps of Belief* (1870), *Ten Great Religions* (1871-83), *Common Sense in Religion* (1879), *Manual of Unitarian Belief* (1884), *Veiled Questions* (1886), and an *Autobiography* (1891).

**Clarke, DR SAMUEL**, an eminent philosopher and theologian, was born at Norwich, October 11, 1675, and educated at Caius College, Cambridge. The system of Descartes, then almost universal, failing to satisfy his mind, he adopted the views of his friend Newton, and expounded them in the notes to his edition of Rohault's *Physics*. Along with philosophy he pursued the study of theology and philology. Chaplain from 1698 to Bishop Moore of Norwich, in 1706 he became chaplain to Queen

Anne, and in 1709 rector of St James's, Westminster. By his work on the Trinity (1712), in which he denied that that doctrine was held by the early church, he raised a violent and protracted controversy (in which Waterland was his chief opponent). The upper house of Convocation, desirous of avoiding controversy, rested content with an explanation, anything but satisfactory, and a promise from Clarke to be silent for the future on that subject. His views were of the kind known as *Semi-Arian* (see *ARIUS*). For the rest, Clarke was a vigorous antagonist of the Deists of his time; he wrote against materialism, empiricism, and necessitarianism; and against Dodwell maintained the essential immortality of the soul. He taught that the fundamental truths of morals, arising out of the fitness or unfitness of certain relations, were as absolutely certain as the truths of mathematics. Space and time he held to be attributes of an infinite and immaterial being. His most famous work is *Discourse concerning the Being and Attributes of God*, originally the Boyle Lectures of 1704-5. They were expressly in answer to Hobbes, Spinoza, Blount, and other freethinkers, and contained the famous and elaborate demonstration of the existence of God, often, but inaccurately, called an *a priori* argument, on which his fame as a theologian largely rests. At the instigation of the Princess of Wales, Clarke entered into a keen correspondence with Leibnitz on space and time, and their relations to God, and on moral freedom. This correspondence was published under the title of *Collection of Papers which passed between Dr Clarke and Mr Leibnitz* (1717). He was not merely a keen dialectician and a man of great strength of mind, but was possessed of great general ability. He published several collections of much admired sermons and innumerable pamphlets, besides a posthumous *Exposition of the Church Catechism* and a beautiful edition of Cæsar (1712); that of Homer (1729-32) was completed by his son. He died 17th May 1729. A collected edition of his works appeared in 4 vols. (1738-42), with a *Life* by Hoadly. His friend Whiston also wrote a *Life* (1741).

**Clarkson, THOMAS**, philanthropist, the son of a clerical schoolmaster at Wisbeach, where he was born, March 28, 1760. From St Paul's School he passed to St John's College, Cambridge, where he took a good degree in 1783. His introduction to the chief interest of his life was his gaining a prize for a Latin essay in 1785, on the question, 'Is it right to make slaves of others against their will?' which, in an English translation (1786), was widely read. Clarkson henceforward devoted himself with indefatigable energy to a vigorous crusade against African slavery, both by an incessant shower of essays, pamphlets, and reports, and by visiting the chief towns of England and even Paris to form associations. Wilberforce brought the subject before parliament in 1787. On March 25, 1807, the law for the suppression of the slave-trade passed the legislature—the occasion of Wordsworth's sonnet: 'Clarkson, it was an obstinate hill to climb,' and Clarkson next wrote a *History of the Rise, Progress, and Accomplishment of the Abolition of the African Slave-trade* (2 vols. 1808). On the formation of the Anti-slavery Society in 1823, for the abolition of slavery in the West Indies, he became one of its leading members, and had the happiness to see the object of its efforts attained in the August of 1833. He took an active part in other benevolent schemes, particularly in establishing institutions for seamen in seaport towns similar to the Sailors' Homes. He was in deacon's orders in the Church of England, but all his life kept close to the Society of Friends, although he never joined its ranks. He died at Playford

Hall, near Ipswich, September 26, 1846. See *Lives* by Taylor (1839 and 1876) and Elmes (1854).

**Clary** (*Salvia sclarea*), a native of southern Europe, which has been cultivated from a very early period for its aromatic and other properties. It is a biennial (2 feet), with clammy stem, large, heart-shaped, rough, doubly crenate leaves, and whorls of pale-blue flowers in loose terminal spikes, with large coloured bracts. Clary is antispasmodic and stimulating, and is used for seasoning soups, and in confectionery, while a fermented wine is prepared from its flowers.—A British species of *Salvia* (*S. Verbenaca*) is sometimes called Wild Clary; *S. pratensis*, Meadow Clary; and *S. horminum*, Annual Clary. See SAGE.

**Classics.** The term *classici* was originally applied to those citizens of Rome that belonged to the first and most influential of the six classes into which Servius Tullius divided the population. As early as the second century after Christ it is applied figuratively by Gellius to writers of the highest rank, and this mode of designation has since been very generally adopted both in literature and art. Most nations have had at some one time a more than usually rich and abundant outburst of literature, and they usually style this the *Classical* period of their literature, and its most distinguished writers their *Classics*. Thus, in Latin literature the classical period may be regarded as extending from the time of Varro, Cicero, and Lucretius, from about 80 B.C., to the time of Juvenal and Suetonius, about 180 A.D.; and is divided into a *Golden* and a *Silver Age*. But as the great productions of the writers and artists of antiquity have continued to be looked upon by moderns as models of perfection, the word *classics* has come to designate, in a narrower sense, the best writers of Greece and Rome, and 'classical' to mean much the same as 'ancient.' The question of the relative value in modern education of the study of the classics in this sense has been much discussed. For 'Classicism,' see ROMANTICISM.

**Classification.** See GENERALISATION, PREDICABLES, BIOLOGY, SPECIES.

**Clastic Rocks** (Gr. *klastos*, 'broken'), secondary or derivative rocks, as composed of fragmental materials—e.g. conglomerate, sandstone, shale, &c., which have been formed out of the remains of previously existing rocks. Besides the large class of *sand-and-gravel* rocks, it also embraces many rocks of organic origin, such as certain *limestones*, composed of the debris of shells, corals, &c.; *coals*, made up of the remains of plants; some *ironstones*, consisting in whole or in part of organic debris. Fragmental volcanic rocks, such as *tuff* and *agglomerate*, come also into the same division.

**Claudel**, PAUL, French dramatist, poet and prose-writer of the 20th-century Catholic revival, was born in 1868 at Villeneuve-sur-Fère (Aisne), became a Chinese expert in the Foreign Office, consul in various European towns, and ambassador at Tokyo (1921). The few who understand find in his work a deep feeling for nature, combined with mysticism, subtlety, freshness, simplicity, and romantic beauty. *L'Annonce faite à Marie*, *L'Otage*, and others have been published and played in English.

**Claude Lorraine** (properly named CLAUDE GELÉE), a celebrated landscape-painter, was a native of Lorraine, and born in 1600. According to Baldinucci, a relative who travelled as a lace-dealer took Claude when still a boy to Italy, but deserted him in Rome. However, he soon found employment in grinding colours, and doing other menial services for Agostino Tassi, a landscape-painter, from whom he gained some knowledge of art. He seems next to have studied under Godfrey

Waal at Naples, and after some time spent in wandering through various portions of Europe, he finally settled at Rome in 1627. Here he made his way slowly with the public, and it was about ten years afterwards that he received a commission from Cardinal Bentivoglio, who introduced him to Pope Urban VIII., for whom he executed four landscapes, two of which, 'La Fête Villageoise' and 'Un Port de Mer au Soleil Couchant,' both dated 1629, are now in the Louvre. His position was now assured, and his works were much sought after. During his later years he suffered from gout and other maladies, and he died in November 1682.

Claude's landscapes, which number about four hundred, are found in the chief galleries of Italy, France, Spain, Germany, Russia, and in particular England. The painting on which he himself set the highest value is the 'Villa Madama.' He kept it as a study, and refused to sell it, even when Pope Clement IX. offered for it as much gold coin as would cover the canvas. Many copies and imitations of Claude's paintings have been imposed on buyers. This was the case even during the artist's lifetime; for he set high prices on his works. It has been stated that it was in order to stop the fraudulent trade carried on in his name that he collected the sketches of his pictures in six books titled *Libri Veritatis*; but these were probably executed simply to preserve a record of the works and of their destination. They were engraved in mezzotint by Earlom, and it was in rivalry with these prints that Turner executed his celebrated *Liber Studiorum*.

Claude was an earnest, indefatigable student of nature, of which, however, he possessed a far less close and scientific knowledge than is evinced by the works of many modern landscape-painters. He was restricted in his range of subjects and effects, and he had little sympathy with nature in her wilder and sterner moods. On the other hand, his composition, if rather formal, is always graceful and well considered; his colour is singularly mellow and harmonious; and as a sky-painter his work is full of delicacy and great tenderness of gradation and aerial quality. Claude produced about thirty etchings, the best of which are distinguished by great technical skill, refinement, and freedom. Hamerton pronounced 'Le Bouvier' to be in many ways 'the finest landscape etching in the world.' His figures, in which he was sometimes aided by other painters, are in general such inferior accessories that he was wont to say he made no charge for them. See Ruskin's *Modern Painters*; Mrs Mark Pattison (Lady Dilke), *Claude Lorrain, sa Vie et ses Œuvres* (Paris, 1884); Dullea, *Claude le Lorrain* (Lond. 1887); Friedlander, *Claude Lorrain* (Berlin, 1922).

**Claudianus**, CLAUDIUS, the latest of the great Latin poets, a native of Alexandria, flourished in the end of the 4th and beginning of the 5th century. He wrote first in Greek, which appears to have been his native tongue, though he was originally of Roman extraction; but in Gibbon's words, he 'assumed in his mature age the familiar use and absolute command of the Latin language; soared above the heads of his feeble contemporaries, and placed himself, after an interval of three hundred years, among the poets of ancient Rome.' His poems brought him into such reputation that, at the request of the senate, the Emperors Arcadius and Honorius erected a statue in honour of him in the forum of Trajan. The productions of Claudianus that have come down to us consist of two epic poems, *Raptus Proserpinæ* and the fragmentary *Gigantomachia*; besides panegyrics on Honorius and Stilicho, *Eidyllia*, *Epigrammata*, and occasional poems. Claudianus displays a brilliant fancy, rich colouring, with variety and distinctness in his pictures; but he is

often deficient in taste and gracefulness. See editions by Gessner (1759), Burmann (1760), Jeep (1879), Birt (1892), and Platnauer (1922, with trans.).

**Claudius I.**, Roman emperor, whose full name was Tiberius Claudius Drusus Nero Germanicus, was the younger son of Drusus (brother of the Emperor Tiberius) and Antonia, and was born at Lyons in Gaul, 10 B.C. He was naturally sickly and infirm, and his education was neglected, or left to be cared for by women and freedmen. His supposed imbecility saved him from the cruelty of Caligula; but Claudius, in his privacy, had made considerable progress in the study of history, and wrote in Latin and Greek several extensive works now lost. After the assassination of Caligula, he was found by the soldiers in a corner of the palace, where, in dread, he had concealed himself. The prætorians carried him forth, proclaimed him emperor, and compelled his recognition by the senate and many citizens who had hoped to restore the republic. By giving largess to the troops who had raised him to the throne, Claudius commenced the baneful practice which subjected Rome to a military despotism under the succeeding emperors. The first acts of his reign seemed to give promise of mild and just government, but in the year 42, when a conspiracy against his life was detected, his timidity led him to yield himself entirely to the guidance of his third and most infamous wife, Messalina, who, in concert with the freedmen Pallas and Narcissus, practised cruelties and extortions without restraint. The emperor meanwhile lived in retirement, partly occupied in his studies, and expended enormous sums in building, especially in the famous Claudian Aqueduct (*Aqua Claudia*). At the same time he ruled well though mildly, and carried out the enlightened policy of extending citizenship to the provincials. Abroad his arms were victorious. Mauritania was made a Roman province, the conquest of Britain was commenced, and the frontier provinces in the east were settled. At home the uxorious emperor continued to be governed by his wives. Tacitus tells us that the shameless Messalina, after abusing her blind and doting husband by a series of the vilest profligacies, went so far as to marry herself publicly to a young lover, on which the emperor, at last awakened to her wickedness and his own shame, put her to death. He next married his own niece, the equally vicious and more cruel Agrippina, who procured his death by poison (54 A.D.) in order to secure the succession of Nero, her own son by an earlier husband.

**Claudius, APPIUS**, a Roman decemvir (451 and 450 B.C.), who gained the high favour of his fellow-citizens by his ability and activity. In the latter year, however, he began to show his real aims towards absolute and illegal power. The growing indignation of the Roman populace reached a height on account of his grossly tyrannous action towards Virginia, daughter of a respected plebeian named Lucius Virginius, who was abroad with the army. The proud patrician gained possession of the person of the maiden by pretending that she was the born slave of one of his clients. Her lover Icilius summoned her father Virginius from the army, but another mock-trial again adjudged the girl to be the property of the decemvir's client. To save his daughter from dishonour, the unhappy father seized a knife and slew her. The popular indignation and the father's appeal to the army overthrew the decemviri, and the proud Appius was flung into prison, where he died by his own hand. The story is specially familiar to English readers from Macaulay's *Lays*. The Claudian *Gens* was one of the most numerous and important of the patrician tribes of Rome; and besides the sons

and grandsons of the decemvir, there were numerous persons of distinction who bore the name of Appius.

**Claus**, KARL, zoologist, born 2d January 1835, at Cassel, became professor successively at Würzburg (1860), Marburg, Göttingen, and Vienna (1873). His principal work is the *Grundzüge der Zoologie* (4th ed. 1878-82). He died in 1899.

**Claus, SANTA**. See NICOLAS.

**Clause**. See DEED.

**Clausel**, BERTRAND, a French marshal, was born at Mirepoix, Ariège, 12th December 1772, and obtained distinction in the Italian and Austrian campaigns of Napoleon; but more especially as commander in Spain, after the battle of Salamanca in 1812. Condemned to death as a traitor on the return of the Bourbons, he was in 1819 permitted to return from America to France; commanded the army and was governor in Algeria in 1830; and was made governor-general of Algeria in 1835. He returned to France in 1837, voted with the opposition in the Chamber, and died 21st April 1842. See ALGERIA.

**Clausewitz**, KARL VON, a very distinguished Prussian general, whose writings prepared the way for a complete revolution in the theory of war, was born 1st June 1780 at Burg. He served with distinction in several campaigns in the Prussian and in the Russian service, in 1815 became chief of a Prussian army corps, and was ultimately director of the army school, and Gneisenau's chief of staff. He died of cholera at Breslau, 16th November 1831. Of his works the best known are his great book on war, *Vom Krieg* (3 vols. 4th ed. 1880), and his life of Scharnhorst. See his *Life* by Schwartz (Berlin, 1877).

**Clausius**, RUDOLF, a great German physicist, born 2d January 1822 at Koslin in Pomerania. He studied at Berlin, and afterwards lectured on natural philosophy as *privat-docent* at Berlin, and as professor at the Zurich Polytechnic School. In 1869 he was appointed to the chair of Natural Philosophy at Bonn, and here he died, August 24, 1888. He was elected a foreign member of the Royal Society in 1868, and in 1879 was given its highest honour, the Copley Medal. His scientific labours cover parts of the field of optics and of electricity, but his especial work was his contribution to the science of thermo-dynamics, the honour of establishing which on a scientific basis he divides with Rankine and Thomson. His mathematical methods he also applied to the theory of the steam-engine, the dynamical or kinetic theory of gases, and to electricity and electro-dynamics. His great work is his *Abhandlungen über die mechanische Wärmetheorie* (1864, and 1867), which in its second edition took a more systematic form as vol. i., *Die mechanische Wärmetheorie* (1876), and vol. ii., *Die mechanische Behandlung der Electricität* (1879). Other books are *Ueber das Wesen der Wärme* (1857), and *Die Potentialfunction und das Potential* (3d ed. 1877). See *Life* by Riecke (1889).

**Clausthal**. See KLAUSTHAL.

**Clavagella**, or CLUB-SHELL, a genus of marine Lamellibranchiate Molluscs of the same family with *Aspergillum* (q.v.). They mostly live in excavated holes in rocks or in masses of coral. The ordinary form of the bivalve shell is curiously modified. One valve (the right) is fixed to the inner surface of the chamber in which the animal lives, and is continued without interruption into a secondary shell-tube, which extends from the chamber outwards, and varies considerably in length in different species. The left valve is free and movable on the right. The mode of excavation is not known. Six living species of wide

distribution are known. The fossil forms, which



*Clavagella lata*, showing the cavity and fixed valve: a, the fixed valve; b, the calcareous tube.

are more numerous, were first discovered. They do not occur below the Upper Chalk.

**Clavaria**, a genus of Fungi, of the order Hymenomycetes, family Clavariaceae, in which the spore-bearing tissue is produced over all parts of the surface. The species are numerous, some of them simple and club-shaped, some branched. *C. botrytis*, a species common in oak and beech woods, especially in Germany, growing on the ground, among moss, grass, heath, &c., is gathered when young and used as food, having a very agreeable sweetish taste. Other species of *Clavaria* are used in the same way. See FUNGI.

**Claverhouse**. See GRAHAM (JOHN).

**Clavichord**, or CLARICHORD, an obsolete keyboard musical instrument of the same type as the Harpsichord (q.v.) and spinet. The strings were set in vibration, not by plectra as in these instruments, but by metal tangents, so placed that they also determined the vibrating length, the unused portion of the string being damped by an interlaced band of cloth, which damped the whole string when the key was released. There might be a set of strings for each note, or the same set might serve for several notes. Bach's *Das Wohltemperirte Klavier* was written for the clavichord.

**Clavicle**, an important part of the pectoral girdle of Vertebrates, perhaps most familiarly known in the collar-bone of man and in the merry-thought of birds. It is well developed in those mammals in which the foreleg or arm is used very strongly and freely, but is poorly developed or absent in many cases, as in Carnivores and Ungulates. In most flying birds it is strong, and often fused to the breast-bone; in the ostrich tribe it is rudimentary or absent. It is not a prominent bone in reptiles, being absent in snakes and crocodiles, but it is well developed in the majority of lizards. There is a distinct 'clavicle' in most Amphibians, but the homology begins to be difficult; still more so when we pass to the bones in fishes to which the name clavicle has been given. See BIRD, BONE, SKELETON; also Huxley's *Anatomy of the Vertebrate Animals*, and other works on Comparative Anatomy, such as those of Gegenbaur and Wiedersheim (trans. Bell and Parker). There is a separate article on the human Collar-bone (q.v.).

**Clavicorn**, an old name for the bass tuba or bombardon. See SAXHORN.

**Clavicornia**, a name sometimes applied to several tribes of beetles with club-shaped (clavate) antennae. They are included within the great Pentamerous section of Coleoptera. Buizing beetles illustrate the type.

**Clavijero**, FRANCISCO XAVIER, Mexican historian, born at Vera Cruz in 1721, entered the order of the Jesuits in 1748, and became a teacher of philosophy. On the suppression of the Jesuits in 1767 he retired to Italy, where he died at Bologna in 1787. He wrote in Italian a *History of Mexico* (Eng. trans. 1787).

**Clavijo y Fajardo**, JOSE (1730-1806), a Spanish publicist, who had a duel with Beaumarchais, and was made, with a character much altered, the hero of Goethe's *Clavigo*.

**Claws**, a term often applied to the chela at the end of Arthropod limbs, but best restricted to the epidermic tips found at the ends of the digits in most reptiles, on the toes, and often on the thumb and first finger of birds, but seen in perfection in many mammals—e.g. Carnivores, Insectivores, Edentates. It is obviously impossible to draw any sharp line between claws and Nails (q.v.).

**Clay** (A.S. *clæg*; of the same root as 'clag,' 'claggy'), a term applied, in a vague way, to those kinds of earth or soil which, when moist, have a notable degree of tenacity and plasticity. The clays are not easily distinguished as rock species, but they all appear to owe their origin to the decomposition of various rocks, and to consist chiefly of aluminic silicate, along with other ingredients, which vary in character with the nature of the parent rock from the degradation of which they are derived. Thus common clay is a mixture of kaolin or China clay (which is a hydrated clay), and the fine powder of some felspathic mineral, which is anhydrous and not decomposed. Clays vary much in plasticity—all being more or less plastic when moistened with water, and capable of being moulded into any form. But while many retain their shape when dried by heat, others, which in the damp state would ordinarily be called clays, tend to fall to powder when all the water is driven off. Clay is eaten by the Botocudos and other savage tribes, as also in Georgia and the Carolinas by negroes and 'poor whites.' The plastic clays are used for many purposes, as for making pottery of all kinds, bricks and tiles, tobacco-pipes, firebricks, &c. The following are the commoner varieties of clay and clay-rocks: *China clay* or *Kaolin* (q.v.); *Pipeclay* (q.v.), very like kaolin, but containing a larger percentage of silica; *potter's clay*, not so pure as the preceding; *sculptor's clay* or *modelling clay*, a fine potter's clay, sometimes mixed with fine sand; *plastiline*, a potter's clay from Italy, supposed to be composed of oil, glycerine, rosin, and powdered clay, which, as it does not shrink, need not be kept wet; *brick-clay* (see BRICKS), an admixture of clay and sand with some ferruginous matter; *Fireclay* (q.v.), containing little or no lime, alkaline earth, or iron (which act as fluxes), and hence infusible or highly refractory; *Shale* (q.v.), a laminated clay-rock; *clay-slate*, an indurated cleaved clay-rock; *loam*, a non-plastic mixture of clay and sand; *Marl* (q.v.), a clay containing much calcareous matter. Clay at the deepest sea-bottom is largely of animal origin. See PETROGRAPHY and SOILS.

CLAY SOILS derive their character from the aluminic silicate which they contain in a state of mixture, as well as in chemical combination with other substances. Some soils contain so large a proportion of alumina as 35 per cent., but generally the proportion is much smaller. The felspars which chiefly yield the alumina of clay soils contain also soda, potash, and lime, substances which

tend to render clays fertile when under cultivation. The physical characters, however, of the different varieties of clay soils arising from the varying proportions of silica, and other substances mixed with the alumina, are chiefly concerned in their relative fertility. Calcareous matter exercises a considerable influence on their powers of producing crops. For an account of the distribution of soils in this country, see Johnston's and Cameron's *Elements of Agricultural Chemistry and Geology*.

**Clay**, CASSIUS MARCELLUS, a zealous abolitionist, born in Kentucky in 1810, graduated at Yale in 1832, and three years after was elected to the legislature of his native state. He opposed the annexation of Texas (1844); started at Lexington *The True American*, a vigorous anti-slavery paper, the following year; volunteered in the Mexican war (1846); supported Mr Lincoln in 1860; and from 1861 till 1869 was U.S. Minister to Russia. A true son of Kentucky, Clay delivered his political addresses armed to the teeth, was involved in a number of serious quarrels, and in 1877 was tried but acquitted on a charge of killing a discharged negro servant who had threatened his life. See his *Life, Writings, and Speeches* (2 vols. 1886). He died at ninety-three in July 1903.

**Clay**, HENRY, statesman, one of the 'great triumvirate' of American orators, was born in 'the Slashes,' a district of Hanover county, Virginia, April 12, 1777. He was the son of a Baptist preacher who died in 1781, and from the employment of some part of his early youth in connection with a grist-mill, he earned the cognomen of 'the mill-boy of the Slashes.' His early schooling was but scanty. When fifteen years old he became an assistant-clerk in the chancery court of his native state, and for four years was amanuensis to that excellent lawyer and true patriot, George Wythe, then chancellor. He also studied law for one year with Robert Brooke, attorney-general of Virginia. In 1797 he was licensed to practise law, and in the same year went to Lexington, Kentucky, where he soon acquired a high reputation as an orator and as a jury lawyer. He was sent in 1806, and again in 1809, to the United States senate for short terms. He first entered the lower house of congress in 1811, and was chosen its Speaker. This position he filled for many years with great ability. He was active in bringing on the war of 1812-15 with Great Britain, and was one of the commissioners who arranged the treaty of Ghent which ended the war. By his course in regard to the 'Missouri Compromise' of 1821, he won the title of 'the great pacificator.' In 1824 he was one of the strongest advocates of a high protective tariff, and in the same year was one of the four candidates for the presidency. No choice having been made by the electoral college, Mr J. Q. Adams was elected president by the House of Representatives; and Clay's acceptance of the position of secretary of state under Adams was by many held to constitute a proof of a corrupt bargain between two statesmen, neither of whom, in truth, would have been guilty of countenancing such a bargain. Clay re-entered the senate in 1831, and in the same year was renominated for the presidency; but in the following year General Jackson was re-elected to that office. His candidature for the office of president in 1844 was in like manner unsuccessful. The compromise of 1850 between the opposing free-soil and pro-slavery interests was largely Clay's work. He died July 29, 1852. Although he was the most attractive public speaker in his country during what is justly regarded as 'the golden age of American oratory,' his ability as a reasoner was excelled by that of Webster; while his other principal

rival, Calhoun, surpassed him in intensity and fiery earnestness. No man had a larger following of devoted personal friends than Clay, and for more than forty years he had a very conspicuous share in shaping the legislation of the republic. As a public man his career was without a blemish. Of the rather numerous biographies of Clay the best is that by Carl Schurz (Boston, 1887).

**Clay Cross**, a town in Derbyshire, 4½ miles S. of Chesterfield, the centre of a coal and iron district. The collieries here were begun by George Stephenson in 1838. Pop. 8700.

**Clay Ironstone**, a granular or compact admixture of the mineral *siderite* (ferrous carbonate) and clay. It occurs as nodules or in thin beds in various geological systems, but especially in the carboniferous strata. It frequently contains organic matter. When very highly carbonaceous, it passes into the variety called blackband ironstone. See IRON AND STEEL.

**Claymore** (a Gaelic term meaning 'the great sword') is properly used of the old Celtic one-handed, two-edged longsword, often engraved on ancient tombstones, with the guards pointing downwards. The name is now commonly given, inaccurately, to the basket-hilted sword of the officers of Highland regiments.

**Clayton**, JOHN MIDDLETON, statesman, was born in Sussex county, Delaware, 24th July 1796, studied at Yale, and practised as a lawyer. In 1829 he became a United States senator, and while secretary of state in 1849-50, he negotiated the Clayton-Bulwer Treaty with Britain, guaranteeing the neutrality of lines of interoceanic communication across Nicaragua or elsewhere. He died 9th November 1856. See BULWER.

**Clazomænæ**, one of the twelve cities of Ionia which stood on the gulf of Smyrna, westward from Smyrna. Under the Romans it was a free city, and had an extensive commerce. It was the birthplace of Anaxagoras. It is now called Vurla.

**Cleānthes**, a Stoic philosopher, born at Assos, in Troas, about 300 B.C. His poverty was such that he had to work all night at drawing water in order to obtain money for his support and to pay his class-fee while attending the lectures of Zeno—a fact discovered only when the Areopagus called upon the ardent young student to show how he obtained his living. For nineteen years he listened patiently to the great Stoic, and, on his death, succeeded him in his school. He died of voluntary starvation when about eighty years old. Cleanthes differed from the other Stoics in regarding the sun as the governing principle of the world; but none of his writings are extant except a *Hymn to Zeus*, one of the purest and noblest pieces of poetry in the Greek language, showing an admirable union of religious feeling and philosophic thought.

**Clear**, CAPE, a headland of Clear Island, the most southerly point of Ireland, with a lighthouse and telegraph station. Clear Island, 66 miles SW. of Cork, is 1504 acres in area.

**Clearing-house**. The business facilities afforded by bankers to their customers in collecting their bills, cheques on other firms, and similar obligations, early necessitated an organised system of interchanging such documents, whereby labour might be saved, and the cash-balances required in settlements reduced. It is claimed by a French writer that the *Chambre de Compensation de Lyon*, as reorganised in 1667, was practically similar to the modern clearing-house; and the Scottish bank-note exchanges (a species of clearing) were established as far back as 1752. The present system, however, originated in London at an unknown date. It is said that the clerks, when collecting

from the various banking-houses, began to interchange the documents of mutual indebtedness in the street, and subsequently at taverns or any banking-office where they were tolerated. Some time previous to 1773 a special apartment was devoted by the bankers to the purpose; and in 1810 the building in Lombard Street, since known as the 'Clearing-house,' was set apart for the clearing, under the direction of a committee of bankers, and the immediate management of two inspectors. The joint-stock banks were not admitted to the clearing-house until 1854. Four years later the country-cheque clearing was established as a department of the clearing-house. In 1864 the Bank of England entered, but it clears only *against* the other banks. Only eighteen banks, including the two chief offices of the London County and Westminster Bank, are members. Other London bankers arrange with clearing banks to represent them.

The system pursued is as follows: From time to time during the day, each firm transmits to the clearing-house cheques and bills payable by other bankers, classified according to the banks retiring them, account being also taken of obligations coming against their firm. At a certain hour the doors are closed, and the balances struck. Time is allowed for each bank to decide as to honouring the drafts upon it, after which the final adjustment of balances takes place. Subjoined is a specimen balance-sheet as at the close of a day's clearing.

Debtors				Creditors			
£	s	d		£	s	d	
NATIONAL PROVINCIAL							
			Barclay	18,621	4	3	
			Bank	475,186	8	9	
			Capital and Counties	37,739	11	10	
			Counties	11,071	7	9	
			Glyn	60,841	8	7	
56,460	13	9	Joint				
			London Coy and Westminster H.O.	28,556	18	5	
189,162	9	6	London Coy. and Westminster, Lombard Street				
1,731	5	4	Lloyds				
			London City and Midland	91,195	2	4	
			London and Provincial	15,206	0	1	
			London and South-western	962	4	2	
			Martin	5,594	6	9	
			National	8,109	1	8	
			Par's	60,174	10	2	
			Union	34,244	9	4	
			Williams	5,199	14	6	
			Country Clearing	38,685	19	1	
126,080	8	6	Metropolitan Clearing C.H.	138,763	2	4	
323,884	17	1		1,014,601	10	0	
2,418	13	10	Returns	2,772	2	4	
325,803	10	11		1,017,373	12	4	
691,570	1	5	Balance				
1,017,373	12	4					

The figures in either column are the sums due to or by the National Provincial Bank in account with each of the other members of the clearing-house, after allowing for their mutual indebtedness, as well as the total amount of vouchers returned unpaid. The result was that after placing all their claims on the other banks against the claims of the latter on them, there remained a sum of £691,570, 1s. 5d. due by the National Provincial Bank on the general balance. This was largely accounted for by the claims of the Bank of England, who only clear on one side. Each bank makes up a similar form. The inspectors having satisfied themselves that the general balance is correct (all the members having agreed between themselves, and the total *debtor* balances equalling the *creditor*), warrants for settling the balances by transfer at the Bank of England, certified by the inspectors, are passed between the members. Formerly these balances were settled in cash. Thus, transactions to the amount of many millions daily are settled without the use of

a bank-note or coin. The importance of the system is illustrated by the fact, stated in evidence before the House of Commons, that the London and Westminster Bank, by getting admission to the clearing-house, were enabled to reduce their cash-balance by £150,000.

A brief explanation of the terms 'Country Clearing,' 'Metropolitan Clearing,' and 'C.H.,' appearing in the specimen balance-sheet shown above, may be given. The Country Clearing deals with cheques drawn on the provincial branches of the various clearing banks, and also with cheques drawn on the country banks for which they act as London agents. The Metropolitan Clearing, which was instituted in February 1907, includes cheques drawn on the London branches of the various banks. Formerly presentation of such cheques was effected by post, or by 'walk' clerks sent out by each bank; since these cheques have been brought under the operation of the clearing system, a large economy of time and labour has resulted. The spaces opposite the term C.H. (i.e. Clearing-House) are used for the adjustment of errors which arise from time to time.

The record of the total amount of bills, cheques, and drafts passing through the clearing-house is regarded as an index of the state of trade; and as London is the chief centre of trade for the world, this record has a world-wide range. The sums passed through the clearing-house are greatest on certain 'special days.' These are, in normal times, (1) Stock Exchange settling days; (2) Consols settling days; and (3) 4ths of the month, trade bills being frequently dated on the 1st of the month, and, with three days' grace, falling due on the 4th of some succeeding month. In most of the large towns in England there is now a clearing-house, and in Scotland the system, including the separately conducted note-exchanges, has been thoroughly organised, so that clearings take place all over the country, which are settled by draft on Edinburgh, the balances of the Edinburgh clearing-house being finally settled in London twice weekly.

The first clearing-house in America was started in New York on 11th October 1853, and the system has since assumed enormous proportions throughout the United States.

The clearing system also developed to a considerable extent in various British colonies.

The system has also extended to the continent of Europe. *La Chambre de Compensation des Banquiers de Paris* was formed in March 1872, the clearing-house of Berlin in 1883, and that of Vienna in 1884; but their transactions are greatly less than those of London and New York. While it was in connection with banking that the clearing-house system originated, the principle (in modified forms) has been adopted by other departments of business. The Stock Exchange Clearing-house was founded in 1874.

See Howarth, *Our Banking Clearing System and Clearing House* (4th ed. 1907) and *The Banks in the Clearing House* (1906); François, *Clearing House* (Lille, 1887); Cannon, *Clearing Houses* (New York, 1900); White, *Money and Banking* (New York, 1902); Matthews, *The Bankers' Clearing House* (1921).

THE RAILWAY CLEARING-HOUSE is an association instituted in 1842 to enable railway companies in Great Britain to carry on, without interruption, the through traffic in passengers, animals, minerals, and goods passing over different companies' lines of railways, and to afford to the traffic the same facilities as if the different lines had belonged to one company. The arrangements are conducted in London by a committee, the members of which are appointed by the directors of the companies who are parties to it; and the association is regulated by the Railway Clearing Act, 1850. The

companies are each represented on the committee by a delegate. Subordinate committees of railway officers also meet from time to time. The accounts of the clearing-system, and the balances due to and from the several companies, are settled and adjusted by the secretary of the committee, with appeal to the committee, whose decision is final. The clerks at stations of the various companies send abstracts of all traffic monthly. The collected passenger-tickets are also sent monthly. Number-men are employed by the clearing-house at junctions where the lines of different companies meet, who note the number of every carriage, horse-box, wagon, van, and sheet or wagon-cover on the train going beyond the parent line, and make weekly returns. The returns from the companies' stations, together with those of the number-men, enable the accounts of mileage and demurrage incurred to be made up by the clearing-house, by whom the companies are debited and credited, as the case may be. A debtor and creditor account is sent from the clearing-house monthly to each company, showing on the one side in one sum what the company has to receive from all other companies as their proportion of through passenger fares, through goods and parcels rates, and mileage and demurrage of carriages, wagons, and sheets; and on the other side, also in one sum, what the company has to pay to others out of moneys drawn by them. The balance is struck as against, or in favour of, the clearing-house (as a common debtor or creditor). In addition to declaring the balances, the clearing-house supplies to each company monthly statements of the details of the traffic of each station.

The clearing-house system is made available also for the recovery of lost articles of luggage. Reports giving the description of each lost article are sent from all stations daily to the clearing-house, and by this means almost all lost luggage is restored to the owners. The government scheme of the parcel post involves payment by the Post-office to the railway companies, and the apportionment as between the companies is effected through the machinery of the clearing-house. There is a similar railway clearing system in Ireland, with its headquarters in Dublin.

**Clearing-nut** (*Strychnos potatorum*), a small tree of the same genus as *Nux Vomica* (q.v.), abundant in the forests of India. These seeds being rubbed on the inside of a vessel, muddy water put into it quickly becomes clear, all impurities settling to the bottom.

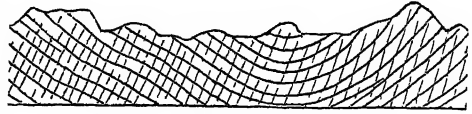
**Cleator Moor**, a town of Cumberland, 4 miles SE. of Whitehaven, with coal-mines and iron-furnaces; pop. 8300.

**Cleats**, in Shipbuilding, are pieces of wood or iron fastened to various parts of the vessel, and having holes or recesses for fastening ropes.

**Cleavage**, in crystals, is the property of splitting more readily along certain planes than others. These planes are the same for all crystals of the same substance, and may be, but need not be, parallel to the crystal-faces. Thus fluorspar crystallises ordinarily in cubes, seldom in octahedra, but the cube can be reduced to an octahedron by flaking off the corners. Cleavage sometimes helps the recognition of minerals. The nearly rectangular cleavage of augite distinguishes it from hornblende, whose angle is about 56°.

**Cleavage**, or **SLATY CLEAVAGE**, is a condition of rocks in which they split easily into thin plates. In true bedding the layers of rock correspond to planes of deposition or accretion, but in slaty cleavage the planes along which the rock splits may or may not coincide with bedding-planes. In point of fact they rarely do, but intersect the bedding-planes at all angles. Slaty cleavage is a

superinduced structure—the result of the extreme compression which the rocks have undergone while they were being squeezed into anticlinal and synclinal folds (see **ANTICLINE**). When thin



Section exhibiting Lines of Cleavage.

sections of clay-slate are examined microscopically, the grains of which the rock is composed are found to be flattened or compressed, and drawn out in the direction of the cleavage planes. Although slaty cleavage is best developed in homogeneous fine-grained clay-rocks, it yet occurs in many coarse-grained rocks as well, but in these the cleavage is never so perfect as in the finer-grained clay-rocks. As induration necessarily accompanies cleavage, the cleaved clay-rocks become of great economic importance, and are familiar to every one in the common blue and purple roofing-slates.

**Cleavers**, or **GOOSE-GRASS** (*Galium Aparine*), a species of Bedstraw (q.v.), a coarse Rubiaceae annual, with whorls of six to eight leaves, both stem and leaves rough with reflexed bristles, the fruit also hispid, and when ripe distributed by adhering like a bur to any animal which may brush against it. A very common weed in hedges and bushy places in Britain and most parts of Europe and North America, it was formerly of repute in domestic medicine as a diuretic. From the time of Dioscorides, and it is said still in Sweden, its prickly stems have been used as a strainer for milk.

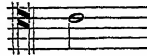
**Cleckheaton** is now part of Spenborough.

**Cleethorpe with Thrumsoe**, a Lincolnshire watering-place and urban district in the parliamentary borough of Grimsby; pop. 28,000.

**Clef**, a musical character placed on the staff, by which the absolute pitch of the notes is fixed. There are three clefs—viz. the G, the C, and the F clef. The G clef is placed on the second line, and the stave with this clef is known as the treble stave; the C clef on the third line as the alto stave; and the F clef on the fourth line as the bass stave. The C clef is a fifth below the G clef, and a fifth above the F clef, thus:



The C clef is also placed on the fourth line for some instruments, and for the tenor part in vocal music,

thus: ; and in old vocal music, and

also in full scores, the C clef placed on the first line is used for the soprano.

**Cleg**, a name given to some insects of the dipterous family Tabanidæ, the females of which are in summer extremely troublesome to horses,



cattle, and human beings. Some of them are well known as 'breeze-flies.' The females pierce the skin of their victims by means of formidable lancet-like mouth organs, and greedily suck the blood from the wounds. The name cleg is sometimes given in England to *Chrysops cæcutiens*, a fly frequent in most parts of Europe, but rare in Scot-

land. It often attacks man, and not infrequently inserts its proboscis through the sleeve, or some other part of the dress. It is about one-third of an inch in length, mostly black, with yellow markings on the abdomen, and very large eyes of the most beautiful green and golden colours. The insect always called cleg in Scotland is *Hematopota pluvialis*—a rather smaller but equally troublesome fly, mostly of a gray colour, but also remarkable for its very large and beautiful eyes, which are greenish, with waved purplish-brown bands. In England it is sometimes called the *Stout*. It is particularly common in low damp places.

**Cleistogamy**, in botany, is the production of small, inconspicuous flowers which never open, but pollinate themselves. In such flowers the petals are apt to be rudimentary, stamens and pollen-grains few in number. They may be subterranean. Many plants, such as chickweed, wood-sorrel, *Lamium amplexicaule*, and violets, produce both cleistogamous and large opening (chasmogamous) flowers, the latter giving an opportunity of cross-pollination. In these species darkness, cold, and other such conditions favour cleistogamy. Some plants produce only cleistogamous flowers.

**Cleveland**, JOHN. See CLEVELAND.

**Cleland**, WILLIAM (1661-89), Covenanting poet. See CAMERONIAN REGIMENT.

**Clematis** (Gr. *klēma*, 'the shoot of a vine'), a genus of plants of the natural order Ranunculaceæ, having four coloured sepals, no corolla, and for fruit numerous one-seeded achænia with long—generally feathery—awns. The species are pretty numerous, herbs or shrubs, generally with climbing stems, natives of very different climates, and much scattered over the world. They possess more or less active caustic properties. The long awns give the plants a beautiful appearance even in winter. The flowers of many species are also beautiful. *C. vitalba*, the common Traveller's Joy, is the only native of Britain. It is common in the south, but becomes rarer towards the north, and is scarcely



*Clematis montana*.

found in Scotland. The twigs are capable of being made into baskets. The fruit and leaves are acrid and vesicant; the leaves are used as a rubefacient in rheumatism; and those of other species are also employed in the same way. A number of species and many garden varieties are of the greatest beauty and most profuse in flowering. The flowers of some in different varieties attain the diameter of from 4 to 8 inches, and range in colour from pure white to pale azure, deep purple, and claret or ruby.

In the United States there are many native species. A beautiful evergreen species from New Zealand, *C. indivisa*, with pure-white flowers, is one of the handsomest of greenhouse climbers; and *C. flammula*, a native of southern Europe and northern Africa, with white flowers, which have a very strong honey-like smell, is the species known as Sweet Virgin's Bower. The garden varieties are propagated by grafting the young shoots in spring on the roots of such common species as *C. vitalba* and *C. flammula*.

**Clemenceau**, GEORGES BENJAMIN EUGENE, born in La Vendée, 28th September 1841, practised medicine in Paris. From his student days he has always been influential in politics. He has been a member of the National Assembly (1871), of the Chamber of Deputies (1876-93), a senator (1902-20), and Prime Minister (1906-9, 1917-20). In January 1920 he withdrew his candidature for the presidency and retired into private life. Apart from the Great War, and the peace of 1919, he is notable as a journalist and for his defence of Dreyfus.

**Clemens**, SAMUEL LANGHORNE, 'Mark Twain' (1835-1910), American humorist, was born at Florida, Missouri. He learned the trade of a printer, and afterwards acted as pilot on the Mississippi River. From a well-known call of the man sounding the river in shallow places ('Mark twain,' meaning 'by the mark two fathoms') his pseudonym as a writer was subsequently taken. After the outbreak of the war of 1861-65 he went to Nevada, where he tried silver-mining; next he became a journalist and lecturer in various parts of the United States. In 1867 he visited France, Italy, and Palestine, gathering material for his *Innocents Abroad* (1869), which established his reputation as a humorist, 125,000 copies selling within three years. He was afterwards an editor at Buffalo, New York, with an interest in the *Express*, where he married Miss Langdon, a lady of wealth. He later removed to Hartford, Connecticut. His books, mostly sold by subscription, yielded him a large income; but he became a member of a publishing firm, and lost his money by its bankruptcy in 1895. His humour, however grotesque, is never mean or ungenerous; it is singularly direct and simple in form, and has appealed as successfully to British as to American readers. 'If the prevailing spirit of Mark Twain's humour,' writes Mr Howells, 'is not a sort of good-natured self-satire, in which the reader may see his own absurdities reflected, I scarcely should be able to determine it.' He varied his work by excellent character-sketches and graphic descriptions. Among his books are *The Innocents Abroad* (1869); *Roughing It* (1872); *The Gilded Age* (1873), the last written with the co-operation of Mr Charles Dudley Warner, and published both as a story and as a comedy, in which shape it had great success; *Tom Sawyer* (1876); *A Tramp Abroad* (1880); *The Prince and the Pauper* (1882); *Life on the Mississippi* (1874); *The Adventures of Huckleberry Finn* (1885); a compilation, *Library of Humour* (1888); *Pudd'n-head Wilson* (1894); *Recollections of Joan of Arc* (1896); *Huckleberry Finn as Detective* (1897); *More Tramps Abroad* (1897); *The Man that Corrupted Hadleyburg* (1900); *Christian Science* (1907); *Autobiography* (1908). His serious outlook on life appears in *What is Man?* (privately printed 1906, published 1910). See W. D. Howells's *My Mark Twain* (1908), the Life by A. B. Paine (1912), and the *Letters* (ed. Paine, 1920).

**Clement**, or CLEMENS, is the name of seventeen Popes (q.v.). The first, CLEMENS ROMANUS, is accounted one of the Apostolic Fathers (q.v.), and is reckoned variously as the second or third successor of St Peter. A 9th-century legend makes him a martyr in the Crimea in 102. His day

is November 23. Origen (185-254) was the first to distinctly identify Clement with St Paul's 'fellow-labourer' (Phil. iv. 3); but this assumption has nothing to support it, while the ancient tradition makes Clement the disciple of St Peter. Moreover, on a name so common endless theories may be built. Distinguished German scholars, such as Hilgenfeld, and Harnack (doubtfully), have identified the bishop with Flavius Clemens, cousin of the Emperor Domitian, whose sons had been named successors to the empire, and who was consul in 95 A.D., and in the same year put to death on a charge of 'atheism' and 'Jewish manners.' The most probable view is that advanced by Lightfoot—that Clement was a freedman of Jewish parentage belonging to 'Cæsar's household'—strong arguments in support of which are set forth in his edition of the two *Epistles*. Of these, the so-called second epistle is really a homily, and is certainly not Clement's; but the first, although its genuineness has been earnestly disputed by the author of *Peregrinus Proteus* (Lond. 1879), is generally accepted. Chiefly hortatory and didactic, it is addressed to the Corinthian Church, in which serious feuds had arisen, and treats of social dissensions and of the resurrection, which is illustrated by a curiously circumstantial account of the phoenix. It was probably written about 95 A.D., and it was widely known and highly esteemed at an early date. Clement would appear to have had some reputation among his contemporaries as a letter-writer; Hermas (q.v.) represents himself as directed by the angel to deliver a copy of his *Shepherd* to him, that he may transmit it to the cities abroad, 'for this function belongs to him.' To-day the epistle is chiefly of interest as the first though innocent step towards papal aggression, and for what Lightfoot calls its *liturgical* position. There is no respectable evidence that it was ever placed in the same catalogue with the canonical books, but in the church at Corinth it was publicly read from time to time, and by the 4th century this use had extended to other churches. For convenience of reading it would be attached to MSS. of the New Testament, as is the case in the famous Alexandrian MS. of the 5th century; but neither on this fact nor on its insertion in the forged Apostolic Canons can any argument be based; and it is only in the late Syriac MS. that it actually appears with the catholic epistles. The first edition was edited by Patrick Young in 1623, from the mutilated and incomplete Alexandrian MS., then in the king's library. This was the only copy known to the world until in 1875 Bryennios (q.v.) published a complete MS. (dated 1056) found at Constantinople, and in 1876 a complete Syriac MS. (1170) came into the possession of Cambridge University. See Lightfoot's scholarly and exhaustive edition (1869-77; 2d ed. 1890), where the second epistle will also be found. Quite a mass of literature has sprung up round the name of Clement, but the other works attributed to him—the Apostolic Constitutions and Canons (q.v.), two Syriac epistles on Virginity (MS. dated 1470; published 1752), the *Clementine* (the *Recognitions* and *Homilies*), and two epistles to James, which, with three forged Clementine letters, were in the 9th century incorporated in the notorious Isidorian Decretals—are all undoubtedly spurious. The *Clementine* is a fiction of which St Peter is the hero; it was regarded by Baur and the Tübingen school as the most notable outcome of the Ebionite party in the early Christian church, and on it much of their theory is based; the *Recognitions* (the Latin form, preserved by Rufinus) have been edited by Gersdorf (1838), the *Homilies* (the Greek form) by Schwegler (1847), Dressel (1858), and De Lagarde (1865).

For the *Epistles to Virgins*, see Beelen's edition (Louvain, 1856), and Funk (Tub. 1881); for their source, see Cotterill's *Modern Criticism* (Edin. 1884).

**Clement of Alexandria**, or TITUS FLAVIUS CLEMENS 'ALEXANDRINUS,' a celebrated father of the Christian church, was born probably at Athens, of heathen parents, about the middle of the 2d century, and resided during great part of his life in Alexandria, whence the epithet *Alexandrinus*. In his earlier years he devoted himself with great zeal to the study of philosophy, and wandered far and wide in quest of truth. The date of his conversion is unknown, but it is certain that after coming to Egypt, and listening to the prelections of Pantænus, he joined the Alexandrine Church, and was made a presbyter. Afterwards he became assistant to his master, whom he succeeded, about 190 A.D., as head of the celebrated Catechetical school. In 203 the persecution of the Christians under Severus compelled him to flee to Palestine. The only later notice we have of him is as the bearer of a letter from his pupil Alexander, afterwards Bishop of Jerusalem, to Antioch; and the date and place of his death are matters of pure conjecture, some writers putting it in 213, others as late as 220. His most distinguished pupil was Origen. Clement held a place in the Western martyrologies until the 17th century, when his name was omitted by Clement VIII. from the revised Roman martyrology; but in France, at least, he has never lost his title, his festival is still celebrated on the 4th December, and his name appears in the popular list of saints whose names may be given to children at baptism.

The chief writings of Clement that have survived, besides a practical treatise, *Who is the Rich Man that is Saved*, are the *Missionary*, the *Tutor*, and the *Miscellaneous*, which form a connected series, probably continued in his lost *Outlines*, which was an investigation of the canonical writings. The first is an exhortation to the Greeks to abandon idolatry; the second, an exposition of Christian ethics; and the third, a collection of treatises and brief observations on Greek and Christian literature, designed as an introduction to Christian philosophy. They show that Clement, when he became a Christian, did not cease to be a philosopher. His liberal mind saw in science not a gift of devils, but of God through the Logos; Greek philosophy was part of the divine education of man, and his teaching is the result of the lofty purity of character that led him to seek the truth alike from heathen writers and from Christian heretics, believing that all that comes from God is good. The period in which he lived must also be taken into account: in his day all believers were regarded as in process of salvation; the distinction between the visible and invisible church had not yet been suggested, while Gnosticism offered to many minds an attractive solution of some obvious difficulties. Clement therefore distinguished between the ordinary believer and the Christian gnostic; above faith he placed knowledge, above salvation the more august glory and full spiritual life of the 'perfect man.' Faith implies knowledge, but imperfect knowledge; many things must be accepted in simple trust, until by contemplation and the practice of what is right the believer shakes himself free from the power of evil, and rises to intelligent sympathy with the divine will. And this system of spiritual evolution Clement extends to the future life, where the process of development is continued before the gnostic becomes as far as possible like God. Here are easily visible the germs of the later mysticism, just as his view of the Father as a pure Monad, undemonstrable, who can only be manifested through the Son, marks an important step in the progress of Neoplatonism. God and the cause of

all things he sought to discover in the simplest thing conceivable; and he went equally astray in making Christianity only a philosophy, and, as a means to a perfect life, the fullness of what had been partial in the Greek systems. Yet two truths he nobly taught—the present recovery of the divine likeness, and that formulated doctrine is not an end but a means to final knowledge. Clement's extant works exhibit a man of pure and gentle spirit, of sincere piety, of wide reading and of wider sympathies, and with a noble conception of the purposes of God's providence; but his learning is undigested, his quotations are often careless, and his turgid, verbose style and desultory method appear to have repelled most scholars.

See editions by Potter (1715) and Stahlin (1905 *et seq.*), translations in Clark's *Ante-Nicene Library* (1877-79) and Butterworth (select works with text, 1919), and a bibliography with Dr Westcott's article in the *Dict. of Chr. Biog.* (1877); Merk, *Clemens von Alexandrien* (Leip. 1879); Winter, *Ethik des Clemens* (Leip. 1882); Bigg, *Christian Platonists of Alexandria* (1886); and works by Eugène de Faye (1899), F. R. Montgomery Hitchcock (1899), John Patrick (1914), and Tollinton (1914).

**Clement XIV.**, GIOVANNI VINCENZO ANTONIO GAGNANELLI, born in 1705 at Sant' Arcangelo, near Rimini, at the age of eighteen entered the order of Minorites, and studied philosophy and theology, which he afterwards successfully taught at Ascoli, Bologna, and Milan. He was the friend and confidant of Benedict XIV., who appointed him to the important post of counsellor to the Inquisition, and under Clement XIII. he was made a cardinal. He succeeded to the papal chair, May 19, 1769, after a conclave agitated by the intrigues of the Catholic sovereigns, who united in opposing every candidate favourable to the Jesuits. The new pope first set about reconciling these monarchs; he suspended the bull *In Cena Domini*, and entered into negotiations with Spain and France. After four years of deliberation, he issued in 1773 the famous brief *Dominus ac Redemptor noster*, suppressing 'for ever' the society of the Jesuits. The motive assigned in the brief is, 'regard to the peace of the church.' From this time his strength gradually gave way, and he died September 22, 1774, of poison, it was said, although no evidence has been produced to verify this suspicion. Clement was remarkable for liberality of mind, address as a statesman, sound learning, and integrity of character. He cherished the arts and sciences, and was the founder of the Clementine Museum, which, by the additions of Pius VI. and Pius VII., became the chief ornament of the Vatican. See Theiner, *Geschichte des Pontifikats Clements XIV.* (Paris, 1853; also in French).

**Clément, JACQUES** (1564-89), the Dominican who stabbed Henry III. (q.v.) of France.

**Clementi, MUZIO**, in his time an eminent pianist and composer for the pianoforte, was born in 1752 at Rome, where he competed successfully for a post as organist at the age of nine. Before he was fourteen, he had composed several contrapuntal works of considerable size, one of which, a mass, had produced some sensation in Rome; he then attracted the notice of an Englishman, Peter Beckford, M.P., who brought him to England in 1766, and at whose house in Dorset he studied till 1770. When he appeared in London, his extraordinary command of the pianoforte secured him an almost unprecedented success. From 1777 to 1780 he conducted the Italian Opera; in 1781 he visited Paris, Strasburg, Munich, and Vienna, where he engaged in a prolonged musical combat with Mozart before the emperor, the victory being left undecided. Mozart's letters express the verdict that Clementi

was 'a mere mechanician;' but the latter had not then exchanged his brilliant execution for the melodic style of his after performances. He made other visits to the Continent, and amassed an independence in England by teaching; and when much of this was lost in the failure of a musical firm with which he had become connected, he founded the business of manufacturer of pianofortes which is still carried on under the name of his associate, Collard. He died at Evesham, 9th March 1832. He has left over a hundred sonatas, of which sixty are for the pianoforte alone; his 'Op. 2' (composed in his eighteenth year) is considered the model of all modern pianoforte sonatas. Of his other works, the *Gradius ad Parnassum* (1817) is a splendid series of studies, 'on which to this day the art of solid piano-playing rests.' See Life by Unger (trans. 1913).

**Cleome'des**, author of a Greek treatise, in two books, *On the Circular Theory of the Heavenly Bodies*, which sets forth the Stoic theory of the universe, and which is remarkable as containing, amid much error and ignorance, several truths of modern science—such as the spherical shape of the earth. Nothing is known definitely regarding his life, but it seems most probable that he flourished in the 2d century A.D. Editions of his treatise are those of Bake (Leyden, 1820), Schmidt (Leip. 1831), and Ziegler (Leip. 1891).

**Cleon**, a famous Athenian demagogue in the time of the Peloponnesian war, for about six years the leader of the party opposed to peace. Originally a tanner, he gradually abandoned his business, and became the champion of popular rights, a position for which his fluent speech and loud voice fitted him admirably. He first became prominent about 427 B.C. by his advocating the putting to death of the Mytilenean prisoners, but his first great success was the reduction of the island of Sphacteria, in which a Lacedæmonian force had long held out. It is by no means clear how far this exploit was not really due to the skilful dispositions of his colleague Demosthenes, but Cleon himself was highly elated with his success, and many of his countrymen must have credited him with military genius, for in 422 he was sent to oppose Brasidas, the great Spartan general, in Macedonia and Thrace. But for this task the demagogue was insufficient, and he only saved his character by falling in the battle fought under the walls of Amphipolis.

Our picture of Cleon has had the misfortune to have been painted in unfavourable colours by such masters as Thucydides and Aristophanes; and, as Grote has pointed out, it should be remembered that the great historian was full of oligarchical prejudices, while we know that Aristophanes girded at other men about whose nobility of character there is no doubt at all. Besides, it appears not unlikely that both owed the demagogue a private grudge; the former for having been banished at Cleon's instance while holding a subordinate command, the latter because Cleon had complained to the senate that in his comedy, *The Babylonians*, Aristophanes had ridiculed his country's policy in the face of foreigners, and that, too, in time of war. Whether just or unjust the picture, Cleon will live in the *Knights* of Aristophanes as the shifty and unscrupulous demagogue, lying and pandering to the mob, which he befools for his own selfish ends. In this comedy he is one of the actual *dramatis personæ*, and this part the author played himself, not being able to find an actor bold enough to take it.

**Cleopat'ra**, daughter of the Macedonian King of Egypt, Ptolemy Auletes, was born in 69 B.C. By the will of her father, who died in 51, she should have inherited the throne along with her younger

brother, Ptolemy, who was also to be her husband, in accordance with Egyptian custom. But she was expelled from the throne by young Ptolemy's guardians, Pothinus and Achillas, whereupon she retreated into Syria to raise troops, and was just about to return to reassert her rights when the great Cæsar arrived in Egypt in pursuit of Pompey. Her charms quickly touched the susceptible heart of Cæsar, who warmly espoused her cause, and, after the successful issue of the Alexandrine war, in which Ptolemy fell, placed her again upon the throne, this time with, as nominal colleague and husband, a still younger brother, of whom she soon rid herself by poison. Cleopatra bore a son to Cæsar, who was called Cæsarion (afterwards cut off by Augustus), and soon followed her lover to Rome, where she received such honours as were but ill-pleasing to the Roman populace. In the civil war after Cæsar's murder, she hesitated at first which side to take. After the battle of Philippi, Antony summoned her to appear before him at Tarsus in Cilicia, to give account of her conduct. The 'serpent of old Nile' sailed up the river Cydnus to meet him, in a gorgeous galley, arrayed as Venus rising from the sea, and accompanied with all the gorgeous and romantic splendour of the East. She was then in her twenty-eighth year, in the perfection of matured beauty, and that, from her pure descent, almost certainly of the best Greek type, spite of Shakespeare's 'gypsy's lust,' Tennyson's 'swarthy' cheeks, and Gérôme's typical Egyptian features. The splendour of her beauty and her wit so fascinated the amorous heart of Antony that he at once flung away for her sake, duty, a Roman's pride, and at last all his ambition and his life. They spent the next winter at Alexandria, where they steeped their senses in the most delirious revelries of reckless love. Antony, although in the meantime he had returned to Rome to marry Octavia, the sister of Octavianus, soon returned to the arms of Cleopatra, who met him at Laodicea, in Syria (36 B.C.), and accompanied him on his march to the Euphrates. From this time his usual residence was with her at Alexandria, and here he heaped upon her and her children the most extravagant gifts and honours. His infatuated folly cost him all his popularity at Rome, and weakened his energies for the inevitable struggle. It was at Cleopatra's instigation that Antony risked the great naval battle of Actium, and when she fled with sixty ships, he forgot everything else and flung away half the world to follow her. When the conqueror appeared before Alexandria, Cleopatra entered into private negotiations with him for her own security; while Antony, who was at first indignant at her treachery, being told that she had already killed herself, fell upon his sword. Mortally wounded, and learning that the report which he had heard was false, he had himself carried into her presence, and died in her arms. Octavianus, by artifice, now succeeded in making the queen his prisoner. Finding that she could not touch his colder heart, and too proud to endure the thought that her life was spared only to grace her conqueror's triumph at Rome, she took poison, or as it is said, killed herself by causing an asp to bite her bosom (30 B.C.). Her body was buried beside that of Antony, and the good Octavia brought up the twin children she had borne to Antony as if they had been her own.

For Cleopatra, 'age cannot wither her'—the fascination of her beauty and the rare romantic interest of her story defy the touch of time. Helen of Troy and Mary Stuart alone divide with her that sovereignty over the imaginations of men that survives across the centuries. See ANTONIUS, CÆSAR, and books by P. W. Sergeant (1909) and Arthur Weigall (1914). For Cleopatra's Needles, see OBELISK.

**Clepsydra** (Gr., 'water-clock'), an instrument to measure time by the trickling or escape of water. In Babylonia, India, and Egypt, the clepsydra was used from before the dawn of history, especially in astronomical observations. A Hindu form of it was that of a copper basin put to float in a vessel, so that by the gradual influx of water through an aperture beneath, it should sink in a certain time. A more common type is that referred to by Greek and Latin writers, which resembled the modern sand-glass, and was used in courts of law to limit the length of the pleadings. Julius Cæsar (*Com. de Bell. Gall.*, lib. v. 13) speaks of measuring time in Britain 'by accurate water-measures,' and some commentators infer that the clepsydra was used by the Britons. More probably, however, it was brought by the Romans, being regularly used in their armies for allotting out the three hours' watches. Pliny ascribes the invention of the clepsydra to Scipio Nasica, but he, no doubt, merely introduced it from Alexandria or Greece, where it had already been greatly improved and perfected.

The general form of the clepsydra consisted essentially of a float which slowly rose by the trickling of water from above through a small hole in a plate of metal. As the float rose it pointed to a scale of hours at the side of the water-vessel, or, in the more elaborate forms, moved a wheel by means of a ratchet, and thus turned a hand on a dial. The first great difficulty was to secure a constant and uniform supply of water. This was well and simply done by using an intermediate cistern, so that, by means of a waste-pipe near the surface, the water always remained at the same level, even when the amount poured in exceeded the average.

There remained a much greater difficulty, arising from a fact often overlooked—viz. that by the Greek and Roman calendar the *hour* was not a fixed space of time, being very much longer in summer than in winter. A *day* meant the interval from sunrise to sunset, and an hour being the twelfth part of it was by no means so simple and measurable a magnitude as the unit of time shown on our modern dials. The problem of measuring the hour, thus varying through the year, was solved by Ctesibius of Alexandria, who invented an elaborate self-adjusting mechanism.—Clepsydra was also the name given to an ancient musical instrument, a hydraulic or water organ, described by Athenæus.

**Clerc, JEAN LE.** See LE CLERC.

**Clerestory**, an upper row of windows rising *clear* above the adjoining parts of the building, but more probably so named as admitting *clearness* or light. The term is particularly applied to the windows in the upper part of the central nave of churches (see GOTHIC ARCHITECTURE; and for an illustration, the article BRISTOL). This mode of lighting was also in use among the Romans. See BASILICA.

**Clergy** (Gr. *klēros*, 'a lot, an inheritance'). The word *klēros* occurs in the Septuagint as the equivalent of the Hebrew *nachalali*, 'an inheritance,' applied to the Jewish nation generally as peculiarly the divine heritage (Deut. iv. 20; ix. 29), and to the Levitical office specifically, as a 'spiritual' heritage, distinguished from the temporal possessions of the other tribes (Deut. x. 9; xviii. 1-2). In the New Testament it is found in cognate senses applied to the Christian body or its several congregations (1 Peter, v. 3, where the word is plural), and to the apostolic office (Acts, i. 17, 25). Hence the term was very generally applied to the ministers of the Christian religion, as holders of an allotted office, in contradistinction to the

*Laity* (q.v.). This use of the term is very ancient, being found in Clement of Alexandria (*De Divite. Servando*, 46) and Tertullian (*De Monog.* 12), and appears to have gradually become prevalent, as the ministers of religion more and more exclusively, instead of the members of the Christian church generally, began to be regarded as God's 'heritage' and 'priesthood' (1 Peter, ii. 9), consecrated to him, and peculiarly his. The distinction between the clergy and the laity became more marked through the multiplication of offices and titles among the clergy, the ascription to them of a place in the Christian church similar to that of the priests and Levites in the Jewish Church, with peculiar rights and privileges (which occurs as early as Clement of Rome, *Ep. ad. Corinth.* i. 40), their assumption of a peculiar dress and of official insignia, the growth of monastic institutions, and the introduction of celibacy. In harmony with the notions on which this distinction is founded, is that of an indelible or almost indelible character derived from ordination, so that a renunciation of the clerical office is either viewed as an impossibility, or a sort of apostasy. These notions in their highest degree belong to the Church of Rome. In the Protestant churches, the distinction between clergy and laity is much less wide; and although the same terms are often used, it is rather conventionally than in their full signification. The employment of official robes by the clergy preceded their assumption of a peculiar ordinary dress (indeed, for the most part, there was no direct adoption of a special garb for ordinary occasions, but the clergy did not change their fashions as the laity did, and continued to wear attire, such as the cassock, which was once commonly worn by all persons, but was discarded by the laity), and is not so intimately connected with any peculiar pretensions.

Among the privileges accorded to the clergy by the Roman emperors, and in the middle ages, was exemption from civil offices; among the rights asserted by them, and which caused much dispute, was exemption from lay-jurisdiction, even in cases of felony. With the revival of the Western Empire by Charlemagne, the clergy became one of the Estates of the empire, and the bishops were given baronial rank, and entitled to sit along with the temporal nobles in the imperial Diets. This institution survived the break-up of the Carolingian empire, and prevailed in several parts of Europe, very noticeably in France until the Revolution. In England the clergy are still technically and constitutionally one of the three Estates of the realm, and taxed themselves in their convocations as late as 1663. The bishops who sit in the House of Lords do so in virtue of baronies annexed to their sees, but not as prelates of the church, and it was held by parliament in Henry VIII.'s time, and later by Coke, that the right of session in convocation made the clergy of the second order ineligible to sit in the House of Commons. But the point remained doubtful till the Act 41 Geo. III. chap. 63, sec. 4 definitely excluded clerks in holy orders from sitting there, under a penalty of £500 per day if so sitting or voting. Those only who have formally relinquished the clerical office can sit, in virtue of the Clerical Disabilities Act of 1870. The clergy were distinguished into the *higher clergy* and the *lower clergy*, that is, those in the 'major orders' of bishop, priest, and deacon (and, since the 13th century, sub-deacon), or those in the 'minor orders' of acolytes, lectors, exorcists, &c. The term *Secular Clergy* is the designation of priests of the Latin and Greek churches who do not follow any religious rule (*regula*), but have the care of parishes. Monks who are in holy orders are designated *Regular*

*Clergy*. See BENEFIT OF CLERGY, ORDERS, BISHOP, PRIEST, RECTOR, &c.

**Clergyman's Sore Throat.** See THROAT.

**Clericus.** See LE CLERC.

**Clerk** (Lat. *clercus*), properly a clergyman; also, in old usage, a scholar; an officer attached to courts and corporations, who keeps the records; a lawyer's assistant; a booking or railway clerk; and in the United States, a shopman.

The PARISH CLERK is an official in the Church of England, who leads the responses in a congregation, and assists in the services of public worship, at funerals, &c. There is usually one in each parish. In cathedrals and collegiate churches there are several of these lay-clerks; and in some cases they form a corporate body, having a common estate, besides payments from the chapter. Before the Reformation, the duties of parish clerk were always discharged by clergymen in minor orders.

**Clerk, JOHN**, of Eldin, writer on naval tactics, was born in 1728, the seventh son of the antiquary, Sir John Clerk of Penicuik, Midlothian (1676-1755). He prospered as an Edinburgh merchant, and by 1773 purchased the small estate of Eldin at Lasswade, where he devoted himself to etching, to geology, and to studying deeply both the theory and practice of naval tactics. In 1779 he communicated to his friends a new manœuvre for 'breaking the enemy's line' in a naval battle—a method which is claimed to have gained, in 1782, a decisive victory over the French. In 1782 Clerk printed fifty copies of his *Essay on Naval Tactics*, published in extended form in 1804. He died 10th May 1812.—His son, JOHN CLERK (1757-1832), was raised to the Scottish bench as Lord Eldin.

**Clerke, AGNES MARY** (1842-1907), born at Skibbereen, County Cork, lived in Italy and London, made astronomical observations at the Cape of Good Hope and elsewhere, and wrote a series of works on astronomy and the history of the science, including *Astronomy in the 19th Century*, *The System of the Stars*, *Astrophysics*, *Modern Cosmogonies*, and the book on the Herschels—not to speak of *Studies in Homer*.

**Clerkenwell**, a London parish, lying within the parliamentary borough of Finsbury, and due north of St Paul's. It is largely inhabited by watch-makers, goldsmiths, and opticians. The Fenian attempt to blow up Clerkenwell prison took place 13th December 1867.

**Clerk-Maxwell.** See MAXWELL.

**Clermont** (in the middle ages, *Clarus Mons*, or *Clarimontium*) is the name of several towns in France. The most important are: (1) CLERMONT, in the department of Oise, 41 miles N. of Paris by rail, with a large hospital and a prison for women. Population, 4000.—(2) CLERMONT-FERRAND, the capital of the department of Puy-de-Dôme (the *Augustonemetum* of the Romans, in the country of the Arverni), which is finely situated on a gentle elevation between the rivers Bedat and Allier, 135 miles S. of Paris by rail. Among the principal buildings are the old Gothic cathedral, built of dark lava from a neighbouring range of extinct volcanoes; the fine church of Notre Dame, where Pope Urban II. preached the first Crusade; the handsome Palais des Facultés; and the government buildings, formerly a convent (1250). The town is the seat of the university of Clermont, colleges, technical schools, and several scientific bodies, and has a large public library. The streets, with the exception of a number of fine squares, are narrow, tortuous, and steep. The chief manufactures are rubber goods, candied fruits, wax matches, chemicals, linen, rope, lace, and machines, and there is

an extensive traffic in the produce of the district, and in the transit trade between Paris and the south of France. There are several mineral springs in the town, of which the iron spring of St Alyre (65° F.) has formed by deposits in the course of ages two natural bridges. The bishopric of Clermont was founded in 253; and seven ecclesiastical councils were held here during the middle ages, the most remarkable of which was that in 1095, at which the first Crusade was instituted by Urban II. A statue has been erected to Pascal, who, as well as Gregory of Tours, was a native of Clermont. Pop. (1872) 32,963; (1921) 82,577.—(3) CLERMONT L'HÉRAULT, 33 miles W. of Montpellier by rail, with manufactures of leather and of cloth for the army. Pop. 5000.

**Clevedon**, a pleasant Somersetshire watering-place, on the Bristol Channel, 12 miles by road but 16 by rail WSW. of Bristol. The historian Hallam, and Arthur, his son, lie in the old parish church; Coleridge lived a while here at Myrtle Cottage (1795); and Clevedon Court (much damaged by fire in 1882) is the 'Castlewood' of Thackeray's *Esmond*. Pop. 7000.

**Cleveite**. See ARGON.

**Cleveland**, a wild mountainous district, with some picturesque fertile valleys, forming the east part of the N. Riding of Yorkshire between Whitby and the Tees. In the south the hills rise 1300 to 1850 feet. An extraordinary change has been wrought in the aspect of the country by a rich discovery of ironstone in the Cleveland hills; since 1851, lonely hamlets have become populous towns. The ironstone is chiefly an argillaceous carbonate, inferior to that of the Coal Measures. See MIDDLESBROUGH, IRON. The title of Duchess of Cleveland was conferred in 1670 by Charles II. (q.v.) on his mistress, Barbara Villiers, and her eldest son (Fitzroy) was first duke. In 1827 the marquise of Cleveland was bestowed on William Harry Vane, Earl of Darlington (whose grandfather married a descendant of the first duke); in 1833 he became duke—a title extinct since 1891.

**Cleveland**, the county seat of Cuyahoga county, Ohio, is the largest city of the state in population and general importance, and the fifth, in 1920, in the United States; it is situated at the mouth of the Cuyahoga River, on the south shore of Lake Erie, 255 miles by rail NE. of Cincinnati, 133 SW. of Buffalo, and 350 E. of Chicago. The city is built mainly upon a plain from 60 to 150 feet above the lake, and is divided into two great divisions, the east and west sides, by the tortuous valley of the Cuyahoga. The 'flats,' about half a mile wide, along the river are occupied by vast lumber-yards, numerous factories, iron, flour, and other mills, coal-yards, ore docks, ship-yards, &c. A wide and massive viaduct, 3211 feet long, constructed mainly of stone (1878), crosses the valley at the height of 50 to 70 feet; and another viaduct of iron (1888), 100 feet above the river and 3931 feet long, makes a second broad level highway between the two divisions of the city. Several other viaducts have since been built. The river forms the inner harbour, and is spanned by numerous bridges. An outer harbour in the lake, safe and commodious, is enclosed by an immense United States breakwater, over 5 miles long and half a mile from the shore, with a large opening for vessels opposite the mouth of the river. A pier on the lake-front saves passenger steamers the necessity of passing under the bridges. Cleveland has a fine city-hall, a court-house, post-office, and other public buildings. The business centre extends east from the lower part of the river-valley, along Superior Street, which is 132 feet wide, and is the chief shopping thoroughfare. It embraces

several parallel and intersecting streets. The Public Square (10 acres in area) is adorned with monuments, fountains, and the fine old 'Stone' (first Presbyterial) Church, a theatre, an hotel, banks, and many business blocks. This attractive breathing-spot contains fountains, a stone speakers' stand for public meetings, and a statue of Commodore Perry, the hero of the battle of Lake Erie in 1813. From the south-east corner of the square, Euclid Avenue, the most famous street in the city, and, according to Bayard Taylor and other travellers, the most beautiful in the world, extends nearly east through the best residence quarter of Cleveland, though business is encroaching upon it. Four and a half miles from the square it passes Wade Park, a beautiful tract of about 65 acres, containing a lake for boating, a deer paddock, fountains, groves of noble forest-trees, and the Museum of Art (1913-16).

A mile farther east is Lake View Cemetery, one of the finest in the country. Here, on a commanding site, 250 feet above Lake Erie, stands the stone monument, 125 feet high, over President Garfield's grave. Euclid Avenue is lined with stately mansions upon a gentle eminence, 200 to 500 feet from the Avenue, in a park-like stretch of shade-trees, smooth lawns, flowers, shrubbery, and winding walks and drive-ways. The same wealth of gardens and shade-trees is noticeable in a less degree throughout the 'Forest City,' except in the poorest quarters. Few houses are built in blocks, and tenements are virtually unknown. A great proportion of the families own the houses in which they live. The area of the city is 57 sq. m. The greater part of this area lies east of the river. The soil is light and sandy, the drainage excellent, and the water supplied from Lake Erie by tunnels is pure and abundant. The climate is temperate, the average yearly rainfall being 37.6 inches, and the mean annual temperature 50° F. Naturally the death-rate is low. Cleveland has a music-hall capable of seating 5000 persons, several fine theatres and others of less importance, hundreds of churches, the Western Reserve University, colleges, hospitals, asylums, and other benevolent institutions. There are two large circulating libraries, one, containing over 200,000 volumes, being free. Schools are numerous, and many periodicals are published in the city. Cleveland's rapid growth is due mainly to the fact that nowhere else can the rich iron ores of Lake Superior, the coal of northern Ohio, and the limestone of the Lake Erie islands be brought together so cheaply. The chief industries of the city are the various manufactures of iron, including steel rails, forgings, wire, bridges, steel and iron ships, engines, boilers, nails, screws, sewing-machines, motor-cars, agricultural implements and machinery of all kinds, the refining of petroleum, pork-packing, wood-work, and other manufactures of endless variety. In ship-building it takes a leading place among American cities. There are many natural gas-wells in the western outskirts. The city has a commanding commercial situation, due, primarily, to its position at the north terminus of the Ohio Canal, connecting Lake Erie with the Ohio River, at the mouth of the Scioto. The start obtained when the canal was opened in 1834 has been maintained. Seven railroads terminate in the city, and two pass through it from east to west. Cleveland's lake commerce is very great, and the bulk of it is coal and iron. Lumber and grain are also important receipts, and it is the largest fresh-fish market in America. In 1796 a party under General Moses Cleveland laid out the site of a town where Cleveland now stands, and in 1830 the population of the town was 1076. In 1836 the city of Cleveland was incorporated. Since then its growth has been very

rapid. In 1840 the Federal census showed a population of 6071; (1850) 17,034; (1860) 43,417; (1870) 92,829; (1880) 160,146; (1900) 381,768; (1910) 560,663; and (1920) 796,841.

**Cleveland**, or CLEVELAND, JOHN, cavalier poet, born at Loughborough in June 1613, the son of a clergyman ousted by the parliament from the living of Hinckley in 1644. In 1627-31 he was at Christ's College, Cambridge, and then migrated to St John's College, where he was elected to a fellowship in 1634, and lived nine years 'the delight and ornament of St John's society.' Here he studied both law and physic. Cleveland vigorously opposed Cromwell's election to the Long Parliament for Cambridge, and was for his loyalty ejected from his fellowship by the parliament in 1644. He betook himself to the king's army, was popular among the cavaliers, and was appointed 'judge-advocate' at Newark, but was obliged to surrender with the garrison. His indignation at the Scottish army for handing over the king to the parliamentarians he expressed in some stinging verses, which, however, are too violent to be really strong. Henceforward Cleveland lived upon the hospitality of his partisans, and was forced to keep his wit in check. In 1655 he was arrested at Norwich, but was soon released by command of Cromwell, whose magnanimous spirit could admire the courageous manliness of the poor poet's letter addressed to him. In 1656 he published a small volume containing thirty-six loyal poems, consisting of elegies upon Charles I., Strafford, Laud, and Edward King, the subject of Milton's *Lycidas*, also some stinging satires. Cleveland now went to live at Gray's Inn, where he soon after died, 29th April 1658. In the year 1677 was published, with a short account of the author's life, *Clevelandi Vindiciæ, or Cleveland's Genuine Poems, Orations, Epistles, &c.*, and in 1910 an edition by Berdan. Cleveland undoubtedly exercised a strong influence upon the greater genius of Butler. Thomas Fuller commends him as 'a general artist, pure latinist, exquisite orator, and eminent poet. His epithets were pregnant with metaphysics, carrying in them a difficult plainness, difficult at the hearing, plain at the considering thereof.' See Saintsbury, *Caroline Poets*, vol. iii.

**Cleveland**, STEPHEN GROVER, the twenty-second and twenty-fourth president of the United States, was born at Caldwell, Essex County, New Jersey, 18th March 1837, the son of a Presbyterian minister. In 1859 he was admitted to the bar in New York State, whither he had removed, and began the practice of law at Buffalo. From 1863 to 1866 he was assistant district attorney for Erie county, and in 1870 was chosen sheriff. After filling the office of mayor of Buffalo, he was, in 1882, elected governor of New York by an unexampled majority of more than 190,000 votes. His course as governor was approved by the best people of all parties. In 1884 he was nominated by the Democrats for the chief-magistracy of the United States. The canvass which followed was one of extreme earnestness and excitement. Cleveland received 219 electoral votes (Blaine, the Republican candidate, securing 182); and the returns of the popular vote also gave him a plurality. He took his seat as president in 1885. In a unique and forcible message to congress in December 1887 regarding the reduction of the great surplus in the national treasury, he strongly advised a careful readjustment of the tariff charges on certain manufactured articles of import, and the admission duty-free of some of the raw materials of manufactures—a position which led to a well-defined issue between the two political parties. Protectionists classed the president's message as a free-trade document, but

this was denied by the Democrats, and its doctrines were adopted as the basis of the Democratic platform at the convention of that party in 1888, when Cleveland was unanimously nominated for re-election to the presidency. In the following August, on the rejection of the proposed Fisheries Treaty with Canada by the Republican majority in the senate, the president sent a message to congress, declaring a policy of 'retaliation' against Canada now necessary. In October he demanded the recall of Lord Sackville, the British minister, for writing a letter held to trench on American politics. At the election in November, Cleveland was defeated by the Republican candidate, General Harrison, over whom, however, he secured a large majority in November 1892. His next term of office was signalled by his zeal for currency reform, for the repeal of the Silver Act, and against the high republican tariff schemes, and by a sudden intervention in the dispute between Britain and Venezuela (q.v.) by a message to congress (December 1895), which for a time threatened to cause war between Britain and the United States. In March 1897 he made way for President McKinlay (q.v.). He died 24th June 1908. See Life by Dr Robert McElroy (1923).

**Cleves** (Ger. *Kleve*, Dutch *Kleeft*), a town of Rheinland, 48 miles NW. of Dusseldorf. It is situated on three gentle elevations, about 2½ miles from the Rhine, with which it communicates by canal, in the midst of a rich and beautiful country. It is well built, in the Dutch fashion, and surrounded by walls. The fine old castle, known as the Schwanenburg, partly built on a commanding rock, is the reputed scene of the legend of the Knight of the Swan, made familiar by Wagner's opera of *Lohengrin*. Anne of Cleves, fourth wife of Henry VIII., was born in this castle. In the collegiate church, which dates from the 14th century, are some good monuments to the counts and dukes of Cleves. Cleves has manufactures of cotton and leather goods, tobacco, &c. Population, 20,000. Cleves was the capital of a duchy (a countship until 1416) extending along both banks of the Rhine, which passed by inheritance in 1609 to Brandenburg.

**Cleves**, ANNE OF (1515-57), daughter of John, Duke of Cleves, became in 1540 fourth wife of Henry VIII. of England by the policy of Thomas Cromwell. The king, disappointed in her looks, had the marriage declared null and void six months afterwards. Anne tamely acquiesced, and continued to live in England. See Hume, *Wives of Henry VIII.* (1905).

**Clew Bay**, an inlet of the Atlantic, on the west coast of County Mayo, Ireland, about 15 miles long by 9 broad. The upper part of the bay contains an archipelago of fertile and cultivated islets; and at the entrance of the bay is Clare Island (3949 acres), which, as well as Inishgort (27 acres), has a lighthouse.

**Cliché** (Fr.), the impression made by a die in any soft metal. It is the proof of a medallist's or die-sinker's work, by which they judge of the effect, and ascertain the stage of progress which they have reached before the die is hardened. The same term is applied by the French and others to electrotypes casts from wood-engravings.

**Clichy**, a town of France, on the Seine, to the north-west of Paris, of which it forms a suburb. It has numerous manufactories, especially of chemicals and catgut, and is much affected by washerwomen. Pop. 50,000.

**Click-beetle**, or SKIP-JACK. See WIRE-WORMS.

**Client**. See AGENT AND CLIENT, PATRON.

**Cliff-dwellers**. See AMERICA (*Antiquities*).

**Clifford**, a family descended from Walter, Richard Fitzpounce's son, who by marriage, prior to 1138, acquired Clifford Castle on the Wye, 17 miles W. of Hereford, and who assumed the surname Clifford. He was the father of Fair Rosamond, Henry II.'s mistress, who seems to have died about 1176, and to have been buried at Godstow Nunnery, near Oxford. The legend of her murder by Queen Eleanor appears first in the 14th century; the Woodstock maze, the clue, the dagger, and the poisoned bowl belong to a yet later age. Among Walter's descendants were the soldier-judge Roger de Clifford, who by marriage with Isabella de Vipont got Brougham Castle in Westmorland (circa 1270); John (1435-61), the savage Lancastrian; Henry (1455-1523), the 'shepherd lord'; Henry (1493-1542), fifteenth Lord Clifford and first Earl of Cumberland; George, third earl (1558-1605), naval commander; and Henry, fifth and last earl (1591-1643). Of a cadet branch was Thomas Clifford (1630-73), a Catholic member of the Cabal, in 1672 created Lord Clifford of Chudleigh.

**Clifford, JOHN** (1836-1923), Baptist minister and Liberal politician, was born at Sawley, near Derby. In 1858-1915 he was pastor of a charge in Paddington; in 1905-11 president of the Baptist World Alliance. See his *Life, Letters, and Reminiscences* by Sir James Marchant (1924).

**Clifford, WILLIAM KINGDON, F.R.S.**, one of the foremost mathematicians of his time, was born at Exeter, 4th May 1845. He was educated at a school in his native town, at King's College, London, and at Trinity College, Cambridge. While at Trinity he read largely in the great mathematical writers, and came out second wrangler in 1867, next year being elected a fellow of his college. At this time, while excelling in gymnastics, he would also solve and propound problems in the pages of the *Educational Times*, and could discuss with ease complicated theorems of solid geometry without the aid of paper or diagram. A High-Churchman at first (though on unconventional speculative grounds), Clifford soon after taking his degree threw off all dogmatic restraints, and discussed the fundamental questions of the philosophy of religion with complete independence. In August 1871 he was elected to the chair of Mathematics and Mechanics at University College, London, which post he retained until his untimely death at Madeira, March 3, 1879. Clifford first established his reputation as an original thinker with the faculty of expressing scientific thought in plain and simple language by a Friday evening discourse at the Royal Institution, *On Some of the Conditions of Mental Development*. He was a valued member of the London Mathematical Society, contributing to the *Proceedings*; for a time he acted as secretary, and afterwards vice-president of the Mathematical and Physical section of the British Association; he also lectured to the Sunday Lecture Society on various physical and philosophical subjects. The versatility of his mind for philosophical and scientific discussion was further shown by his varied contributions to periodical literature. Clifford issued in his lifetime the first part of *Elements of Dynamics* (1878). A further portion, edited by Mr R. Tucker, was published in 1887. A work on the *Common Sense of the Exact Sciences*, which Clifford left unfinished, was completed and edited by Professor Karl Pearson in 1885. A selection from his *Mathematical Papers* appeared in 1881, and a series of lectures on *Seeing and Thinking* in 1879. Clifford's general scientific and philosophical writings are collected, with a prefatory memoir, in *Lectures and Essays*, edited by L. Stephen and F. Pollock (1879; 2d ed. 1886).—**MRS CLIFFORD (LUCY LANE)** published a really

striking novel, *Mrs Keith's Crime* (1885); *Aunt Anne* (1892); two books for young children of quite unusual interest, *Anyhow Stories* and *Very Short Stories and Verses for Children* (1886); and plays.

**Cliff-swallow** (Petrochelidon). See SWALLOW.

**Clifton**. See BRISTOL.

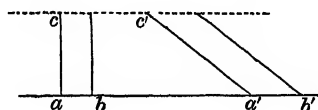
**Clifton**, Ontario. See NIAGARA FALLS.

**Clifton**, (1) a city of New Jersey, in Passaic county, 13 miles NW. of New York; pop. 26,000.

—(2) A copper-mining town of Arizona, 100 miles NW. of Deming, New Mexico; pop. 4000.

**Climacteric Years** (from Gr. *klimaktēr*, 'the step of a stair or ladder,' *klimax*). It was long believed that certain years in the life of man had a peculiar significance to him, and were the critical points, as it were, of his health and fortunes. The mystical number 7 and its multiples with odd numbers (e.g. 35, 49) constituted crises of this kind. The most important of all was the 63d year, called, by way of eminence, the 'climacteric year' or 'grand climacter,' which was supposed to be fatal to most men; its influence being attributed to the fact that it is the multiple of the two mystical numbers 7 and 9. An actual 'change of life' (Fr. *âge critique*) in woman is marked by the cessation of menstruation, usually between the 48th and 52d years. Astrologers called any period which an evil conjunction marked as threatening, a *climacteric time*.

**Climate** (from the Greek *klima*, 'a slope or inclination,' afterwards applied to a tract of country, with reference to its supposed inclination to the pole, and the effect of the obliquity of the sun's rays upon the temperature), a term now employed as including not merely the conditions of a place or country with regard to temperature, but also its meteorological conditions generally, in so far as these exercise an influence on the animal and vegetable kingdoms. The effect of the sun's rays is greatest where they fall perpendicularly on the surface of the earth, and diminishes as their obliquity increases; the surface which receives any given amount of the sun's rays increasing with their increased obliquity, as  $a'b'$  is greater than  $ab$  in the annexed figure; whilst



at the same time the oblique rays being subjected to the influence of a greater number of particles of the atmosphere, as  $c'a'$  is longer than  $ca$ , a greater amount of their heat is absorbed before they reach the surface of the earth at all. The greater or smaller extent of surface receiving a certain amount of heat, also makes important differences to arise from *exposure* by slope towards the equator or towards the nearest pole. *Elevation* is a most important cause of differences of climate. As we ascend from the level of the sea to the greatest mountain altitudes, the temperature gradually diminishes, and we ultimately reach a region of perpetual snow, as in approaching the poles. The progressive diminution of the temperature is, however, affected by many causes, so that the line of perpetual snow is far from being at the same elevation in all places of the same latitude. Thus the snow-line on the southern side of the Himalayas is depressed by the heavy rainfall brought by the winds from the Indian Ocean; and that on the northern side is elevated by the extreme drought and summer heat in the vast

tablelands of Central Asia, thus causing active evaporation from the snow-fields; so that the difference between the two is not less than 4000 feet in favour of the northern side of the mountain-ranges; and Humboldt says, 'millions of men of Tibetan origin occupy populous towns in a country where fields and towns would, during the whole year, have been buried in snow, if these tablelands had been less continuous and less extensive.'

As the actual temperature of the atmosphere depends not so much upon the direct rays of the sun as upon the radiation from the heated surface of the earth, the diversities in the character of that surface are productive of great effects in modifying climate. A sandy desert, a tract of country clothed with luxuriant vegetation, and an expanse of water, absorb and radiate heat in very different degrees. A newly ploughed field both absorbs and radiates heat much more rapidly than a field covered with grass. A sandy desert heats the atmosphere above it much more than either a fertile tract or a watery expanse, whilst a watery expanse only slightly raises the temperature; but, on the other hand, the desert cools sooner by terrestrial radiation; whilst the heat absorbed by the water being diffused through a larger mass, owing to the depth to which solar radiation penetrates and to vertical as well as horizontal currents generated by the winds to great depths, the influence of the ocean, of seas, and of great lakes, is very powerful in maintaining a greater equableness in the temperature of the air. Thus maritime places, and particularly islands and peninsulas, have a more equal temperature, with less diversity of the extremes of summer and winter, than more inland or continental places otherwise similarly situated. The effect of the sea is modified by many circumstances, and particularly by currents, of which the Gulf Stream (q.v.) affords a notable instance, the heated water conveyed by it and by the general surface-flow north-eastwards of the waters of the Atlantic, from the equatorial to the polar regions, having a great influence on the climate, particularly of the north-west of Europe. Over the world generally, atmospheric currents or prevailing winds must be regarded as exercising even a greater influence on climate than oceanic currents. The quantity of rain or snow that falls in the course of a year, and the times and manner of its falling, are circumstances which have the greatest possible effect on climate; these being in their turn much influenced by the distribution of land and water, and by the character and elevation of the surface of the land, according as the mountain-ranges lie across or in the line of the rain-bringing wind.

The relations of climate to vegetation are generally determined less by the mean annual temperature than by the relative duration of summer and of winter. Thus maize, which may be mentioned as an important example, succeeds well in climates of which the winter-cold is severe, the summer season alone being sufficient for its whole life; whilst, on the other hand, such plants as fuchsias, some kinds of laurel, and even the common hawthorn, which succeed well enough where maize would scarcely put forth an ear, would perish from the colder winters of countries where it is profitably cultivated. The polar limit of particular species of animals, except those which hibernate, is generally determined by the degree of winter-cold which they can bear without injury.

Bogs and marshes exercise an unfavourable influence on climate, cooling the air and generating fogs, as do clay-soils also to some extent, through their retentiveness of moisture; whilst marshes of some kinds, and in some situations, abound in malarious and other exhalations very unfavourable to health. Similar remarks apply to large tracts of forest.

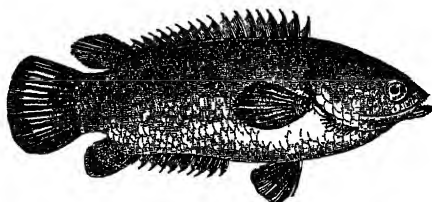
The clearing, drainage, and cultivation of land have generally favourable effects on climate; although plantations are often beneficial for shelter, and a too complete removal of natural forests may prevent the deposition of moisture from the atmosphere to such a degree as to cause droughts, a result stated to be exemplified in some of the smaller West India Islands, and the tendency to which is said to be manifested on a great scale in some sections of the continent of North America.

The important and difficult subject of climate will be found further elucidated in some of the principal geographical articles (ASIA, &c.), and in the articles ATMOSPHERE, GEOGRAPHICAL DISTRIBUTION, GLACIAL PERIOD, HAIL, HEALTH RESORTS, HYGROMETER, ICE, METEOROLOGY, MONSOONS, PLEISTOCENE, RAIN, SEASONS, SNOW-LINE, STORMS, TEMPERATURE, WEATHER, WIND. See also the great *Handbook of Climatology* by Julius Hann (3d ed. 1909-11; trans. 1903-4). Medical Climatology is an important subject of research, and of it the literature of health resorts represents a subsection, as illustrated by *The Climates and Baths of Great Britain* (2 vols. 1895-1902). Changes of climate seem to be responsible for grave national and political changes; the desiccation of Asia (q.v.) may have caused the great migrations of the early Christian centuries.

**Climax** (Gr., 'a stair'), in Rhetoric, that artifice which consists in placing before the mind of the reader or hearer a series of propositions or objects so arranged that the least forcible strikes it first, and the others rise by successive gradations in impressiveness. See the example in 1 Sam. iv. 17.

**Climbing.** See ALPINE CLIMBING.

**Climbing Perch** (*Anabas scandens*), a bony fish in the Acanthopteri division, famous for its peculiar clambering habits. It is a native of rivers and ponds in most parts of the East Indies. It is about six inches long, and in general form somewhat resembles a perch. That this fish climbs trees, has been asserted by observers whose veracity and accuracy cannot easily be questioned; yet others, who have enjoyed ample opportunity of observation, express great doubt concerning this habit. According to circumstantial accounts, the fish suspends itself by its spiny gill-covers, and by fixing its anal fin in cavities of the bark, urges its way upwards by distending and contracting its body. There is no doubt that it often leaves pools when they are in danger of being dried up, and travels in search of water. Though these fish are sometimes



Climbing Perch.

compelled in their distress to travel by day, and have been met in the glare of noon toiling along a dusty road, their migrations are generally performed at night or in early morning, whilst the grass is still wet with dew. This restless fish is aided in its peregrinations out of water by an accessory labyrinthine respiratory cavity, in which water may be retained for a considerable time. Climbing perches are plentiful in the Ganges, and the boatmen have been known to keep them for five or six days in an earthen pot without water, using

daily what they wanted, and finding them as lively as when just caught. Some related forms, such as the walking fish (*Ophiocephalus*), exhibit to a less marked degree the same power of living out of water. Closely related also is the Chinese Macropod, not unfrequently kept for its beauty in aquaria. Many of the genera make nests for the eggs, over which the males frequently keep guard.

**Climbing Plants**, or CLIMBERS, are, in the most extensive and popular sense of the term, those plants which, having weak stems, seek support from other objects, chiefly from other plants, in order to ascend from the ground. This, however, is accomplished in very different ways. Some climb by means of small root-like processes growing from the stem, as the ivy; others by means of hooks (e.g. Cleavers, q.v.); others again twining round their support—e.g. hop, convolvulus, &c.; and others, the most evolved, by help of sensitive organs, which are branches or leaves or leaf-stalks more or less modified. The subject of climbing plants has been worked out with peculiar fullness and interest in Darwin's classical monograph. See also in this work the section of the article PLANTS on the movements of plants; also the articles on CLEMATIS, CONVULVULUS, HONEYSUCKLE, HOPS, IVY, LIANAS, PASSIONFLOWER, VINE, &c.

**Clinical Medicine** (Gr *klinē*, 'a bed') is that department of the art which is occupied with the investigation of diseases at the bedside of the sick; and a clinical lecture is one delivered to students there. So with clinical surgery. Clinical baptism is baptism administered to sick or dying persons on their sick-bed; a clinical convert is one converted on his death-bed.

**Clinker**, the name given to the scales or globules of black oxide of iron, obtained from red-hot iron under the blows of a hammer. The same term is applied to the slags of iron-furnaces. By geologists the cindery-like masses which form the crust of some lava-flows are termed clinkers.

**Clinker-built**, or CLENCHE-BUILT. See BOAT.

**Clinkstone**, or PHONOLITE, is a greenish gray or brownish compact or very finely crystalline igneous rock, remarkable for its tendency to split into slabs, which are now and then thin enough to be used for roofing purposes. This structure is due to the parallel arrangement of plate-like or tabular crystals of sanidine felspar. The slabs give a metallic ring or 'clink' when struck with a hammer, whence its name. Its essential mineral components are sanidine and nepheline, but other minerals, such as angite or hornblende, leucite and magnetite, are usually present. The rock has often a porphyritic structure.

**Clinometer**, an instrument for the purpose of taking the amount of dip or angle of inclination of a stratum. There are various kinds in use, but the simplest consists of a strip of wood upon which is mounted a graduated arc with a pendulum. When this instrument is held horizontally, the pendulum points to zero; when it is held in a slanting position, the pendulum shows the number of degrees that the upper edge or the base of the strip deviates from horizontality. The most useful form of clinometer is that which is combined with a compass—both these instruments being required in geological observations.

**Clinton**, (1) capital of Clinton county, Iowa, on the Mississippi, which is here crossed by an iron railroad bridge, 4000 feet long, 60 miles SSE. of Dubuque by rail. It has numerous mills, foundries, and factories, and a trade in lumber and grain. Pop. 24,000.—(2) A city of Illinois, 22 miles S. of Bloomington, with iron industries; pop. 6000.—(3) A town of Massachusetts, on the Nashua River.

35 miles W. of Boston by rail. It has large manufactures of gingham and plaids, carpets, combs, and machinery. Pop. 13,000.—(4) The capital of Henry county, Missouri, about 90 miles W. from Jefferson City; pop. 5000.—(5) A village of Oneida county, New York, 9 miles WSW. of Utica, the seat of Hamilton College (1812; Presbyterian).

**Clinton**, a distinguished American family, descended from Charles Clinton, who was born in Ireland in 1690, settled in New York state in 1731, and died there in 1773.—His third son, JAMES, born in 1736, served with distinction against the French, and as brigadier-general took part in several operations during the War of Independence. He died in 1812.—The fourth son, GEORGE, born in 1739, studied law, and from 1768 sat in the New York assembly; in 1775 he was sent as a delegate to the second Continental Congress, and in 1776 he was appointed general of militia, serving against Sir Henry Clinton on the Hudson. In 1777 he was chosen first governor of New York, to which post he was re-elected from 1780 to 1795, and in 1801; and to him was due the first conception of the Erie Canal. In 1804 he was chosen vice-president of the United States, and in that office he died at Washington, 20th April 1812.—James's son, DE WITT, born in 1769, was admitted to the New York bar in 1788, and was private secretary to his uncle, then governor, from 1790 to 1795. He sat in the state legislature (1797) and in the state senate (1798–1802); and in 1802 he was elected to the United States senate, but resigned in the same year on being appointed mayor of New York by his uncle. In this office he continued, save for two short intervals, until 1815, holding other appointments at the same time; he was defeated by Madison in the presidential contest of 1812. It was he who pressed the adoption of the Erie Canal scheme; the bill was passed and Clinton elected governor of the state in 1817, and in 1825 he opened the canal. He was several times re-elected in spite of the untiring efforts of his political opponents, and died in office at Albany, 11th February 1828. He published a number of addresses, some literary and historical, which will be found in his Life by Campbell (1849).

**Clinton**, SIR HENRY, British general, born about 1738, was the son of the Hon. George Clinton, colonial governor of Newfoundland, and afterwards of New York. He first entered the New York militia, was gazetted to the Guards in 1751, served with conspicuous gallantry on the Continent, and was promoted colonel in 1762 and major-general in 1772. From 1772 to 1784 he sat in parliament in the interest of his cousin, the Duke of Newcastle. Sent to America in 1775, he fought at Bunker's Hill, and in 1776 was repulsed in an attack on Charleston, but was shortly afterwards knighted for his services under Howe. After Burgoyne's surrender in 1778, Clinton succeeded Howe as commander-in-chief of the forces in North America, which he at once concentrated in New York. In 1780 he captured Charleston and the entire southern army; but after Cornwallis' capitulation at Yorktown in 1781, Clinton resigned his command and returned to England, where in 1783 he published a *Narrative* of the campaign. In 1794 he was appointed governor of Gibraltar, and died there, 23d December 1795. His two sons both rose to be generals in the army and G.C.B.'s, the younger being one of Wellington's favourite officers.

**Clinton**, HENRY FYNES, a great classical scholar, was born January 14, 1781, at Gamston, in Nottinghamshire. He was educated at Southwell, Westminster, and Christ Church, Oxford, where he graduated B.A. in 1803. He represented Aldborough in parliament from 1806 till 1826. He

died at Welwyn, October 24, 1852. His great works on Greek and Roman chronology are unlikely ever to be superseded or forgotten. These are the *Fasti Hellenici* (1824-34), and *Fasti Romani* (1845-50).

**Clinton Group**, name given in North America to a subdivision of the Upper Silurian strata.

**Clio**, in Greek Mythology, the Muse of History and Epic Poetry. She was represented as sitting with a half-opened scroll in her hand, and a casket for holding manuscripts at her feet. See MUSES.

**Clio**, a genus of shell-less pelagic molluscs in the class of Pteropods. They occur in myriad swarms in northern (*C. borealis*) and southern (*C. australis*) seas, and along with such related forms as *Limacina* form the principal part of the food of some species of whales. The whalers rightly call it 'whales' food.' The whale has simply to swim through a shoal with its mouth open to engulf thousands. Clio is a small animal of a spindle-shape, towards an inch in length, with distinct head, bearing six tentacle-like processes, which are sensitive and glandular, and in part used for laying hold of the prey of small animals. It is active in habit, rising to the surface when calm, or as rapidly sinking again. It swims by means of two locomotor expansions of the 'foot.' See PTEROPODS.

**Clione**, a genus of boring sponges. See BORING ANIMALS.

**Clipper** is a sailing ship built expressly for speed, with very sharp lines and great spread of canvas. The Baltimore clippers in the California and the China trade were long famous, and, till superseded (after 1860) by steamers, the Aberdeen tea-clippers. In 1854 the *Lightning*, of Boston, did Boston to Liverpool, 2827 miles, in 13 days, and Melbourne to Liverpool, 12,190 miles, in 64 days. See Clark, *Clipper Ship Era* (1911).

**Clisthenes**, Athenian constitutional reformer, redistributed the people in ten tribes instead of four (510 B.C.), was ostracised by the aristocratic party of Isagoras, but recalled.

**Clitheroe**, a municipal borough in Lancashire, on the left bank of the Ribble, 35 miles N. of Manchester. It lies on a low eminence at the base of Pendle Hill, which is 1831 feet high. Clitheroe has cotton and paper mills, and extensive lime-quarries are wrought in the neighbourhood. Its ruined castle, founded by Robert de Lacy in the later part of the 12th century, was dismantled by the parliamentarians in 1649. The free grammar-school dates from 1554. About 4 miles south-west lies Stonyhurst College (q.v.). Clitheroe has been a borough since about 1280. Till 1832 it returned two members to parliament; till 1885, one. Pop. 12,000.

**Clive**, CAROLINE, novelist, was born in London, 24th June 1801, the daughter of Mr Meysey-Wigley, M.P. for Worcester. In 1840 she married the Rev. Archer Clive; and, for several years a great invalid, she died, through her dress catching fire, at Whitfield, Hereford, 13th July 1873. Between 1840 and 1872 she published eight volumes of poems by 'V.', but she is best known by *Paul Ferroll* (1855), a really strong sensation novel, much superior to *Why Paul Ferroll killed his Wife* (1860).

**Clive**, KITTY, comic actress, was born in London in 1711, the daughter of William Raftor, a Jacobite lawyer from Kilkenny. She came out at Drury Lane about 1728, and chiefly at Drury Lane she continued to play till 1769, when she quitted the stage, and retired to Twickenham. About 1731 she had married George Clive, a barrister, but they soon parted. She died at Little Strawberry Hill, 6th December 1785. Garrick, Handel, Horace Walpole, and Dr Johnson all liked her, the last

remarking to Boswell that 'in the sprightliness of humour he never had seen her equalled.' And of him she said: 'I love to sit by Dr Johnson; he always entertains me.' See her *Life* by Percy Fitzgerald (1888).

**Clive**, ROBERT, the creator of our Indian empire, was born at the manor-house of Styche, near Market-Drayton, 29th September 1725. He was the eldest of thirteen children; his father, a lawyer and small landowner, of a very old Shropshire family. The boy was brought up by an uncle near Eccles. There, and at all his four schools—Lostock, Market-Drayton, Merchant Taylors', and Hemel-Hempstead—he proved a much better fighter than scholar, a thorough young dare-devil; and in 1743 he was packed off to India as a writer in the service of 'John Company.' He reached Madras penniless, and the drudgery of his life there moved him to suicide. But the pistol snapped twice, and he flung it from him, exclaiming: 'It appears I am destined for something; I will live.'

The capture of Madras by the French (1746), Clive's escape thence to Fort St David (the scene of his gallant duel with the caid-sharper), his share in its defence, in the fruitless siege of Pondicherry (1748), and in the storming of Devikota (1749)—these events bring us up to the August of 1751, and Clive's daring dash upon Arcot. He seized it, and held its enormous citadel for eleven whole weeks against 7000 natives and 120 French soldiers. His own little force was reduced to 80 Englishmen and 120 sepoy (splendid fellows these); but, after a last desperate assault, the siege was raised (14th November), and Clive followed up his success by the victories of Ari and Kaveripak, and the capture of Kovilam and Chingalpat.

In February 1753 he married Margaret Maskelyne, sister to the astronomer, and immediately after sailed with her for England, where he was presented with a diamond-hilted sword, cleared his father's estate from encumbrances, stood for St Michaels, but was unseated, and otherwise got through a very fair fortune.

So in October 1755 he was back in India, and a twelvemonth later was summoned, with Admiral Watson, from Madras, to avenge the atrocity of the Black Hole. Calcutta was soon retaken; Chandernagore, the French settlement, captured; and at Plassey, on 23d June 1757, Clive's 3200 men (two-thirds of them sepoy) encountered Suraj ud Dowlah's 50,000 with 40 to 50 French gunneers. The battle took eight hours to win, that truly 'decisive battle of the world.' But its lustre was sullied by the only two blots on Clive's memory. In his dealings with Mir Jaffier, the would-be next nawab of Bengal, he had imposed on a go-between, the merchant Omichand, with a fictitious treaty, to which he had forged his colleague Watson's signature; and now from Mir Jaffier he accepted a present of upwards of £200,000. Both actions are defended by Malcolm, both sternly condemned by Macaulay and Malletson.

For three years sole ruler in all but name of Bengal, Clive, in 1760, with a fortune of more than £40,000 a year, returned to England, to be hailed by Pitt as 'a heaven-born general'; in India he was known as *Sabat Jung*, 'the daring in war.' In 1761 he entered parliament as member for Shrewsbury; in 1762 was raised to the Irish peerage as Baron Clive of Plassey; in 1764 was created a Knight of the Bath. But meanwhile in India the Company's affairs, through the dishonesty of its servants, high and low, had fallen into the utmost disorder; and Clive was the only man who could set them right. He arrived at Calcutta in May 1765, and at once applied himself wisely and firmly to reform the civil service and re-establish military discipline. This second governorship, lasting but

twenty-two months, marks the beginning of our Indian administration, as Plassey of our military supremacy.

Early in 1767 Clive quitted India, never to return; in all he had spent there less than a dozen years. This time he came back to England poorer than when he last left it; but this time he came back to encounter a storm of obloquy. The energy with which he had cleansed that Augean stable had raised up a host of influential enemies, who employed their influence to gratify their enmity, to stir up ill-feeling against him. His early proceedings in India were in 1772 made the subject of animadversion in parliament, and next year matter for the inquiry of a select committee. He was examined and cross-examined more like a sheep-stealer than the Baron of Plassey. Indignation at treatment so unmerited found vent at last in the exclamation: 'By heaven, Mr Chairman, at this moment I stand astonished at my own moderation.' The censure implied in the ultimate resolution was hardly wiped out by its rider, that he 'did at the same time render great and meritorious services to his country' (21st May 1773). Sickness, opium, mental depression—on 22d November 1774 Clive died by his own hand. He is buried in the church of Moreton Say, the parish that gave him birth.

Clive's eldest son, Edward (1754-1839), was governor of Madras 1798-1803, and in 1804 was made Earl of Powis, having in 1784 married the daughter of the last Herbert Earl of Powis.

See ABBOT, DUPLÉIX, INDIA; Sir John Malcolm's *Life of Clive* (3 vols. 1836), with Macaulay's essay thereon; two works by Malleon (1882 and 1893); *Lives* by Sir Charles Wilson (1890), Sir A. J. Arbutnot (1899), Sir George Forrest (1918); and Browning's *Dramatic Idylls* (2d series, 1880). For the conflicting accounts of the manner and place of Clive's death, whether by penknife, razor, pistol, or poison; whether at his mansion in Berkeley Square, or his Shropshire seat, Walcot Park, see Horace Walpole's *Letters to the Countess of Ossory* (i. 155); the *Gentleman's Magazine* for September 1848, p. 227; and several articles in *Notes and Queries* for 1888.

**Cloaca**, in Zoology, the technical name for the common terminal chamber into which the alimentary canal, the genital and the urinary ducts, all open. A cloacal chamber and aperture occurs in many fishes, in all amphibians, reptiles, and birds, and in the three lowest mammals. In all other mammals the urinogenital orifice is independent of the end of the alimentary canal or anus.

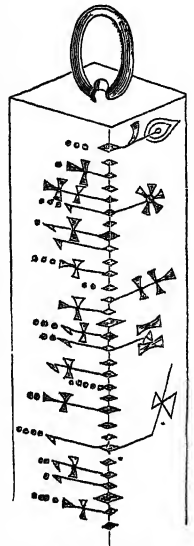
**Cloaca Maxima**, the most important of the sewers of ancient Rome, according to tradition, constructed by Tarquinius Priscus, or by Tarquinius Superbus, to drain off the stagnant waters of the Velabra, a swampy land between the Capitoline and Palatine hills on which the Forum and Circus Maximus also stood. Running from the valley of the Subura, under the Forum along the Velabrum, it opened into the Tiber in an archway still 11 feet wide by 12 feet high, consisting of three concentric arches, built of large blocks of peperino stone, fixed together without cement, of the uniform size of rather more than 5 feet 5 inches long and 3 feet high. The sewer was flushed by a continual stream of superfluous water from the aqueducts. Large portions of this and of the other cloacæ remain entire after two thousand years, but the greater part is buried, by the accumulation of soil, at a considerable depth below the present level of the streets. During the Republic, the surveillance of the Roman cloacæ was one of the duties performed by the censors. The *cloaca maxima* was repaired by Cato and his colleague in the censorship. Agrippa, when ædile, obtained praise for his exertions in cleansing and repairing the cloacæ, and is recorded to have passed through them in a boat. Under the empire, officers called *curatores cloa-*

*carum urbis* were appointed for their supervision. So thoroughly was the city undermined by these large sewers that Pliny calls it *urbs pensilis*, a city suspended in the air.—*Cloacina* ('The Purifier') was a surname of the goddess Venus at Rome.

**Clocks.** See HOROLOGY.

**Clodius.** See CICERO.

**Clog Almanac**, the name given in England to a primitive kind of calendar or almanac, called also a 'rim stock' and 'prime staff.' In Scandinavia it was called a 'Runic staff,' from the Runic characters used in its numerical notation. It was generally of wood (whence its name of 'clog'—i.e. log or block), of about 8 inches in length, but was sometimes of brass, of bone, or of horn. When of wood it was most commonly of box; but elm, fir, and oak were also employed. 'This almanac,' says Dr Plot, in his *Natural History of Staffordshire*, written in 1686, when it was still in use among the common people of that county, 'is usually a square piece of wood, containing three months on each of the four edges. The number of days in them are expressed by notches—the first day by a notch with a patulous stroke turned up from it, and every seventh by a large-sized notch. Some are perfect, containing the dominical letters as well as the prime and marks for the feasts, engraven upon them, and such are our prime staves in the Museum at Oxford: others imperfect, having only the prime and immovable feasts on them, and such are all those I met with in Staffordshire.' The marks on the left side, in the figure, indicate the golden numbers of a cycle showing the new moons throughout the year. On the right side against the 6th January is a star, the symbol of Epiphany; against the 13th St Hilary is shown by the bishop's double cross; 25th, conversion of St Paul, by an axe. The mark against the first notch (or New-year's Day) symbolises the Circumcision of our Lord. Christmas was marked by a horn, the sign of health-drinking—*notans cornua exharrienda*, as Dr Plot quotes. Examples of the clog almanac may be seen in the British Museum (one cut apparently towards the end of the 17th century); in the Ashmolean Museum and the Bodleian Library at Oxford; in St John's College, Cambridge; and in the Cheetham Library, at Manchester. It is described by the Swedish historian, Olaus Magnus, in the 16th century; and by the Danish antiquary, Olaus Wormius, in the 17th century. Some of the clog almanacs show a peculiar numerical notation. The first four digits are marked by dots; the fifth, by a sign like the Roman numeral V; the next four, by this sign and additional dots; and the tenth, by the sign +. See Chambers's *Book of Days*.



Clog Almanac for January.

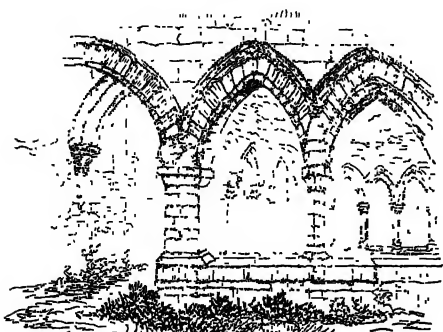
**Clogher**, a decayed episcopal city of County Tyrone, on the Blackwater, 15 miles SSE. of Omagh, with Protestant Episcopal and Roman Catholic bishops. The Protestant cathedral and Protestant Episcopal palace are handsome edifices; but, though formerly a parliamentary borough, the place is now a mere village. Pop. 200.

**Clogs** are a sort of shoes, the uppers of which are leather and the soles of wood (specially alder

wood); much used in the north of England and south-west of Scotland, especially in winter.

**Cloisonné.** See ENAMEL.

**Cloister** (Fr. *cloître*, *claustrum*, 'an enclosure'), a covered passage or ambulatory running round



Cloister, Kilconnell Abbey.

the walls of certain portions of monastic and collegiate buildings. The cloister usually surrounded or ran along three or four sides of a quadrangular area, which was called the *cloister garth*, generally situated on the south or sunny side of the church, as shown under CHURCH in the ground-plan of Durham cathedral. That of Salisbury, one of the finest in the kingdom, is 195 feet square. The roof of the cloister, which was often vaulted, was supported on the side next to the quadrangle by pillars and arches, which were frequently occupied by tracery. The upper portions of these arches above the mullions were often glazed; and sometimes latterly even the whole arches, so that they became a row of windows, as at Gloucester. Cloisters were used for exercise and recreation by the inmates of the religious houses. Occasionally, when wholly glazed, they had cells or stalls for study on the inner side; and very frequently a stone bench may still be seen, which runs along the same side. Many of the larger monasteries had more cloisters than one; and so characteristic were they of the religious houses, that the term cloister came to be used in a general sense for the whole establishment, which is still the sense of the word *kloster* in German. See MONASTERY.

**Clonakilty**, a seaport of County Cork, at the head of Clonakilty Bay, 33 miles SW. of Cork, with some trade in grain; pop. 3000.

**Clonard**, a village in Meath on the Boyne, in the 6th century the seat of a famous monastery where Finnian taught and Columba studied.

**Clones**, a town of County Monaghan, 94 miles NW. of Dublin by rail, with remains of an abbey and of a round tower; pop. 2400.

**Clonfert**, an ancient episcopal city of Ireland, is in the extreme east of County Galway. The bishopric was founded in the 6th century, and as an Anglican one was incorporated with Killaloe; but it is still the see of a Roman Catholic bishop.

**Clonmacnoise**, in King's County, on the Shannon and 10 miles south of Athlone, was the seat of a famous monastery founded by St Ciaran in 541, and still has impressive remains of its 'Seven Churches,' with a splendid Celtic cross and other memorials of the past.

**Clonmel**, a municipal borough in Tipperary and Waterford counties, on the Suir, 135 miles SW. of Dublin. It gave birth to Sterne and Lady Blessington, and was the chief scene of Smith O'Brien's attempted rising in 1848. Till 1885 it

sent a member to parliament. Here Bianconi (q.v.) first established his jaunting-cars; and Clonmel is still a great tourist centre. Pop. 10,000.

**Clontarf**, now part of Dublin city, is much frequented for sea-bathing. Here, in 1014, Brian Boru won a great victory over the Danes.

**Clootz**, JEAN BAPTISTE DU VAL DE GRÂCE, BARON, better known as Anacharsis Clootz, was perhaps the most singular of all the frothy enthusiasts brought to the surface of society by the French Revolution. He was born near Cleves in 1755, and from his eleventh year was educated in Paris. While still young he traversed Europe under the name of Anacharsis, lavishing his money to promote the union of all nations in one family. In the French Revolution he saw the fulfilment of his dreams. He constituted himself the 'orator of the human race,' and wearied out the National Assembly with his endless rant, at one time leading in a tatterdemalion regiment of strangers dressed in the costumes of different nations, at another raving at Christianity and preaching in screams the worship of Reason. He gave his vote for the king's death 'in the name of the human race.' With all its folly his enthusiasm was honest, and he was at once hated and feared by the jealous Robespierre, who had him excluded as a noble from the Jacobin Club, and at last involved him in St Just's impeachment of Hébert and his adherents. He was guillotined, March 23, 1794, preaching materialism to the last, and protesting against his sentence, as usual, 'in the name of the human race.' Of his books may be named: *Certitude des Preuves du Mohammédisme* (1780), *L'Orateur du Genre Humain* (1791), and *La République du Genre Humain* (1793). See Lives by Avenel (1865) and Stern (1915).

**Clopinel.** See MEUNG (JEAN DE).

**Close**, in England, specially the precincts of a cathedral. In Scotland the word means a narrow side-street, or a passage leading to a court, or to the stair of a block of tenements.

**Close Time**, the time during which game, certain wild birds, salmon, and some other fish may not be shot or caught, varies for the different animals and for different places. Lists of the dates may be found in such almanacs as Whitaker's; and see WILD-FOWL, SALMON, TROUT, &c.

**Closterseven.** See CUMBERLAND (DUKE OF).

**Closure** (formerly in the French form *clôture*), the name used for a power given in 1882 to the Speaker of the House of Commons, or chairman of committees, to close a debate when it seems to him that the subject has been discussed, and he is authorised to do so by a motion duly supported. For the rules of procedure, see PARLIAMENT.

**Clotaire I.** (*Hlothar*), son and successor of Clovis (q.v.), first king of the Franks in Gaul, reigned as sole king from 558 to 561.—CLOTAIRE II., a king of the same Merovingian dynasty, reigned over the Franks thirty years later. See FRANCE.

**Cloth.** See WOOLLEN MANUFACTURE.

**Clothes-moth.** See MOTH.

**Clotho**, one of the Fates (q.v.).

**Clotho**, a genus of spiders which spins a curious tent for itself and its young. See SPIDER.

**Clotilda**, St., born in 475, was the daughter of Chilperic, king of Burgundy, and in 493 became wife of Clovis, king of the Franks. She was the chief means of securing the conversion of her husband to Christianity, and largely influenced his life. After his death she lived a life of austerity at Tours, where she died in 545. She was canonised a few years after. Her remains were buried in the church of St Geneviève at Paris, and burnt

at the Revolution to prevent their desecration. See *Life* by Professor Kurth (Eng. trans. 1899).

**Cloudberry** (*Rubus Chamæmorus*), a plant related to the bramble, although of very different appearance, having a herbaceous single-flowered stem destitute of prickles. The plant is of humble growth, 8 to 10 inches in height; the leaves few, large, lobed, and kidney-shaped; the flower large and white; the fruit orange red, equal in size to a bramble-berry, and of an agreeable flavour. It is a native of the northern parts of Europe, Asia, and America. In Britain it is chiefly confined to elevated moors; in Norway and Sweden it is much more abundant, and the fruit is highly valued and made into excellent preserves.

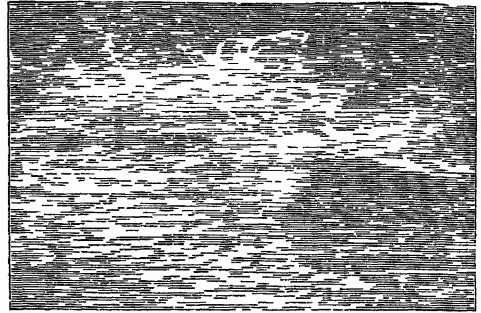
**Clouds** are masses of fog, consisting of minute particles of water, often in a frozen state, floating in the atmosphere. When air has its temperature lowered below the saturation point, either by ascending and becoming rarer, or by meeting a colder current, a portion of the vapour loses its gaseous form, and becomes condensed into minute specks of water. It was shown by Dr Aitken that this condensation always takes place round a small particle of dust. A cloud, therefore, does not consist of vapour, in the proper sense of the word, but of very small drops of water. How this water-dust is suspended in the atmosphere—why the particles do not descend as soon as formed, has never been thoroughly explained. Sir G. G. Stokes held that the rate of fall is rendered exceedingly slow by the friction and drag of the air-particles, just as fine powders remain suspended for a long time in liquids of much less specific gravity than themselves. Besides, as Sir J. Herschel says, ascending air-currents also oppose the fall of clouds, for the air may be ascending faster than the particles of the cloud are falling through it; while at night, in the absence of rising currents, clouds often descend to, and dissolve in lower and warmer levels. The conditions under which clouds are formed, and afterwards deposited in rain, are more fully considered under **EVAPORATION, DEW, RAIN, SNOW-LINE**. The present article is confined to a description of the various kinds of clouds and of the weather they indicate.

A general haze of precipitated vapour covering the sky, and coming down to the earth, is termed a *Fog* or *Mist*; and the term cloud is usually confined to masses of fog floating in the higher regions, and not descending to the ground. They are mostly within a mile of the earth's surface; and few are more than six miles above it. From observations made at Uppsala in Sweden, it has been found that there are three principal cloud layers: the low clouds at from 2000 to 6000 feet; middle clouds, 12,000 to 15,000 feet; and high clouds, 20,000 to 27,000 feet. These three layers are found at apparently much the same heights all over the earth. Clouds spread and move with the wind in varied, often grand forms; they are generally disposed in beds parallel to the earth's surface; vertical clouds occur rarely, if at all.

Luke Howard's classification of clouds, proposed in 1802, into three primary forms—*Cirrus* (Cir.), *Cumulus* (Cum.), and *Stratus* (Str.); three intermediate—*Cirro-cumulus* (Cir.-c.), *Cirro-stratus* (Cir.-s.), and *Cumulo-stratus* (Cum.-s.); and one compound form, *Nimbus* (Nim.)—has been universally adopted, and has been shown by the Hon. Ralph Abercromby and others to hold good in all climates and atmospheric conditions.

*Cirrus*, or curl cloud, consists of parallel, curling, flexuous, diverging, and partly straight fibres, increasing in any or in all directions by elongation, branching, or addition of new fibres. It is the

highest and least dense of clouds; varies most in extent, direction, and shape; retains longest its varied outlines; and is the longest illuminated after sunset and before sunrise. It has been compared to a mare's or cat's tail, a lock of hair, fine



Cirrus.

trellis-work, or thin silvery streaks, and it may cover all the sky. Threads and groups of Cir., during gentle wind after severe weather, presage serene settled weather. But after a long tract of fair days, whitish filaments or parallel bands of Cir. crossing the sky, with the ends converging by perspective in each horizon, foretell a change to wet; they move with the upper currents of the atmosphere, and generally indicate by this motion a change of wind long before it is felt on the earth's surface. Cir., being so high, consists of minute ice crystals, whose refractions and reflections produce the halos, coronæ, and mock suns and moons almost restricted to this cloud and its derivatives the Cir.-s. and Cir.-c. Cir., especially with fine tails, varying much in a few hours, presages rain or snow, and windy variable weather.

*Cumulus*, ball of cotton, day or summer cloud, consists of dense, convex, hemispherical, or conical heaps of small roundish clouds, piled or stacked on each other. The heaps enlarge upwards from a

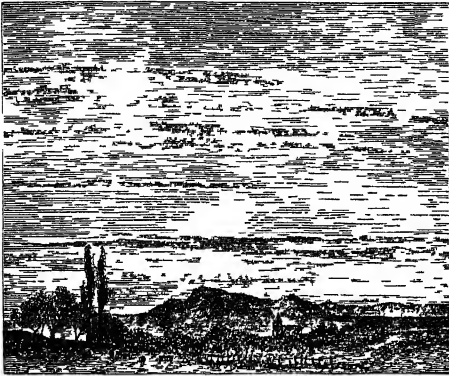


Cumulus.

horizontal base, and have rounded or rocky tops; they sometimes unite into stupendous white-topped mountains. It is formed by the condensation of vapour in local ascending columns of air, and is generally at from 4000 to 6000 feet elevation. Cumuli often begin after sunrise as a few scattered specks in the clear sky; these specks enlarge and unite to form clouds, which nearly cover the sky in the afternoon, and generally decrease and vanish about sunset; but rain follows if they increase in number and darkness in the evening. Cum., of

pleasing forms, dispositions, and colours, and of moderate size, presages fine dry warm and calm days; but cold, rain, and tempest follow dark, abrupt, dense, shaggy Cum., covering the sky, and rolling on each other. Hemispherical, silvery white Cum. presages thunder.

*Stratus*, fall or night-cloud, the lowest of clouds, is a widely extended, horizontal sheet, of varied thickness, seldom rising above 4000 feet, and often quite close to the earth's surface. It is common in



Stratus.

summer and autumn, often from sunset to sunrise, and is densest at or after midnight. It arises in calm clear evenings, after warm days, from the sinking and flattening out of Cum., from the cooling of moist air on damp ground, marshes, lakes, rivers, or from the cooling of moist air mixed with smoke enveloping great cities. From a height it is seen spreading around like a sea, and creeping up hillsides. After sunrise it rises higher, sometimes forming Cum., and sometimes entirely disappearing; but it may quietly accumulate in layers, and become Nim.

*Cirro-cumulus*, or sonder-cloud, consists of Cir. compressed into dense roundish-white cloudlets, or woolly irregular tufts, and is found either in the middle or high cloud layers. It forms the well-known mackerel sky, but is also often seen through breaks in lower clouds moving differently. It may vanish or pass into Cir. or Cir.-s. Solar and lunar coronæ appear in it. It occurs in warm dry weather and between summer showers, and presages increased heat. Cir.-c. very dense, round, and close, and with Cum.-s., presages a storm or thunder. In winter it precedes a thaw and warm wet weather.

*Cirro-stratus*, or vane-cloud, consists of long, thin, horizontal clouds, sometimes hairy, with bent or undulated edges. It is found on the advancing side of cyclonic storms, and hence is a sure prognostic of wind or rain. Being of great extent, but little depth, and at a great height, it is the most usual source of solar and lunar halos.

*Cumulo-stratus*, or twain-cloud, is a Cir.-s. mixed with Cum. heaps, or a wide flat base surmounted by a bulky Cum., with fleecy protuberances or rocky and mountain masses. It is much denser than Cum., though being formed by less rapidly ascending currents, the air is not dry enough to round off sharply its tops. It often forms vast banks of cloud, with overhanging masses. It is common towards night in dry windy weather, when it has a leaden hue. It generally arises from Cum. becoming denser, wider, and protruding in large irregular projections over the base. It tends to overspread the sky, and partly or wholly to become Nim., and fall in showers. Cum.-s. is intermediate

between clouds indicating fair and those indicating rough, rainy weather, and attends sudden atmospheric changes. Distinct Cum.-s. forms before thunder. Cum.-s. increases the grandeur of mountain scenery, and drops on and envelops mountain-tops like a curtain.

*Nimbus*, or Cumulo-cirro-stratus, the black rain-cloud, is a cloud, or mixed system of clouds, with rain or snow falling from it. It is a dense, continuous, horizontal black or gray sheet, with fringed edges, having rolling masses of Cum. above it and topped by Cir. Before rain, vast towering masses of Cum. often pass into Cum.-s., which, increasing in density, darkness, irregularity, and extent, become Nim. capped by Cir.-s. Thunderstorms are always accompanied by Nim. in its most perfect form.

The term *scud* has been applied to loose vapoury fragments of clouds driven by wind, and *cumulonous* to very shaggy cumuli.

The formation and height of clouds depend on the quantity of vapour in the air, the course and height of air-currents, the climate, season, temperature, disposition, and extent of sea and land, and the height of land. The highest clouds yet observed were Cir. at 46,000 feet elevation. Remarkable cloud-rings prevail over the calm zones of the equator, and over those of Cancer and Capricorn. The tops of mountains are often capped by clouds formed by the moisture in the air condensing as it is forced up and over the hill. Clouds, viewed from above in bright sunshine by the aeronaut or mountaineer, appear as dense volumes of steam or masses of white cotton.

Clouds moderate the sun's rays during day, and the earth's radiation during night. They always exhibit positive or negative electricity, but of greatest tension in thunderstorms. They are the carriers of the moisture required by plants; of the water of springs, lakes, and rivers; and of the polar, glacial, and winter snows, which cover temporarily or permanently parts of the earth.

In Britain, six or seven tenths of the sky is on an average daily obscured by clouds. There is most cloud in winter, and about mid-day, and least in May or June, and during night. Summer and autumn nights are freest of clouds. All the forms of clouds may be seen in one day, often very much commingled.

**Clough**, ARTHUR HUGH, poet, was born at Liverpool, January 1, 1819. His father, a cotton-merchant there, belonged to an old Denbighshire family. In the winter of 1822-23 he emigrated to Charleston, in South Carolina, and there the boy mostly lived in the midst of a home-life of singular happiness, until in November 1828 he was sent back to school at Chester, and to Rugby in the summer following. Dr Arnold had already been head-master for a year, and his high ideal of Christian duty early made a profound impression upon the boy. At Rugby he was foremost in athletic sports, edited for some time the school magazine, and not only worked his way to every honour open to him, but gained the warm affection of all his school-fellows. In November 1837 he entered Balliol College, Oxford, but astonished all who knew his powers by only obtaining a second-class in 1841. In the spring of the following year he was elected to a fellowship at Oriel. Clough's residence at Oxford had fallen at a time of fierce theological controversy, and his sensitive spiritual nature reflected all the unrest of the atmosphere around him. For a time he fell under the spell of Newman's influence, but this was soon followed by a period of severe inward struggle between his absolute honesty of mind and the religious prepossessions of his youth, the result of which was that he felt it his duty to withdraw in

1848 from Oriel. A little earlier he had published his first long poem, the *Bothie of Tober-na-Vuolich*, a 'Long Vacation pastoral' in hexameter verse. He spent some time in travelling in France and Italy, part of the time with Emerson, and was appointed on his return (October 1849) Warden of University Hall, London. His life here was far from congenial to him, but he found much help in the warm friendship of Carlyle. At Rome, in 1849, he had written his *Amours de Voyage*, and at Venice, during a holiday in 1850, he wrote *Dipsychus*. In 1852 he resigned his office, and sailed to America; but an examiner-ship in the Education Office soon recalled him to England. In June 1854 he married, and the remaining seven years of his life were spent in the calm peace of domestic happiness, free at once from the unrest of religious perplexity and the vexation of his earlier monetary liabilities undertaken for the sake of his father's business. In the spring of 1856 he was nominated secretary to the Commission for examining scientific military schools on the Continent, and the duties of this office carried him to France and to Vienna. But his health now began to give way, and he was advised by his physicians to travel. After visits to Greece, Constantinople, the Pyrenees, and Italy, he was carried off at Florence by paralysis succeeding a malarial fever, November 13, 1861.

Clough's poetry reflects with absolute sincerity all the spiritual unrest and conflict of his life, his passionate love of truth, and intense longing for reality. His few short lyrics are almost perfect in form and matter, but, as an artist in words, his best gift was perhaps his undeniable humour, which is of a rare and indeed exceptional quality. But his true significance is that pointed out with sure insight by Lowell: 'We have a foreboding that Clough, imperfect as he was in many respects, and dying before he had subdued his sensitive temperament to the sterner requirements of his art, will be thought a hundred years hence to have been the truest expression in verse of the moral and intellectual tendencies, the doubt and struggle towards settled convictions, of the period in which he lived.'

Clough is the subject of Matthew Arnold's elegy *Thyrsis*, one of the finest tributes of passionate admiration to the dead in the English language, almost worthy indeed to be compared with the *Lycidas* of Milton, the *Adonais* of Shelley, and the *In Memoriam* of Tennyson. No truer words have been spoken of Clough than these:

The music of his rustic flute  
Kept not for long its happy country tone;  
Lost it too soon, and learnt a stormy note  
Of men contention-tost, of men who groan,  
Which tasked his pipe too sore, and tired his throat.

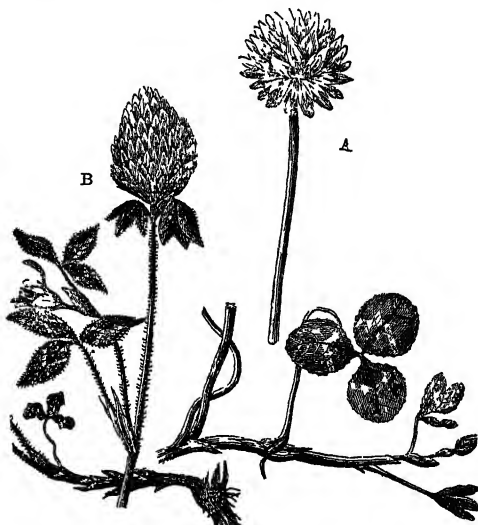
See Samuel Waddington's *Monograph* (1882), and a study by J. L. Osborne (1920). Clough's *Poems* were published in 1862, with a memoir by F. T. Palgrave; edited in 1910 by H. S. Milford, and in 1913 with an introduction by C. Whibley; his *Poems and Prose Remains*, edited by his wife, with an admirable short memoir, in 2 vols. in 1869.

**Clove Bark**, a name vaguely used for various aromatic drugs, some belonging to the clove, others to the cinnamon alliance. To the former class belongs the bark of *Eugenia caryophyllata* (see **CLOVES**); to the latter, the *Culilawan* (q.v.).

**Clovelly**, a coast village of north Devon, 11 miles WSW. of Bideford. From its rude little pier it climbs 400 feet upwards in a steep narrowcombe, white house rising over white house, and all nestling in flowers and greenery. Dickens describes it in *A Message from the Sea*.

**Clover**, or **TREFOIL** (*Trifolium*), a genus of Leguminosae containing a great number of species, natives chiefly of temperate climates, abounding

most of all in Europe, and some of them very important in agriculture as affording pasturage and fodder for live-stock. The name clover is popularly extended to a number of plants not included in the genus, but somewhat closely allied. See **MEDICK** and **MELLIOT**. The true clovers (*Trifolium*) have herbaceous, not twining, stems; roundish heads or oblong spikes of small flowers; the corolla remaining in a withered state till the ripening of the seed; the pod enclosed in the calyx and containing from one to four or occasionally up to six seeds. Twenty species are native to Britain, and several others are North American.—The most important to the farmer is Red Clover (*Trifolium pratense*), which is common in natural pastures and meadows throughout Europe. Red Clover is widely cultivated, as yielding a very large crop of palatable and nutritious forage, and as being adaptable to varying soil and climatic conditions. Two varieties are known in commerce, 'Ordinary' or 'Broad Red,' which is generally biennial in habit and early flowering; and 'Cowgrass' or 'Perennial Red Clover' (*Trifolium pratense perenne*), which is generally of longer duration, later flowering, hardier, and more drought-resisting. This plant was formerly reputed very noisome to witches, and knights and peasants wore a leaf of it as a potent charm against their arts. Zigzag Clover (*T. medium*) is sometimes mistaken for Red Clover, as the flowers are of similar colour. The stem, however, is bent in a zigzag manner at every node; the leaflets are narrower than in Red Clover, and the flowers are less densely crowded in the head. This plant is of little agricultural value,



A, White Clover (*Trifolium repens*).  
B, Red Clover (*Trifolium pratense*).

and its seed is not met with in commerce.—White or Dutch Clover is also a common native of Britain and of most parts of Europe and North America. The flowers are white or pinkish, borne on long flower-stalks which spring from the procumbent stem. White Clover is a valuable pasture plant, more particularly for the poorer classes of land. It is far less valuable for hay than either of the other species generally cultivated. Two varieties are recognised, viz. (1) Wild White, and (2) Cultivated White. The former is of smaller growth, but much harder and more lasting.—Alsike Clover (*T. hybridum*) is a perennial species introduced into England from Sweden in 1834, and has proved a valuable forage plant. While the yield is not equal

to that of the red species, it is hardier than the latter, and better suited to cold clay soils. Under suitable conditions it lasts up to four or five years. The flowers are white or pink.—Crimson or Italian Clover, frequently spoken of as 'Trifolium' (*T. incarnatum*), is an annual species with hairy, erect stems and rich crimson flowers. The species is tender, and cannot be grown successfully in the northern part of Britain. It is generally grown as a *catch-crop*, being sown on the stubbles in autumn, and fed off in time for another crop to be planted the following spring. A variety (*T. Molineri*) known as Moliner's Clover is native to Cornwall, and has shorter stems and pale, almost white, flowers.—Alexandrian or Egyptian Clover or Beers ( *T. Alexandrinum* ), a native of Egypt, is an annual, and is universally cultivated in its native country, where it is the principal fodder for cattle. It has oval heads of pale-yellow or whitish flowers.—Three small annual yellow species, which are generally confused with each other, and sometimes also with Black Medick (*Medicago lupulina*), occur in Britain, and are sometimes sown on poor and dry land, although their produce is very scanty. These are Yellow Suckling (*T. minus*), Slender Trefoil (*T. filiforme*), and Hop Clover or Hop Trefoil (*T. procumbens*).—None of the strictly native North American species have been much utilised as forage plants.

Clovers began to be widely introduced into field culture in Britain about two hundred years ago. They are now almost universally grown, either singly or in mixture with cultivated grasses in alternation with grain and root crops. Red Clover is frequently grown alone, while the other species more commonly form only part of the 'seeds' mixture. The varieties of Red Clover are the most valuable, but they require to be grown on fairly rich soils. Even on the latter frequent recurrence of the crop leads to 'clover-sickness' and the failure of the crop. Land should be thoroughly cleaned before the crop is sown; hence it usually follows the fallow or root-crop in rotation. It is almost invariably sown under a cereal 'nurse-crop,' although it may also be sown after harvest, at all events in the warmer districts. Clovers, like other leguminous plants, play a very important part in farm economy by restoring fertility. Their roots under normally suitable conditions develop nodules containing bacteria (*Bacterium radicicola*) which live in a condition of *symbiosis* with the plant, supplying it with nitrogenous substances derived from atmospheric nitrogen. Clovers, in the presence of these bacteria, which are present in most cultivated soils, are thus independent of nitrogenous manurial substances in the soil.

The caterpillars of a number of species of moth feed on the leaves of different kinds of clover; but the insects most injurious to the crop are weevils of the genera *Apion* and *Sitones*. See CLOVER-WEEVIL and WEEVIL.

**Clover-weevil**, a small black beetle of the genus *Apion*, which in larval and adult state infests clover and other leguminous plants. See WEEVIL.

**Cloves** (Lat. *clavus*, 'a nail') are the flower-buds of the Clove-tree (*Eugenia caryophyllata*). The genus to which this tree belongs is of the natural order Myrtaceæ; the tree is from 15 to 40 feet high, with a beautiful pyramidal head. The leaves are large, ovate-oblong, acuminate at each end, evergreen; the flowers are small, but produced in great profusion in cymes. Leaves, flowers, and bark have an aromatic odour. The ripe fruit resembles an olive in shape, but is not quite so large; it is of a dark-red colour; it sometimes appears in commerce in a dried state, under the curious name of *Mother Cloves*; it has an odour and flavour similar to cloves, but much weaker;

the broken fruit-stalks are sometimes also used for the same purposes as cloves; but the flower-buds themselves are the principal product of the tree. They are gathered, and are dried by exposure to the smoke of wood fires, and afterwards to the rays of the sun, or by the latter alone. When first gathered they are bright red, but become of a deep-brown colour. The unexpanded corolla forms a little round head at the end of the calyx tube,



Clove :

a, a branch with leaves, buds, and flowers; b, a bud.

which is about half an inch long, and thus the appearance is not unlike that of a little nail, whence the name. The clove-tree is a native of the Moluccas, and the Amboyna cloves were long esteemed the best; but the tree has been cultivated in Java, Sumatra, Réunion, Mauritius, Guiana, and the West Indies, and three-fourths of the entire crop of the world are now produced by Pemba alone, Zanzibar contributing most of the rest. The Dutch, in order to secure a monopoly and keep up the price, destroyed the trees in the other Molucca Islands in the 17th century, and confined the cultivation of them to Amboyna. In 1770 the French succeeded in introducing the plant into Réunion. Before the discovery of the Spice Islands Eastern merchants brought them from Arabia, Persia, and Egypt to the harbours of the Mediterranean, from which the Venetians and Genoese diffused them over Europe.

The Wild Clove-tree of the West Indies is *Pimenta acris*.

The properties of cloves depend chiefly on an essential oil, *Oil of Cloves*, which forms one-fifth or one-sixth of their whole weight. They are used for flavouring dessert dishes and articles of confectionery, also for driving moths from clothing, furs, &c., by placing them in the boxes or drawers with the clothing. They are also reputed to possess febrifuge properties. They have a hot taste and a characteristic odour. The oil of cloves is obtained by repeatedly distilling cloves with water, when two oils pass over, one of which is lighter and the other is heavier than water. The oil has a hot acrid taste, is of a light yellow when pure, and brown red when not so carefully prepared. It has a well-known odour, and is soluble in ether, alcohol, and the fixed oils. It is useful in medicine to check nausea and griping, caused by the administration of purgatives, and has consider-

able reputation as a cure for toothache. It is also employed in the scenting of soap, and by the distiller. *Tincture of Cloves* is obtained by treating cloves with alcohol for several days, and then straining, or by a solution of the oil of cloves in spirits of wine. It is added, in medicine, to stomachic, tonic, and purgative mixtures. Cloves are adulterated by adding to the fresh spice more or less of the buds from which the oil has been distilled, and which are thereby rendered practically worthless. The exhausted buds are made to appear fresh by rubbing them between the hands moistened with sweet oil, or otherwise varnishing them with a thin coating of oil.

**Clovis** (old Ger. *Chlodwig*, modern Ger. *Ludwig*, Fr. *Louis*), king of the Franks, was of the Merovingian race, and was born 465 A.D. By the death of his father, Childeric (481), he became king of the Salian Franks, whose capital was Tournai. His first achievement was the overthrow of the Gallo-Romans under Syagrius, near Soissons. He then took possession of the whole country between the Somme and the Loire, and established himself in Soissons. In 493 he married Clotilda, daughter of a Burgundian prince. His wife was a Christian, and earnestly desired the conversion of her husband. In a great battle with the Alemanni near Cologne, Clovis was hard pressed, and as a last resource invoked the god of Clotilda, offering to become a Christian on condition of obtaining the victory. The Alemanni were routed, and on Christmas Day of the same year Clovis and several thousands of his soldiers were baptised by Remigius, Bishop of Rheims. Most of the Western Christian princes were Arians, but Clovis was strictly orthodox, and, in consequence, was saluted by Pope Anastasius as the 'Most Christian King.' In 507, love of conquest concurring with zeal for the orthodox faith, Clovis marched to the south-west of Gaul against the heretic Visigoth, Alaric II., whom he defeated and slew at Vouglé, near Poitiers, taking possession of the whole country as far as Bordeaux and Toulouse; but he was checked at Arles in 507, by Theodoric, king of the Ostrogoths. Clovis now took up his residence in Paris, where he died in 511. His great aim was the subjugation of all the Frankish princes, and the union of the whole Frankish people into a single powerful kingdom.—Clovis II., son of Dagobert, reigned over the Franks from 638 to 656.

**Cloves**, WILLIAM, an Elizabethan surgeon of distinction, was born about 1540, became surgeon at St Bartholomew's Hospital, served with Leicester in the Low Countries, and also on board the fleet that defeated the Spanish Armada. He became surgeon to the queen, and after a prosperous practice in London retired to a country house in Essex, where he died in 1604. He wrote five books in clear and vigorous English, of which two long continued popular: *A Prooved Practise for all Young Chirurgeians* (1591), and *A Treatise on the Struma* (1602).

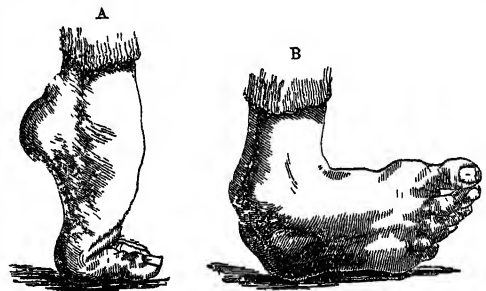
**Clown**. See FOOLS, PANTOMIME.

**Cloyne**, an ancient episcopal town of County Cork, 15 miles ESE. of Cork. The cathedral was founded in the 6th century by St Colman; opposite is a finely preserved round tower over 90 feet high. About 1430 the see was united to that of Cork, separated in 1678, and reunited in 1835; the town still gives its name to a Roman Catholic diocese. Berkeley was Bishop of Cloyne (1734-53). Pop. 750.

**Clubbing**, in cabbages, turnips, and other plants of the genus *Brassica*, a diseased growth of tubercular excrescences in the upper part of the root or lower part of the stem, caused by the larvæ of the Cabbage-fly (q.v.) and of other insects, by

which the vigorous growth of the plant is prevented, and crops are often much injured. It is common for gardeners to cut away these excrescences, with their contained larvæ, in planting out young cabbages, &c.; and where they are not so numerous that the injury done by the knife is necessarily great, this plan succeeds very well. Dressings of gas-lime applied to the soil some time before planting is the best preventive of this evil; but change of crop, when practicable, is of all things the most commendable. Clubbing is sometimes confounded with Anbury (q.v.), from which it is quite distinct.

**Club-foot** (Lat. *talipes*) is a distortion of the foot primarily due to shortening occurring in one or other of the groups of muscles which carry out its intricate movements; subsequently, this error in the muscular activity becomes aggravated by shortening of the ligaments which bind the bones together, and ultimately the shape of the bones themselves becomes altered so as to constitute a very serious deformity, difficult to correct. In the majority of cases the condition is congenital, and at the time of birth it is usually only the muscular structures that are affected. Thus it is of great importance to recognise its presence early in life; for until the ligaments and bones become altered in shape, it may be remedied by very simple means, such as manipulation and electric stimulation of the affected groups of muscles. If these simple measures appear ineffectual, recourse must be had to the division of the tendons (tenotomy), by which the shortened muscles are attached to the bones of the foot. The foot thus freed from the cause of the distortion, should be placed at rest in good position within an immovable apparatus, such as a plaster of Paris case, until healing of the tendons has occurred. The weakened parts should then be



Club-feet:  
A, *Talipes equinus*; B, *Talipes varus*.

exercised by suitable manipulations which restore their strength. In very bad cases it may be necessary to remove portions of the distorted bones and thus restore the natural shape of the foot.

These affections are very markedly hereditary, and they are in all probability due to disordered function in the nerves leading to the affected muscles, or in the brain or spinal cord, in which these nerves have their origin. Four chief varieties of club-foot are recognised by surgeons: (1) *Talipes equinus* (fig. A), in which the heel is drawn up, and the patient walks on the under surfaces of the toes; (2) *Talipes calcaneus*, in which the reverse condition is present, and the patient walks on the heel only; (3) *Talipes varus* (fig. B), in which the patient walks on the outer border of the foot; and (4) *Talipes valgus*, where the inner edge of the sole alone touches the ground. See DEFORMITIES.

**Club-moss**. See LYCOPODIACEÆ.

**Club-rush**. See SCIRPUS.

**Clubs.** The word *club* is from the same root as *clump*; and its secondary meaning of 'a collection of persons' is illustrated by 'a clump of trees.' As specially applied to a select association meeting for social intercourse, it dates from the 17th century, and the use has since been extended to other bodies having a common object, such as literature, science, amusements, politics, or the furtherance of material interests. The practice of some kind of club-life is almost universal, and can be traced in the earliest civilisations. Travellers in Africa, the Pacific, and elsewhere constantly speak of a kind of club-house where the men meet for gossip, recreation, or tribal business. Vacancies in the public tables among the Spartans were filled up by ballot, and Aristotle refers to members of the same locality in Greece as clubbing for merry-making. Many such associations both in Greece and Rome were, however, really secret societies for the cultivation of religious mysteries; others were more of the nature of Guilds (q.v.). But there are records of social clubs more closely allied to the modern form, and Cicero tells of his pleasure in frequenting such gatherings. We also hear of a club of old soldiers belonging to the armies of Augustus, and another among the officers of an African legion. Women had their sociable *collegia*.

In England the history of clubs dates from the Court de Bone Compaignie mentioned by Occleve in the early part of the 15th century. Nearly two hundred years later the symposia originated by Raleigh made the Mermaid Tavern in Bread Street famous, while Ben Jonson is said to have founded a similar gathering at the Devil Tavern. The Apollo is connected with Jonson's *Leges Convivales*. The Rota (1659) and the clubs of the Restoration were mainly political. The members of the Calves' Head Club (q.v.) were supposed to ridicule the memory of Charles I. The portraits of the members of the Kit Kat Club (1700) are still preserved. Addison, Steele, and the essayists of the *Spectator* and *Tatler* class have made us familiar with the coffee-house and tavern clubs of their time. The Royal Society Club (1743) is the earliest of the many dining-clubs associated with the learned societies. To Reynolds is due the institution of the still existing Literary Club (1762), which numbered so many distinguished members, among them Dr Johnson, who established the Ivy Lane and other clubs of a less formal character. Good fellowship and conversation were the leading features of these societies.

The present type of English club is quite different from the earlier bodies bearing the same name. It arose about the commencement of the 19th century, and is characterised by dining and other arrangements whereby members seek to preserve their independence while sharing in the benefits to which their united subscriptions contribute. The modern club-house is generally a spacious and handsome building, with dining, smoking, billiard, newspaper, writing, and drawing rooms, &c. Some possess libraries, the most extensive being that of the Athenæum, which owns one of the choicest collections of books of reference in London. The Garrick is famous for its theatrical, and the United Service for its naval and military, pictures. Portraits of eminent members are to be found on the walls of many club-houses. Clubs are usually managed by a changing committee, who submit their accounts and report to an annual meeting. Some are proprietary—i.e. owned by an individual, or by a small company. The number of members is generally limited. They are either elected by a ballot of the whole club, a certain proportion of black-balls or contrary votes excluding, or by the committee, who sometimes choose all or a select number. The revenue is derived from an entrance

fee and annual subscription paid by each member, and from the sale of provisions, &c., consumed in the house. Most clubs have a dining-room to which strangers may be invited; in others a select number of honorary members are admitted. Many clubs provide bedroom accommodation for members. Moderate card-playing is allowed, but games of chance are invariably forbidden in good English clubs. There are clubs for ladies alone, and some to which ladies are admitted on equal terms with gentlemen. In others ladies are allowed as guests. Speaking generally, the former exclusiveness of club-life is becoming relaxed, even in the older clubs; facilities for the entertainment of friends, sometimes ladies, are becoming more general.

It is difficult to say where the club proper ends and the mere drinking saloon commences; many of the inferior class of clubs which have grown so numerous of late years fall in the latter class. Partly in consequence of this difficulty, the Licensing Acts (1910 and 1921) provide strictly for the registration and licensing of all clubs, and for the withdrawal of such license on proof of any club being misconducted (see LICENSING LAWS). Within recent years many night clubs have been established, where dancing and other entertainments are carried on and ladies admitted. Some of these are reputable. The police supervision of clubs in Great Britain is nominal, but on the European continent all clubs are under a much more rigid legal control.

The best organised and finest clubs in the world are in London, where there are over a hundred of a high class. County clubs are to be found in all English provincial towns. At Edinburgh the New Club (1787), and in Dublin the Kildare Street (1790), are equal to the best metropolitan clubs. The English in India and the colonies possess luxurious club-houses in which bedrooms for temporary visitors are a convenience.

Well-appointed clubs in the English style have been established in all the leading cities of the United States. Among the best in New York are the Lotos (1870), Union League (1863), Century, Manhattan, Union, Knickerbocker, and University. Gambling, and the giving of dramatic and musical entertainments, and exhibitions of pictures are special features of club-life on the European continent. The Jockey Club (1833) and the Union Artistique 'Cercle des Mirlitons' (1863) at Paris are representative examples. The political associations formed in Paris at the time of the first revolution exercised considerable influence on public affairs. In 1848 similar bodies in Germany and Austria were suppressed by order of the police. 'Club' is frequently used as an equivalent to society, as in benefit societies, Alpine Club, Book-club (q.v.), and cricket, cycling, yachting, boating, and racing clubs.

See Ned Ward, *The Secret History of Clubs of all Descriptions* (1709); Ward, *Account of all the most Remarkable Clubs and Societies in London and Westminster* (1750); C. Marsh, *The Clubs of London, with Anecdotes of their Members* (2 vols. 1832); *The London Clubs* (1853); J. Timbs, *Club-life in London* (2 vols. 1866); J. Strang, *Glasgow and its Clubs* (1857); W. Arnold, *The Sublime Society of Beefsteaks* (1871); A. F. Leach, *Club Cases* (1879); Ivey, *Clubs of the World* (1880); Sir P. G. Egerton, *Grillion's Club* (1880); C. J. Barrett, *Barn Elms and Kitecat Club* (1884); L. Fagan, *The Reform Club* (4to, 1887); F. G. Waugh, *Athenæum Club and its Associations* (1890), and *Members of the Athenæum Club* (1890); A. Bourke, *History of White's* (2 vols. 1892); Hon. Mrs Anstruther, 'Ladies' Clubs' in *Nineteenth Century* (1899); A. F. Baillie, *The Oriental Club* (1901); P. Fitzgerald, *The Garrick Club* (1904); Major Griffiths, *Clubs and Clubmen* (1907); E. Clunet, *Les Associations* (1909, &c.); R. Neville, *London Clubs* (1911); Wertheimer's *Law relating to Clubs*, rev. A. W.

Chaster (1913); H. T. Witt, *Club Accounts* (1913); F. W. Pixley, *Clubs and their Management* (1914); Sir A. Geikie, *Annals of the Royal Society Club* (1917); G. A. F. Rogers, *Arts Club* (1920); E. C. Austen-Leigh, *List of English Clubs* [annual].

**Clugny**, or CLUNI. See CLUNY.

**Cluj**, the Rumanian name of Klausenburg (q.v.) or Kolozsvár.

**Clumber**, a seat of the Duke of Newcastle 3 miles SE of Worksop. It has given name to a breed of Spaniels (q.v.).

**Clunes**, a gold-mining township of Victoria, 119 miles NW. of Melbourne; pop. 1800.

**Cluny**, or CLUGNY, an industrial town in the French department of Saône-et-Loire, on the Grosne, 15 miles NW. of Mâcon by rail; pop. 3000. The famous Benedictine abbey, founded here in 910 by the Duke of Aquitaine, had two centuries later attained a degree of splendour and influence unrivalled by any similar institution of the middle ages; at its height, Cluny stood second to Rome alone as a chief centre of the Christian world. It was the asylum of kings, the training-school of popes; its abbot took rank above all others, issued his own coinage, and was a power in the political world; it was enormously wealthy, and covered Europe with its affiliated foundations. Two hundred priors of subordinate houses assembled here in the 12th century, and in the 15th century there were said to be over 2000 religious houses that were offshoots of or connected with the abbey in France, Italy, Spain, England, Germany, and Poland; although the alphabetical list of Cluniac foundations in the 15th century, at the end of the *Bibliotheca Cluniacensis*, represents only 925. In England the extension of the order dates from the Conquest; William and his successors were devoted to Cluny, and numerous foundations were shortly established, of which the priory of Lewes (1077) became the chief. At their ultimate suppression in 1539 these numbered 35, exclusive of such Scottish foundations as Paisley and Crossraguel. In the 16th century the conventual buildings at Cluny covered upwards of 25 acres. The grand basilica or abbey church, commenced by St Hugh, the eighth abbot, in 1089, and dedicated by Pope Innocent II. in 1131, was, until the construction of St Peter's at Rome, the largest church in Christendom. Of this magnificent and imposing pile one tower and part of the transept alone remain; the site of the nave is traversed by a road. The abbey, over which cardinal-ministers and princes of the blood had once ruled as commendator-abbots (see COMMENDAM), had outlived both its utility and its importance; it was no longer a great seat of learning, and its 300 monks had dwindled to 40, when in 1790 the order to whom Pope Urban II. had said, 'Ye are the light of the world,' was finally suppressed. Its library was the richest and most important in France, and its archives are of the greatest value for monastic history and for the history of the early Norman kings of England. In 1562 the Huguenots sacked the abbey and scattered its records; but most of this literary treasure was afterwards wonderfully recovered. Many records were burned along with religious books by the mob in 1793, and the library was again scattered; it was generally supposed that nothing had survived, but in 1829 no fewer than 225 folio and quarto volumes of charters and MSS. were discovered in the town-hall, of which many are preserved in the Bibliothèque Nationale, Paris, and some have found their way to the British Museum.

For those relating to England, see Sir G. Duckett's *Record-Evidence of Chans* (1886), *Charters and Records* (1888), and *Visitations and Chapters-General* (1893).

See also works by Pignot, the historian of the order, Lorain, Penjon, Cuchérat, and Champly; and L. M. Smith, *Early History of the Monastery of Cluny* (1921). The ancient palace in Paris of the abbots became in 1833 a museum of antiquities.

**Clupeidæ**. See HERRING, SARDINE, SPRAT

**Clusia**, a genus of tropical trees and shrubs of the order Clusiaceæ or Guttiferæ (q.v.), some of which are commonly called Balsam trees, from their resinous or balsamic products. They are very often *epiphytes*, growing on larger trees, but also take root in the ground. *C. rosea*, a native of the West Indies and tropical America, yields a resin, which is used as an external application in veterinary medicine, and for covering boats instead of pitch. The abundant resin exuding from the disc of the flowers of *C. insignis*, the Wax-flower of Demerara, is used to make a gently stimulating and soothing plaster. The name was given in honour of the botanist Clusius.

**Clusium**. See CHIUSI.

**Clusius**, the name by which Charles de Lélusé (1526-1609), botanist, is generally known. Born at Arras, he travelled in Spain, England, Hungary, &c., and from 1593 was a professor at Leyden.

**Clwyd**, a river of North Wales, rises on Craig Bronbanog, in Denbighshire, and enters the Irish Sea after an irregular course of 30 miles. Below Ruthin it flows through the fertile Vale of Clwyd, 24 miles long, and 2 to 7 wide.

**Clyde**, a world-famous river and firth of south-west Scotland. The river rises as Dae Water at an altitude of 1600 feet, and runs 106 miles northward and north-westward, round Tinto Hill (2335 feet), and past Lanark, Bothwell, Glasgow, and Renfrew, till at Dumbarton it merges in the firth. Its drainage area is estimated by Sir John Hawkshaw at 1481 sq. m., of which 111 belong to the South, North, and Rotten Calder, 127 to the Kelvin, 200 to the Black and White Carts, and 305 to the Leven and Loch Lomond. Tributaries higher up are Powtrail Water, Little Clydes Burn, Douglas Water, Medwyn Water, Mouse Water with its deep gorge through the Cartland Crag, and, near Hamilton, the Avon. Of these, Little Clydes Burn, rising close to head-streams of the Tweed and the Annan, is often wrongly regarded as the Clyde's true source. In the four miles of its course near Lanark the river descends from 560 to 200 feet, and forms the four celebrated Falls of Clyde—Bonnington, Corra, Dundaff, and Stonebyres Linns, of which the finest, Corra, makes a triple leap of 84 feet. Above the falls the Clyde is a beautiful pure trout-stream, traversing pastoral uplands; below, it flows through a rich fertile valley, here broadening out into plain, there pent between bold wooded banks. But its waters become more and more sluggish, begrimed, and polluted the nearer they get to Glasgow, where experiments made with floats in 1857-58 showed that the sewage sometimes took a whole week to travel only 2½ miles. Since 1765 upwards of ten millions sterling has been expended on rectifying and deepening the channel from Glasgow to Dumbarton, about 90,000,000 cubic yards of materials having been lifted by steam-dredgers during 1844-1913. The result has been that whereas a hundred years ago there was a depth at low-water of 15 inches, now they have at Glasgow 27 feet at low-water (spring-tides); then even lighters could not pass to and from Glasgow except at time of floods or at high-water in spring-tides, and now the Clyde from Glasgow downwards is navigable by the largest steamers afloat. In 1812 Henry Bell (q.v.) launched on the Clyde the first practical steamboat that appeared on European waters; and since then the river's shipping and shipbuilding (the latter

dating from a little before 1720) have both grown enormously.—The FIRTH broadens from 1 mile at Dumbarton to 37 at Ailsa Craig. It sends off the Gareloch, Loch Long, Holy Loch, and the Kyles of Bute; contains the islands of Bute, Arran, and the two Cumbræes; is bordered along its ancient sea-margin with an almost continuous fringe of seaports and watering-places; and is one of the world's chief commercial waterways.

**Clyde, LORD.** See CAMPBELL, SIR COLIN.

**Clydebank,** an enterprising parliamentary (1918) and police burgh of Dumbartonshire, on the right bank of the Clyde, 11 miles by rail from Glasgow. Up to 1875 it was an entirely agricultural district, but since the establishment of extensive shipbuilding and sewing-machine works and docks it has grown enormously. The villages of Dalmuir, Kilbowie, and Yoker are incorporated with it. Pop. 37,500.

**Clydesdale.** See LANARKSHIRE; and for CLYDESDALE HORSES, see HORSE.

**Clyster** (*enema*), a liquid medicine administered by the rectum, or lower end of the intestine. It is used either for the purpose of procuring evacuation of the bowels, or of conveying stimulants (brandy, wine, &c.), other medicines, or nourishing substances into the system. A nourishing clyster, in order to be effective, must be specially prepared or digested by means of pepsin, pancreatin, or some such agent; for the rectum, though it has the power of absorbing food already digested, is not capable of performing the functions of digestion. A nourishing or medicinal clyster must be administered in as small bulk as possible; no more than a wine-glassful should be introduced at one time, or it will probably be rejected. For the purpose of procuring evacuation, on the other hand, as large a quantity should be introduced as possible; simple warm or cold water may be employed, or in special cases, various cathartics may be used in addition, such as colocynth, aloes, castor-oil, or turpentine made into an emulsion with yolk of egg; and sometimes carminatives, to expel air. The introduction of a teaspoonful of glycerine is often very effectual in procuring an action of the bowels when other methods fail. Medicinal clysters should only be used under medical superintendence. An injecting syringe, with a flexible tube and a double-action valve, is usually employed for the administration of remedies in this way.

**Clytemnes'tra,** in Homeric legend, the wife of Agamemnon. See AGAMEMNON, ÆSCHYLUS.

**Cnidus,** or GNIDOS, the chief of the cities of the Doric league in Asia Minor, stood on the promontory of Triopion (now Cape Krio), in Caria, and, with its two harbours, was long a wealthy and flourishing port. Here, in 394 B.C., a great sea-fight took place between the Athenians under Conon, and the Spartans under Pisander, in which the former were victorious. The city was a principal seat of the worship of Aphrodite, who was therefore sometimes called the Cnidian goddess. One of its many temples contained the famous statue in Parian marble of the naked Aphrodite by Praxiteles. Some of the marbles excavated in 1857-58 are in the British Museum.

**Cnossos.** See CRETE, MINOS, KNOSSOS.

**Cnut,** Latinised CANUTUS, hence CANUTE, called the Great, and by Scandinavian writers the Mighty and the Old, king of the English, Danes, and Norwegians, was born about 994, the son of Sweyn, king of Denmark, by his first wife Gunhild, a Polish princess. His father died in England in his career of conquest (1014), and Cnut was at once chosen by his fleet king of England, while his elder brother, Harold, succeeded as king of Denmark.

But the Witan sent for Ethelred to be king, and Cnut was soon obliged to flee and return to Denmark, but not before, with the characteristic cruelty of his early life, he had cut off the hands, ears, and noses of the English hostages of his father, and put them ashore at Sandwich. Next year (1015) he put to sea again with a splendid fleet, and landed on the coast of Dorsetshire. He ravaged the country far and wide, and by Christmas had made himself master of Wessex. Early next year he marched to York, and overawed all Northumbria into submission. Already he was master of almost all England, save the city of London alone, when the death of Ethelred and the election as their king by the Londoners of his vigorous son Edmund gave a new turn to the struggle, which went on fiercely, and with varying result. Twice Cnut failed in his attempts to capture London. The final struggle took place at Assandun (see ASHINGDON), when, after a desperate battle, the English fled. Edmund and Cnut met at the isle of Olney, in the Severn, and divided the country between them—Cnut taking the northern part; Edmund, Wessex and the south. The death of Edmund in 1016 gave the whole kingdom to the young Danish conqueror. His first act was to put to death some of the more powerful English chiefs, and to send the two little sons of Edmund out of the kingdom. In 1018 he levied a heavy Danegeld of over £80,000, with which he paid off his Danish warriors, keeping only the crews of forty ships, the nucleus of his 'hus-carls.' The kingdom he divided into the four earldoms of Mercia, Northumberland, Wessex, and East Anglia. From this time Cnut's character seems to have become completely changed. At once he laid aside his ruthless, revengeful temper to become a wise, temperate, devout, and law-abiding ruler. He strove also to govern England according to English ideas, restored the equal rights that had prevailed in Edgar's time, and gradually replaced the Danish earls with native Englishmen, to whom he opened up the highest offices. Æthelnoth became Archbishop of Canterbury; Godwine, Earl of Wessex. He himself married Emma, the widow of Ethelred. He was liberal to monasteries and churches, and reverent to the memory of the native saints and martyrs. He made a pilgrimage to Rome in 1026-27, and his letter sent from Rome to his subjects reveals alike the noble simplicity of his nature and the high conception he had formed of the duty of a king. The death of Harold in 1018 had given him the crown of Denmark; the death of Olaf in 1030 closed a long struggle, and gave him secure possession of Norway. Cnut gave eighteen years of peace and order to England. His power depended mainly on the greatness of his own personality, for at his death his empire at once fell to pieces. He died at Shaftesbury, 12th November 1035, and was buried in the Minster at Winchester. The famous story, telling how he rebuked the flattery of his courtiers by showing them that the advancing waves on the seashore had no regard for his kingship, is given by Henry of Huntingdon. By his first wife, Ælfgifu of Northampton, he left two sons, Sweyn and Harold, and by his second, Emma of Normandy, one son, Hardeknut, and a daughter, Gunhild. The crown of Norway went to Sweyn. In England Cnut was succeeded by Harold. See Oman's *History of England before the Norman Conquest* (1910) and a Life by Larson (1912).

**Coach Dog.** See DALMATIAN DOG.

**Coaching.** One of the most remarkable circumstances in connection with this subject is the comparatively short period in which its history is comprised. It might very reasonably have been

thought that the exigencies of commerce, no less than those of private requirements, would, even in the earliest times, have demanded a system of communication as speedy as possible, and that some steps would have been taken to secure the desired end. Such, however, scarcely appears to have been the case; and merchants and squires contented themselves with whatever facilities for travel were afforded by the stage-wagon, a cumbersome vehicle drawn at a walk by six, eight, or more horses. Passing over all earlier attempts to organise road traffic, we may come to the year 1659, when the first stage-coach—that from Coventry—was started. Its pace was probably not faster than that of the Oxford coach, which went from London to Oxford in two days, at about 3 miles an hour, or that of the vehicles which occupied two days and a half in compassing the distance between London and Dover. In 1700 a week was required to go from London to York; and two days from London to Salisbury. The first mail-coach was not put on the road until 1784, when Mr John Palmer, manager of the Bath theatre, and M.P. for Bath, overcame strenuous opposition, and induced Mr Pitt to supersede Allen's system of postboys, whose contract rate of speed was 5 miles an hour, by his (Palmer's) plan of carrying the mails by mail-coach. The first experiment was made on the 8th of August 1784, on which day Mr Palmer entered government service as comptroller-general of the Post-office. A coach left London at 8 A.M. and reached Bristol at eleven at night. The other coach left Bristol at four in the afternoon, arriving in London at eight the next morning, the up journey thus taking sixteen hours, or one hour longer than the down journey. The scheme appears to have worked so well from the beginning, that the municipal authorities of the more important towns soon petitioned for the adoption of Mr Palmer's plan in their districts, and in nearly every instance the request was complied with. It was part of the new scheme that the mails should be timed at each stage, so that they might all reach London at about the same hour; and that the outgoing mail-coaches should start at the same time from the General Post-office. At the outset the regulation pace was 6 miles an hour; but in course of time this was increased until the coaches were rated at 10 miles per hour.

This acceleration, however, was due to causes other than the judgment and enterprise of Mr Palmer, the skill of coachmen and coach-builders, and the employment of better horses. At the period above mentioned the bad state of the roads precluded quick travelling, and although we find that roads were the subjects of legislation as early as 1346, it was not till the days of Macadam and Telford that road-travelling was, so to speak, revolutionised. The former returned to Ayrshire from America in the year 1783, and after studying road-making as a science while one of the road commissioners in Scotland, came south to Bristol in 1816, became surveyor in that district, and was consulted as to the making of other roads in all parts of England. As soon as Macadam's plans were carried into effect, good roads took the place of bad ones; quick travelling commenced, and paved the way for the palmy days of coaching, until, in 1836, there were fifty-four mail-coaches in England, thirty in Ireland, and ten in Scotland. Meantime the stage-coaches had grown in number, travelled at a high rate of speed, and necessitated the employment of a vast amount of capital. Among the best-known London proprietors were Chaplin, Horne, Sherman, Nelson, and Mountain; the two first named, having the judgment to discern that the railways would eventually drive coaches off the road, threw in their lot with the London and

Birmingham Railway. It was not till after George IV. came to the throne that coaching reached the zenith of its fame in respect of organisation, pace, appointments, and one may, perhaps, say coachmanship as well. The 'palmy days,' concerning which so much has been written, began about 1820, and coaching was possibly at its most perfect pitch about 1836. For about four years it enjoyed this repute, and then the downward journey, far more rapid than the upward one, began; one by one coaches were taken off; coaching inns became roadside public-houses; coachmen and guards found other occupations, or migrated to the workhouse; stables were emptied, and admiration for coaching gave way to appreciation of railroad-travelling.

Of amateur coachmen and coachmanship in the 18th century comparatively little is known; but, when good roads were the rule instead of the exception, 'gentleman coaching' became a fashionable amusement. Mr John Warde, the famous master of foxhounds, was a renowned whip, to whom were due the thanks of the old coachmen for having originated the idea of placing springs under the coach-box. The name of Peyton has ever been connected with the annals of the road; the Messrs Walker, Sir St Vincent Cotton, the Marquis of Worcester, Mr Henry Villebois, Mr Maxse, Mr Jerningham, Mr Sackville Gwynne, Sir Bellingham Graham, Mr Stevenson, Hon. Fitzroy Stanhope, Hon. T. Kenyon, Colonel Sibthorpe, and Mr C. Buxton are among the number of those who patronised the road by every means in their power. Others, scarcely less enthusiastic, succeeded them, until there were no road-coaches to be driven. So far as London is concerned, the link between the past and present was broken in the year 1858, when the Brighton 'Age,' under the management of Clarke, assisted by the Duke of Beaufort and Sir George Wombwell, was given up. The coach, which was a sort of link between the real coaching period and the modern revival, was at work again, for a short time, in 1862. In 1866 Captain Haworth, Captain Lawrie, and a few others started the 'Old Times' to Brighton. At the end of the season the confederacy was broken up, and in 1867 the Duke of Beaufort, Mr Chandos Pole, and Mr B. J. Angel took the road, running a coach each way daily.

The year 1877 was a somewhat memorable one in the annals of modern coaching, as on 4th November the 'Old Times' was put on to St Albans, and thereafter ran for long every 'lawful day' without a break, though not always on the same route. In 1888 it was put upon the Brighton road, and on the 11th July, James Selby (*ob.* Dec. 1888), its coachman since 1877, drove from Piccadilly to Brighton and back in seven hours fifty minutes, the outward journey being accomplished in three hours fifty minutes and ten seconds. This performance, however, is not a 'record,' as in 1837 Israel Alexander, a professional on the Brighton road, drove down with Queen Victoria's first speech in three hours forty minutes.

The new movement was quickly followed up, and in 1867 Mr Charles Hoare had a coach on the road between Beckenham and Sevenoaks, which after a time made London its starting and returning point. Windsor, High Wycombe, Virginia Water, Dorking, Reigate, Guildford, Portsmouth, and Oxford, and Cambridge, all had their coaches during recent times, and the movement was at its height in the late 'nineties and the early years of the present century. With the advent of the motor-car there was a partial, but not a total, collapse; and just before the commencement of the Great War not only were there half-a-dozen public coaches running in and out of London, but there had recently been a marked increase in the number

of private coaches. Some eight or ten years previously—about the year 1906—it had looked as if four-in-hand driving was going out of fashion altogether. Only one or two coaches were struggling against the new order of things, and the number of coaches at the meets of the two driving clubs was being gradually diminished. But as the motor-car became more generally understood, the driving people took heart of grace, and began to return to their old love. The principal cause of the decline in four-in-hand driving had been the fact that the horses which were being actually driven when the first motor-cars appeared were frightened of the new traffic, and when one of a coach team tried to bolt the consequences were often unpleasant, even when accident was averted. But as a new generation of horses, accustomed to motor-cars from foalhood, began to be used, this difficulty disappeared, and four-in-hand driving became, to a great extent, once more popular.

The American whip, Mr A. G. Vanderbilt, put a pair of coaches, one running either way, on the Brighton road in 1908; and in the same year the first of the series of international horse shows was inaugurated at Olympia, and prizes were given for four-in-hand teams, while a year or two later the first Marathon drive from Hampton Court into the Olympia show ring took place. This Marathon drive for road coaches was from the very first a great success. It was followed shortly afterwards by the 'Field' Cup, or Coaching Corinthian, a drive for amateurs, which began at Olympia, and took the coaches through a part of Richmond Park, and thence to Ranelagh, where the teams were looked over by the judges, and rested for a time. Afterwards they were sent back to Olympia, and judged finally in the ring at the evening session. The full distance of this drive was at first seventeen miles, but it was afterwards curtailed by three or four miles. No change of horses was allowed. Another Marathon drive has taken place in connection with the Richmond show. In this case there is a class for road coaches, and another for private drags, and the two start together from the magazine in Hyde Park, and are driven to the show-ground at Richmond, where the road coaches are drawn up on one side, and the private drags on the other, for the judges to inspect. The popularity of these drives is quite phenomenal, and has been so since their commencement. All along the route the crowd turn out in thousands, and from Hammer-smith Bridge to Olympia the teams have to wend their way through a lane of people on either side, all other traffic being stopped for the moment by the metropolitan police.

The shows which have been mentioned have also held competitions for members of the Coaching Club, and these caused an extraordinary increase in the quality of the horses driven by members of this club.

The meets of the Four-in-Hand Driving Club and the Coaching Club are justly regarded as among the sights of the season. The former is the more exclusive as well as the elder, having been established in 1856, chiefly at the suggestion of Mr W. Morritt. The club could not entertain one quarter of the applications for membership, so in 1870 the Coaching Club was established, and has been gradually increasing in size. For the first driving club of which we have any account we must go back to the year 1807, the date of the establishment of the Bensington Driving Club—the B.D.C. it was generally known as, and commonly called the 'Benson'—which was limited to twenty-five members. For the first sixteen years of the club's existence its members used to drive down two days in the season to Bensington, near Wallingford, and twice to Bedford, near Staines; but

in 1823 the Bensington gatherings were given up. A second club was founded in 1808 by Mr Charles Buxton. The new association was called the Four-horse Club, and landaus were used instead of coaches; but it was sometimes, though wrongly, designated as the Whip Club, and the Four-in-hand Club. The Four-horse Club was broken up in 1820, was revived in 1822, but became extinct altogether about 1829. The B.D.C. was then the only body of the kind until 1838, when Lord Chesterfield established the Richmond Driving Club, the members of which, after meeting at Chesterfield House, drove to Richmond to dinner. This club, however, came to an end after nine or ten years; and in 1852 the B.D.C. was broken up. From that time there was no driving club until the present Four-in-hand Driving Club was founded as already mentioned. Coaches are sometimes put on in the provinces. The motor-car can hardly be accounted a rival of the four-in-hand.

See the Duke of Beaufort's *Driving* (Badminton series, 1888); W. Outram Tristram's *Coaching Days and Coaching Ways* (1888; new ed. 1903); Fairman Rogers's *Manual of Coaching* (N.Y. 1900); a series of works on the great coaching roads by C. G. Harper; the works of 'Nimrod' (C. J. Apperley, q.v.); the *New Book of the Horse*, by Charles Richardson; and the article in this work on Carriage.

**Coach-whip.** See WHIP-SNAKE.

**Coagulation**, the amorphous solidification of a liquid, or part of a liquid, as when the casein of milk is solidified by rennet in making Cheese (q.v.), or the white of an egg by boiling. The process varies in various substances. Albumen, or the white of an egg, coagulates at a temperature of 160° F. Milk is coagulated or curdled by the action of rennet or by acids. The fibrin in the blood, chyle, and lymph of animals is coagulated by the separation of these fluids from the living body. See BLOOD.

**Coahuila**, a state of Mexico, separated from Texas by the Rio Grande, has an area of 64,000 sq. m., partly mountainous, and forming in the west a part of the inland drainage basin of the Bolsón de Mapimí. The climate is healthy, although extremes of heat and cold are usual. The state is rich in minerals, especially silver. Coal, not of very good quality, is found. It is plentiful, however, as nowhere else in Mexico. Other minerals are lead, copper, iron, and petroleum. It has valuable pasturage, and in many parts a most fertile soil; but no district of Mexico was so slow in being developed. Railway construction, however, prepared the way for a change. Great areas of the Bolsón de Mapimí in Coahuila and the neighbouring state of Durango have been reclaimed by irrigation from the Nazas and other rivers, and the region has become the chief cotton-producing district of Mexico. A large number of cotton-factories and flour-mills are in operation. Pop. 400,000. Capital, Saltillo (q.v.).

**Coaita.** See SPIDER-MONKEY.

**Coal**, in the sense of a piece of glowing fuel (and hence a piece of fuel, whether dead or alive), is a word common to all the Germanic languages (Old English *col*, Icel. *kol*, Ger. *kohle*). The different sorts of fuel are distinguished by prefixes, as *charcoal*, *pit-coal*; but in England, owing to the absorbing importance of mineral or pit coal, the word coal alone has come to be used in this special signification (Ger. *steinkohlen*, Fr. *charbon de terre*).

Coal is one of the most important of all rocks; it consists chiefly of carbon, and is universally regarded as of vegetable origin. Its geological relations are noticed in the article CARBONIFEROUS SYSTEM. It occurs in layers or beds, and is always

of a black or blackish-brown colour. Some of the varieties have a very considerable degree of vitreous or resinous lustre, while others are destitute of lustre; some have a shell-like fracture, and others have a highly cross-jointed structure, and are readily broken into cubical or rhomboidal fragments. The precise characters of coal as a rock species are not easily defined, and both in Britain and other countries important cases have occupied courts of law, in which this difficulty was strongly felt, as in the great Scottish lawsuit concerning the Torbanehill Mineral or Boghead Coal (q.v.). Coal, indeed, is rather a commercial than a scientific term, but in a general way we may define it as a fossil fuel of black colour and stony consistency, which, when heated in close vessels, is converted into coke with the escape of volatile liquids and gases. The variety known as blind coal or anthracite no doubt gives off scarcely any volatile matter, but this is because it has undergone a natural distillation through the action of subterranean heat or of the proximity of intrusive igneous rock. We may therefore divide coal into two primary divisions—namely: (1) *Anthracite*, which does not, and (2) *Bituminous coal*, which does, flame when kindled. Anthracite (q.v.) sometimes contains as much as 94, and if we exclude the ash, 98 per cent. of carbon, and as this element decreases in amount it graduates into a bituminous coal. The term anthracite is, however, still applied to some coals which do not contain more than 80 per cent. of carbon. Various synonyms, such as stone coal, glance coal, culm, and Welsh coal, are also used to designate this substance, which is used chiefly for smelting purposes and for generating steam. In the United States it is also very largely used for domestic purposes—heating and cooking. It is difficult to kindle, but gives out a high heat in burning. Bituminous coal includes an almost endless number of varieties, one of the best marked being *cannel* or *parrot coal*. Cannel coal is probably so called from burning with a bright flame like a candle, and the name parrot coal is given to it in Scotland from the crackling or chattering noise it makes when burned. That of different localities varies much in appearance, but it is most commonly dull and earthy, or with only a slight lustre; some examples are, however, bright and shining. In texture it is nearly always compact, and certain beds of it admit of being polished in slabs of considerable size, which approach black marble in appearance. Of this material vases, inkstands, boxes, &c. are made. Cannel coal contains a large percentage of ash, but the best cannels are in some places much used for open-grate fires in houses. Cannel is for the most part consumed in making gas, of which it yields from 8000 to 15,000 cubic feet per ton. When distilled at a low red-heat it yields paraffin oil. The other varieties of bituminous coal are so numerous that, as an Admiralty report states, there are as many as seventy denominations of it imported into London alone. Still, among these there are three leading kinds—1. *Caking coal*, which cakes or fuses into one mass in the fire. It breaks into small uneven fragments, and is found largely at Newcastle and some other localities. 2. *Splint or hard coal*, occurring plentifully in Scotland, which is hard, and breaks into cuboidal blocks. This is often called block-coal; and locally it is very valuable, because it can be employed in smelting without being first coked. It is not very easily kindled, but when lighted makes a clear lasting fire. 3. *Cherry or soft coal*, which breaks easily into small irregular cubes, has a beautiful shining lustre, is readily kindled, and gives out a cheerful flame and heat. It is common in Staffordshire. Brown coal or Lignite (q.v.), though for the most part inferior to

true coal, is nevertheless an important fuel in some countries in default of a better kind. There are, however, large deposits of lignites in some regions, as in North America, which coke well, and which are excellent substitutes for true coal.

The use of coal does not seem to have been known to the ancients; nor is it well known at what time it began to be used for fuel. Some say that it was used by the ancient Britons; and at all events it was to some extent an article of household consumption during the Anglo-Saxon period as early as 852 A.D. There seems to be reason for thinking that Britain was the first European country in which coal was used to any considerable extent. A coal-pit at Preston, Haddington, was granted to the monks of Newbattle between 1210 and 1219. Henry III. is said to have granted a license to dig coal in 1234. About the end of the 13th century it began to be employed in London, but at first only in the arts and manufactures; and the innovation was complained of as injurious to human health. In 1306 the parliament petitioned the king to prohibit the use of coal, and a proclamation was accordingly issued against it; but owing to the high price of wood, its use soon became general in London. It was for a long time known there as *sea-coal*, because imported by sea.

Several theories as to the mode of the origin of coal have been put forth from time to time. The one now generally believed in is that the rank and luxuriant vegetation which prevailed during the carboniferous age grew and decayed upon land but slightly raised above the sea; that by slow subsidence this thick layer of vegetable matter sunk below the water, and became gradually covered with sand, mud, and other mineral sediment; that then, by some slight upheaval or gradual silting up of the sea bottom, a land surface was once more formed, and covered with a dense mass of plants, which in course of time decayed, sank, and became overlaid with silt and sand as before. At length, thick masses of stratified matter would accumulate, producing great pressure, and this, acting along with chemical changes, would gradually mineralise the vegetable layers into coal. Microscopical examination shows that coal consists principally of the cortical portions of plants—more especially of the bark of such trees as *Sigillaria*—commingled with the debris of various other plants, amongst which the spore cases and spores of certain lycopodiaceous trees not infrequently occur in great abundance. It seems probable indeed that many coal-seams simply represent great swamps and marshy jungles.

As will be seen from the following table, wood, peat, lignite or brown coal, and true coal indicate by their composition the changes which vegetable matter undergoes by decay and pressure; and a table in which a considerable number of examples of each substance could be given would show how gradually these substances pass into each other:

	Wood	Peat	Lignite.	Coal.
Carbon . . . . .	50.0	60.0	65.7	82.6
Hydrogen . . . . .	6.2	6.5	5.3	5.6
Oxygen . . . . .	43.5	33.5	29.0	11.8
	100.0	100.0	100.0	100.0

In each of these bodies there is usually a small percentage of nitrogen, which in the above table has not been separated. In passing from wood or peat to coal, the proportion of oxygen and hydrogen decreases, these substances being given off in the form of marsh-gas and carbonic acid in the process of decay.

On the continent of Europe, productive coal-fields occur in Belgium, France, Prussia, Spain, Silesia, and in Russia—the only important Russian coal-field being that of Donetz, on the north shore of the Sea of Azov. Coal is also found in India, China

(where several extensive coal-fields occur, in which coal has been worked from a very early period), Japan, the Malay Archipelago, Australia, New Zealand, Africa, and Antarctica. There is evidence of promising coal-deposits in several South American countries, but, owing to the great supply of wood in their forests, there is little temptation to work them. Considerable importance already attaches, however, to the mines of Chile (q.v.). In Canada there are small, though valuable, coal-fields; but in the United States enormous fields of fossil fuel are found. The entire area of these is about 200,000 sq. m., being 83 times greater than the area of the coal-fields of Great Britain. But although the coal-measures of the States are of vast extent, and contain many valuable coal-seams—a few of them 40 and even 50 feet thick at certain places—it has been doubted whether the amount of workable coal in them has not been exaggerated. In proportion to the extent of the seams, the quantity of coal annually raised in the States is small, some 500,000,000 or 600,000,000 tons. The distribution of the coalfields of Britain and North America is discussed at CARBONIFEROUS SYSTEM.

**Coal-supply of the World.**—A report on the world's coal-resources was drawn up for the twelfth International Geological Congress (Canada, 1912), and published at Toronto (3 vols. 1913). It was computed that there was probably available altogether in known coal-fields 7,397,533,000,000 tons (4 billion tons bituminous, 3 billion brown coal, the remainder anthracite). About half of the total is in the United States. Canada is second with one-sixth, mainly in the west. Approximately the reserves in various countries were these:

United States.....	3,214,174 million tons.
Canada .....	1,234,269 " "
Russia.....	233,997 " "
United Kingdom.....	189,535 " "
Germany.....	85,551 " "
France .....	17,585 " "

The world's consumption in 1916 was reckoned at 1600 million tons.

See Green and Miall, *Coal: History and Uses* (1878); Galloway, *History of Coal-mining in Great Britain* (1882); text-books of coal-mining by Pameley (1891), Hughes (1892), and Peel (1901); Hull, *The Coal-fields of Great Britain* (1880); Meldola, *Coal and what we get from it* (1891); D. M. D. Stuart, *Coal Dust and an Explosive Agent* (1894); Nicolls, *The Story of American Coals* (Phila. 1897); the Final Report of the 1901 Commission (13 parts, 1905); H. S. Jevons, *The British Coal Trade* (1915); *Historical Review of Coal-mining* (1924).—For mining methods, the inspection of mines, explosions, and cognate matters, see MINING. The condition of colliers and salters in Britain is discussed at SLAVERY. For coal-tar products, see COAL-TAR, DYEING. See also BRIQUETTE, COKE, FUEL, GAS, PETROLEUM.

**Coalbrookdale** is a district in Shropshire, extending 8 miles along the river Severn; its exhausted coal-field supplies iron, petroleum, and limestone, and manufactures iron. The village of Coalbrookdale is 11 miles SE. of Shrewsbury.

**Coal-fish** (*Gadus carbonarius*), a species of cod, with black upper parts, common in northern seas. It occurs from 80° N. lat. to the Mediterranean, and is common off North American and British coasts. In Scotland it is commonly called Saith. It often measures 2 to 3 feet in length, and may be considerably larger; occurs in great shoals; is exceedingly voracious. Though decidedly coarse, its flesh is much eaten in northern parts. The young ones are often caught by boys fishing off the rocks, and are variously known as podleys, sillocks, cuddies, and coalseys. See COD.

**Coaling Stations.** The necessity for maintaining a sufficient number of outposts on the great lines of British trade, both for mercantile and naval

purposes, has been recognised as a particular requirement of Great Britain on account of the extensive ramifications of her commerce and interests. In the old sailing days, when the largest man-of-war could only carry provisions and water for a few months, bases from which they could obtain supplies were an absolute necessity. In modern times, when supplies of coal are an even more urgent necessity, the question of coaling stations becomes a very acute one. It was not till 1878, however, that the question was taken up in earnest by the British government, when a strong Royal Commission was appointed to inquire into the whole subject. A great amount of evidence was taken, and a final report made in 1881. Their inquiry was directed to the needs of trade rather than that of the navy. The importance of the trade-route by the Cape to the East was the great point insisted on; harbours on this route were selected and recommended for defence. Since then the route *viâ* the Suez Canal has become even more important, and has been well provided for. While for mercantile purposes coaling and oiling or fuelling stations are absolutely necessary, for the naval purposes of Britain, with her fleets in every part of the world and her widespread interests, they are of supreme importance. The defence of coaling stations has always been a vexed question, and much money has been expended on many of them. It is now, however, being recognised that as any attack on them would probably be made by raiding parties of a few ships, their defence should not be so difficult a matter as was at first supposed. A few guns well disposed in suitable positions and manned by properly trained men will answer for general purposes, instead of what was at first contemplated—namely, that every coaling station should be another Malta or Gibraltar.

**Coalition**, in Politics, is applied to the union of two parties, or, as generally happens, portions of parties who agree to sink their differences, and act in common. Pitt the elder, when he took office in 1757, coalesced with the Whig aristocracy represented by the Duke of Newcastle. The Great Coalition was formed in 1782, when Fox, the leader of the reformers, took office along with Lord North, the leader of the opposite party. When Lord Derby's ministry resigned in 1853, there was a short coalition between the Whig party under Lord John Russell, and the more moderate of the Conservative party under Lord Aberdeen. The arrangement made between Conservatives and Liberal Unionists in 1886 can scarcely be called a coalition, inasmuch as the main responsibility of government rested on the former, while the latter gave them a general support. Part of the Liberal and Labour parties formed a coalition with the Conservatives under Mr Asquith (1915) and Mr Lloyd George (1916). Cohesion between its components had weakened before the Conservatives withdrew, and Mr Lloyd George resigned and was defeated in 1922.

**Coal-measures.** See CARBONIFEROUS.

**Coal-tar**, or GAS-TAR, is a thick, black, opaque liquid, which comes over and condenses in the pipes when coal or petroleum is distilled. Now usually obtained in the manufacture of gas, tar was about 1782 extracted from coal by the ninth Earl of Dundonald under a patent, expressly for the purpose of being used for protecting ships from rotting. Coal-tar is slightly heavier than water, and has a strong, disagreeable odour. The amount of tar so obtained of course varies with the nature of the coal employed, but it is also dependent on the average temperature of distillation. With a low temperature, a large quantity of tar is produced, along with

a small yield of a highly illuminating gas. At first this tar was regarded as a waste product, or, at most, as a source of pitch; but it soon became apparent that as a source of Benzene (q.v.), and through it of the Aniline (q.v.) dyes, it was a commodity of great commercial value.

When coal-tar is distilled, a large number of volatile substances pass over as the temperature rises higher and higher. At first various gases, ammonia and naphtha, are obtained to the extent of about  $\frac{1}{10}$ th part of the original tar, and then distillation ceases, although the temperature gradually rises. After a period of about an hour, more oils, like the former, lighter than water, are obtained, and so on the distillation proceeds, with successive intervals, yielding what are known as Creosote or Creasote (q.v.) oils, and finally Anthracene oils, the residue in the still being Pitch (q.v.).

At first, when anthracene was of little importance, distillation was not pushed so far, and the anthracene oils were allowed to remain in the pitch; but since the discovery of the process for making artificial Alizarin (q.v.), the heat is pushed as far as possible consistent with the production of a pitch that will sell. The first light oils yield chiefly benzol, carbolic acid, and naphtha. The creosote oils yield creosote and naphthalene, while the anthracene oils produce anthracene and lubricating oils.

After this enumeration of the chief coal-tar products, it will be possible to realise the great importance of this substance. The naphtha, besides being used as a solvent for india-rubber and gutta-percha, is burned to produce a fine variety of carbon for printing-ink. The benzol, including in this term many nearly allied substances, not only yields many brilliant dyes, but is used for cleaning gloves, silks, and other articles which would be injured by washing. The creosote in its crude form is largely used for preserving wood, enabling it to be exposed in damp situations without rotting, while, when burned, its smoke yields lampblack. The carbolic acid obtained is one of the most valuable constituents of coal-tar. Finally, the residual pitch is in constant requisition for making roofing felt and asphalt pavement. Besides these primary products of coal-tar, there are of course numerous compounds derived more or less remotely from it. Such are the aniline dyes, high explosives, the quinine substitutes, antipyrin, antifebrin, &c., and Saccharine (q.v.). Failing other outlet, the gas-works can use coal-tar in its crude state as fuel for heating the stills. See NAPHTHALENE, PICRIC ACID, &c.

**Coalville**, an urban district of Leicestershire, 16 miles NW. of Leicester; pop. 20,500.

**Coanza**, a river of West Africa, rising in the east of Benguela, and after a generally NW. course, entering the Atlantic about 30 miles S. of St Paul de Loando, by a mouth over a mile broad. It is navigable for light vessels as far as the Cambambe cataracts, over 120 miles.

**Coast Defence.** The character of the defence provided for the coasts of a state must depend on the nature of the coast and of the attack to be anticipated. Germany sought a solution of the problem mainly by means of submarine mines and aircraft, associated with a strong flotilla of torpedo-boats, and, in certain spots, with powerful batteries. Italy entrusts the defence of her coasts chiefly to her very powerful fleet of ironclads, which can move from place to place as required. In France and England all these methods are employed: mine-fields, aircraft, submarines, torpedo-boat flotillas, batteries, and a strong fleet of heavy ships, some of which have been specially designed for this purpose. In Italy the unusual feature of 120-ton guns

mounted in gun-barges, to take part in the defence of certain important harbours, is also to be noticed. As a general defence against an attack in force, aircraft, coastal motor-boats, submarines, and strong batteries in connection with mine-fields offer, perhaps, the best security. Against depredations by isolated ships or cruisers, well-placed guns on the disappearing system, with some fast aircraft and torpedo-craft, would probably be most efficacious. The question of the best system of defence, under the great changes which have taken place in the material of warfare, must probably remain undecided until the experience gained in the Great War has been thoroughly examined.

**Coastguard**, an organisation formerly intended to prevent smuggling merely, but later constituted so as to serve as a defensive force also. The old coastguardsmen were in the employment of the Customs department; they were posted along the shore at spots commanding extensive views of the beach, and were expected to be always on the look-out for smugglers. In 1856 the coastguard was transferred to the Admiralty. The Coastguard Service Act of 1856 was replaced in 1925 by the Coastguard Act. In 1922 a committee composed of civilians formed at the Admiralty to inquire into the duties, &c., of the coastguard force recommended that the coast watching in peace-time for excise and for general look-out duties should be undertaken by the Board of Trade, and that the naval votes be thus relieved of the cost of maintaining the coastguard personnel and matériel—buildings, &c. In war-time, however, the Admiralty would resume control of all coast-watching stations and duties of personnel. The transference to the Board of Trade took effect in 1923, but wireless and certain signal stations still remain under Admiralty control.

**Coast Survey** of United States. See CHART.

**Coatbridge**, a thriving manufacturing town in Lanarkshire, 9 miles E. of Glasgow by rail, and 32 W. by S. of Edinburgh. The centre of a great mineral district, it is surrounded by blast-furnaces, and produces locomotives, malleable iron, boilers, tubes, tin-plate, firebricks and tiles, and railway wagons. Its development to a municipal burgh (1885) was mainly due to the Gartsherrie Ironworks of Messrs Baird. Pop. (1831) 741; (1851) 8564; (1881) 18,425; (1921) 43,909.

**Coati**, or COATI-MUNDI (*Nasua*), a genus of the raccoon family (Procyonidae) in the bear-like section of Carnivora. There are two species found in Mexico, Central America, and South America. They live on trees, feeding somewhat omnivorously, and grubbing with an upturned flexible snout. They are social in their habits, and readily adapt themselves to domestication. See RACCOON.

**Coats Land.** See ANTARCTICA.

**Coatzacoalcas**, a river of the isthmus of Tehuantepec in Mexico, which falls into the Gulf of Mexico 130 miles SE. of Vera Cruz. At its mouth is Puerto Méjico (Coatzacoalcas), a terminus of the Tehuantepec Railway; pop. 10,000.

**Cob.** See COB-NUT.

**Cobalt** (sym. Co, eq. 59, from *Cobaltus*, 'a malicious sprite' or 'gnome') is a metal the ores of which are sparingly distributed. In the metallic state it is found in meteoric stones or aerolites to the extent of one per cent., but it generally occurs combined with arsenic as *Speiss* cobalt,  $\text{CoAs}_2$ , or as cobaltite, the arsenide and sulphide of the metal,  $\text{CoSAs}$ . To obtain the metal itself from its ores is a matter of some difficulty. It is more tenacious than iron, and is used in high-speed steel and electroplating. It is of a gray colour with a reddish tinge, brittle, hard, and very magnetic. Many of its compounds are valued on account of the brilliance and permanence of their colours.

The Protoxide of Cobalt,  $\text{CoO}$ , is employed as a blue pigment in porcelain-painting. *Zaffre* is the impure oxide obtained by partially roasting cobalt ore previously mixed with two or three times its weight of fine sand. *Smalt* is the term applied to a deep-blue glass, which owes its colour to the presence of oxide of cobalt, and which, when reduced to very fine powder, is employed occasionally by laundresses to correct the yellow colour of newly washed linen, and by paper-makers as a blue pigment for staining writing-paper. Smalt is also used in the production of the blue colours in porcelain, pottery, glass, encaustic tiles, fresco-painting, &c., and forms the principal ingredient in *Old Sevres Blue*, *Thenard's Blue*, *Turquoise Blue*, &c. (see BLUE). A compound containing the oxides of cobalt and zinc is of a beautiful green colour, and is known as *Rinman's Green*. The chloride of cobalt dissolved in much water may be employed as a sympathetic ink (see INK). In dilute solutions it is of a faint pink colour, which is not observable when it is used for writing upon paper; but when heated before the fire it loses water, and becomes blue, and the writing is then capable of being read. On allowing the paper thereafter to lie in a damp place, or exposing it to the vapour of steam from a kettle, water is again absorbed, and the writing returns to its invisible state. The addition of a little perchloride of iron to the ink makes the writing appear green; a solution of zinc imparts a red tint; and a salt of copper, a yellow. See E. Halse, *Cobalt Ores* (1924).

**Cobalt**, a town of Ontario, 330 miles N. of Toronto; the name being given because the characteristic associate of the silver ores found close by is the metal cobalt. Beginning with the spring of 1904, the town grew rapidly, and by 1911 had a population, including that of the near-by mines, of 5638; in 1921 reduced to 4449.

The Cobalt mining area is situated in the district of Nipissing, Ontario, within a few miles of Lake Temiskaming. The mineral deposits which made it famous were discovered during the building of the railway in the autumn of 1903. By 1905 it had become one of the world's most famous mining areas. The ores consist of native silver and compounds of that metal, together with arsenides of cobalt and nickel. The chief value of the ores is in their silver content. At its height not only was Cobalt the world's greatest producer of silver, but it produced more cobalt and more arsenic than any other locality, and was the world's third greatest producer of nickel. The ores are found mostly within an area of 6 sq. miles, in narrow cracks or fissures which do not average more than three or four inches in width. The rocks in which these fissures occur are among the oldest known, and form the southern edge of the great pre-Cambrian region of Canada.

**Cobán**, capital of the department of Vera Paz, in Guatemala, on a fertile plateau 85 miles N. of the town of Guatemala; pop. 31,000.

**Cobbe**, FRANCES POWER (1822-1904), born at Newbridge near Dublin, granddaughter of the archbishop, turned from her early evangelicalism to Theodore Parker for spiritual guidance, associated with Mary Carpenter (q.v.) in good works, and from 1860 was a busy author of books, leader-writer for the London dailies, and contributor to the magazines. She travelled in Italy and the East, and wrote *The Cities of the Past* (1864) and *Italics* (1864). A strong Theist, a supporter of women's rights, and a prominent antivivisectionist, she published her *Autobiography* in 1894.

**Cobbett**, WILLIAM, born at Farnham, Surrey, on 9th March 1763, was the son of a small farmer,

and grandson of a day-labourer. From scaring crows the boy rose to be ploughman; but a visit to Portsmouth and a sight of the fleet had spoiled him for farming, when, in May 1783, a sudden freak took him to London. He reached it with just half-a-crown, and for nine months was quill-driver to a Gray's Inn attorney. Enlisting then in the 54th Foot, he first spent a year at Chatham, where he mastered Lowth's *English Grammar*, and read through a whole lending library—Swift's *Tale of a Tub* had been his boyhood's delight. Next he served as sergeant-major in New Brunswick (1785-91), meanwhile saving 150 guineas, and studying rhetoric, geometry, logic, French, and fortification. On his return he obtained a most flattering discharge; in February 1792 married; but in March went to France to get out of a court-martial on three of his late officers, whom he had taxed with speculation. Six months later he sailed for America. At Philadelphia he taught English to French refugees (Talleyrand wanted to be one of his pupils); translated from the French; and, as 'Peter Porcupine,' wrote fierce onslaughts on Dr Priestley, Tom Paine, and the native Democrats. Twice he was prosecuted for libel, and America got too hot for him, so in June 1800 he returned to England. The Tonies welcomed him with open arms; and in 1802 he started his famous *Weekly Political Register*, which, with one three-months' break in 1817, continued till his death. But, Tory first, it altered its politics in 1804, till at last it 'became the most fierce and determined opponent of the government, and the most uncompromising champion of Radicalism.' A great lover of the country, Cobbett settled at Botley in Hampshire, where he planted, farmed, and went in for manly sports; a true soldiers' fiend, he got two years in Newgate (1810-12), with a fine of £1000, for his strictures on the flogging of militiamen by German mercenaries. In 1817 money muddles and dread of a second imprisonment drove him once more across the Atlantic. He farmed in Long Island, writing all the while for the *Register*, till in 1819 he ventured back again, and came bringing Tom Paine's bones—the one really silly action of his life. Botley had to be sold, but he started a seed-farm at Kensington; and bent now on entering parliament, stood for Coventry (1821) and Preston (1826). Both times he failed; but his ill-advised trial for sedition (1831) was followed next year by his return for Oldham to the first Reformed parliament. His career there, if not quite a failure, was signalised chiefly by a crack-brained attack on Peel; anyhow, the late hours were too much for him, and on 18th June 1835 he died at Normanby farm, near Guildford. He was buried at Farnham.

Coarse, virulent, braggadocio, inconsistent—Cobbett was all this. He was often right, but he must have been oftener wrong, for oftener he came to abuse what once he had eulogised than *vice versa*. He was a very Ishmael of politics; Lord Dalling dubs him 'the contentious man.' Still, a man he was, a genuine John Bull; and if he wrote nonsense about Waterloo and the national debt, and more nonsense than sense about the Reformation, he wrote it in fine strong English. He loathed Whigs and 'mock gentlefolks,' but he honestly loved the poor—loved Nature, too, and could paint her dear English scenery with a freshness and insight wholly and solely his own. The *Rural Rides* (new edition, with notes by Pitt Cobbett, 1885) are unsurpassable. They were a reprint (1830) from the *Register*, and followed or were followed by *Porcupine's Works* (12 vols. 1801), the excellent and entertaining *English Grammar* (1818), the savage *History of the Reformation* (1824-27), the *Woodlands* (1825), the shrewd, homely *Advice to Young*

*Men* (1830), and forty more works. He originated Hansard's *Debates* (1806) and Howell's *State Trials* (1809).

See *Lives* by Huish (1835), E. Smith (1878), E. Carlyle (1904), Melville (1913), and G. D. N. Cole (1924); also, for his interest in the prize-ring, the *Wendham Papers* (1913).

**Cobbold**, THOMAS SPENCER (1828-86), was born at Ipswich, studied medicine at Edinburgh, lectured in London on botany, zoology, comparative anatomy, geology, and helminthology, in connection with various hospitals and colleges, and wrote *Entozoa* (1864), *Parasites* (1879), *Tapeworms* (1866), and numerous other works on kindred subjects.

**Cobden**, RICHARD, a great English politician, 'the Apostle of Free Trade,' was born at Heyshott, near Midhurst, Sussex, 3d June 1804. His father, a thrifless yeoman, had to sell his farm in 1814, and relations charged themselves with the maintenance of the eleven children; Richard, the fourth, being sent to a 'Dotheboys' school in Yorkshire. After five wretched years there, in 1819 he was received into a wholesale warehouse in London, belonging to his uncle, where he soon showed great aptitude for business, and as a commercial traveller he visited Scotland and Ireland. In 1828 Cobden and two of his friends entered into a partnership for selling calicoes by commission in London. They set up an establishment for calico-printing in Lancashire in 1831, and in 1832 Cobden settled in Manchester, the town with which his name is so closely associated. He wrote a comedy which was rejected by the manager of Covent Garden Theatre. In 1835 he visited the United States, and in 1836-37 travelled in Turkey, Greece, and Egypt. The result of his travels appeared in two pamphlets, *England, Ireland, and America* (1835), and *Russia* (1836); the latter intended as an antidote against the 'Russophobia' then prevalent. In these pamphlets he also ridiculed the workings of diplomacy, and asserted England's mission to be the avoidance of war and the extension of commerce. He contested the borough of Stockport unsuccessfully on free-trade principles in 1837. In 1838 he carried in the Manchester Chamber of Commerce a motion to petition parliament for the repeal of all duties on corn. In the same year seven merchants of Manchester formed the association which soon grew into the Anti-Corn-law League. Of this League Cobden was the most energetic and prominent member. His lectures all over the country, and his speeches in parliament (to which he was returned in 1841 by the constituency which had rejected him in 1837), were characterised by clear, quiet persuasiveness; and to them was in great part due, as Sir Robert Peel acknowledged, the abolition of the corn laws at so early a period as 1846.

Cobden's zeal for free trade in corn had, however, to such a degree withdrawn his attention from private business, that he was now a ruined man, and a subscription of £80,000 was raised in recognition of his great services; and with this in 1847 he re-purchased Dunford, the farmhouse in which he was born. As his health, too, had suffered, he re-visited the Continent, and during his absence was elected both for Stockport and the West Riding of Yorkshire. He chose the latter constituency, which he continued to represent till 1857. He shared Mr Bright's unpopularity for opposing the policy that led to the Crimean war; and on an appeal to the country by Lord Palmerston to support him in his Chinese policy, of which Cobden was a strenuous opponent, he retired from the West Riding and contested Huddersfield, where, however, he was defeated. Cobden spent his leisure in a second American tour. During his absence he was elected for Rochdale.

Lord Palmerston, who was at this time forming his ministry of 1859-65, with a just appreciation of Cobden's great services, offered him a seat in the cabinet as President of the Board of Trade; but Cobden, as the uncompromising opponent of Palmerston's policy, felt bound to decline the honour. After his election for Rochdale, the state of his health did not permit him to take any part in parliamentary proceedings, but as Her Majesty's plenipotentiary, he (1859-60) arranged and concluded the treaty of commerce with France. Cobden spoke out strongly in favour of the North during the American civil war, and in 1864 strenuously opposed intervention in favour of Denmark. He died in London, 2d April 1865. In all the relations of life Cobden was a man amiable, single-minded, and earnest. In parliament and on the platform he was a master in the art of clear, persuasive, and convincing speech. He may be regarded as the representative man of the Manchester school, and therefore as the most prominent champion of free trade, peace, non-intervention, and economy.

His *Speeches on Questions of Public Policy* were edited by John Bright and Thorold Rogers (1870). See CORN LAWS, FREE TRADE; the Cobden Club publications; his *Life* by Morley (new ed. 1920); Ashworth, *Recollections of Cobden* (1877); Watkin, *Alderman Cobden* (1891); Balfour, *Essays and Addresses*; Mrs Salis-Schwabe, *Reminiscences of Cobden* (French, 1879; trans. 1895); J. A. Hobson, *Cobden, the International Man* (1919).

**Cobet**, CAREL GABRIEL, Dutch Hellenist, born at Paris in 1813, studied at Leyden, travelled in Italy, and in 1846 obtained a professorship at Leyden, where he died 6th October 1889. He published *De Arte Interpretandi* (1847); collections of *Variae Lectiones* and *Miscellanea*; works on the comic poet Plato, Dionysius of Halicarnassus, and Xenophon; and editions of Diogenes Laertius, Xenophon's *Anabasis* and *Hellenica*, Lysias, and Cornelius Nepos (1881).

**Cobh**, the old name of Queenstown (q.v.) resumed in 1920.

**Cobham**, LORD. See OLDCASTLE.

**Cobi'ja**, a seaport of the Chilean province of Antofagasta (q.v.), on a shallow, open bay. See ATACAMA.

**Coble**. See BOAT.

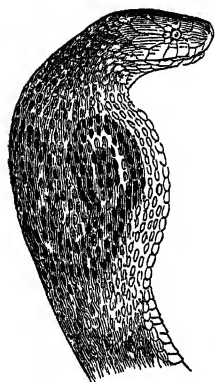
**Coblentz**, or KOBLENZ, capital of Rheinland, 56 miles SSE. of Cologne by rail, is beautifully situated at the junction of the Rhine and the Moselle, the former of which is here crossed by a bridge of boats, and the latter by a fine stone bridge, built originally in 1344. Both rivers are also spanned by railway bridges. An ancient stronghold, Coblentz was, prior to the Great War, still very strongly fortified (see EHRENBREITSTEIN); but by the treaty of Versailles it was dismantled. In the old town, many of the streets are irregular, narrow, and dirty; but the new town, which is situated nearer the Rhine, is handsomely built, spacious, and clean. Among the principal buildings are the church of St Castor, the oldest Christian church in the Rhine district, founded in 836, though dating in its present form from the 12th century; the Kaufhaus (1479); the Protestant Florins Kirche (12th century); the church of Our Lady (1250-1431); and the old Jesuit College, now a gymnasium. The extensive palace built in 1778-86 by the last Elector, and the old archiepiscopal palace built by the last archbishop, have been restored. The favourable position of the place secures it an active commerce in wine, corn, mineral waters, &c. It manufactures Moselle wine, pianos, paper and cardboard goods, machinery, boats and barges, cigars, japanned goods, and furniture. Pop. (1875) 29,290; (1910) 56,478; (1919) 56,637. Coblentz (Fr. *Coblence*) was known to the Romans as *Confluentes*. From 1018 till 1796 it belonged to

Trèves. In 1798 it was made the capital of the new French department, Rhine and Moselle, and by the treaty of 1815 was given to Prussia.

**Cob-nut**, a name given to some of the largest and finest cultivated varieties of the Hazel-nut (q.v.).—In the West Indies the name cob-nut is given to the fruit of *Omphalea trandra*, a tree of the natural order Euphorbiaceæ. It is also called Hog-nut. The tree has a white juice, which turns black in drying, and in Guiana is used instead of ink. The albumen of the seed is eaten, after the embryo, which contains a cathartic principle, is removed.

**Cobourg**, a port of entry and capital of North-umberland county, Ontario, on Lake Ontario, 69 miles NE. of Toronto. It is a railway junction, and contains several woollen-mills, foundries, and breweries. Pop. 5000.

**Cobra da Capello** ('hooded snake'), the Portuguese name for one of the most deadly of the poisonous Indian snakes, technically known as *Naja tripudians*. It belongs to the sub-order of venomous Colubrine snakes (Proteroglyphia), in which the fangs borne on the upper jaw are not perforated by a complete canal, but possess simply an anterior groove down which the poison trickles. The cobra is a large snake, 5 feet or more in length; the



Head of Cobra.

colour varies considerably from pale yellow to dark olive; one variety has spectacle-like black markings on its neck. By the dilatation of the anterior ribs during excitement the neck can be distended so as to produce a hood-like appearance. It is by preference nocturnal, and feeds on amphibians, reptiles, birds, eggs, small mammals, &c. It does not appear to be naturally aggressive, but instinctively assumes a threatening attitude when disturbed. It then dilates its neck, hisses loudly, and prepares to strike by raising its fangs in the usual snake fashion. The habits vary greatly in different

situations. It may haunt human dwellings for the sake of poultry and other food, and is said to occur 8000 feet up the Himalayas. Though essentially land animals and fond of concealing themselves among old masonry, stone heaps and the like, the cobras can swim and climb with ease. In gracefulness of movement they excel. The head and neck are often raised above the level of the rest of the body, which remains horizontal. In spite of pictures to the contrary, they can only raise the front part of the body to a very limited extent.

The bite of the cobra is as usual accompanied by the compression of one of the salivary glands modified as a poison bag. The secretion trickles down the grooves of the fangs, and entering the wound produces rapid nervous paralysis, from which recovery is, to say the least, extremely rare. Great numbers of deaths occur annually in India from cobra bites, but as the assailant often escapes, identification is frequently a matter of conjecture. No certain remedy is known, but excision, cauterising, ligaturing, doses of ammonia, drugging with rum, &c. are often resorted to. The victims are usually natives, who, going about after dark, not unfrequently trample upon the cobra and other snakes. The rattles which they use to warn off the reptiles do not appear to have much more effect

than the spells to which they trust. The cobra has become the centre of numerous native superstitions, the object of animal-worship, and a favourite subject with the adroit snake-charmers.

*Naja tripudians* is found in India, Java, and South China; *N. haje*, an allied species, is common in Egypt and parts of Africa. The coral snake (Elaps), the rock-snake (Bungarus), the venomous water-snake (Hydrophis), are genera within the same sub-order.

**Coburg**, picturesquely situated on the left bank of the Itz, 81 miles SSE. of Eisenach by rail, was capital of the former duchy of Coburg, long part of the united duchy of Saxe-Coburg-Gotha. After the revolution the republic of Saxe-Coburg-Gotha split in two, Coburg uniting (1920) with Bavaria, Gotha with the other former Saxon duchies to form the land of Thuringia. The older part of the town, which is fairly well built, is surrounded by attractive modern suburbs. Coburg was, alternately with Gotha, the ducal residence, and the palace, erected in 1549, rebuilt 1693, is one of the principal buildings in the town. Among the others are the government buildings, the arsenal, containing a public library, the town-house, and another palace. The old castle of Coburg, mentioned in 1057, beside which Coburg originally grew up, is situated on an eminence 530 feet above the town. It afforded Luther a shelter during the Diet of Augsburg in 1530, and in 1632 successfully resisted a siege by Wallenstein. In 1782 it was converted into a prison, but in 1838 it was thoroughly restored, and now contains valuable collections. Luther's apartments are preserved as he used them. Coburg has manufactures of machinery, colours, woollen, cotton, marquetry, baskets, porcelain, furniture, and carriages, and exports beer. Pop. (1875) 14,567; (1919) 23,417. Prince Albert, consort of Queen Victoria, was born at Rosenau, 4 miles N. With their son, Edward VII., the Coburg family ascended the throne of Britain.

**Coburg Peninsula**, the most northerly part of Australia to the west of the Gulf of Carpentaria, runs out in a north-west direction towards Melville Island, from which it is divided by Dundas Strait. On its north side is the bay known as Port Essington, at the head of which was established, in 1831, the settlement of Port Victoria—abandoned, on account of its insalubrity, in 1850. Swamp buffaloes, originally brought from Java, have increased here enormously.

**Cobweb.** See SPIDER.

**Co'ca** (*Erythroxylon Coca*)—which has of course no connection with Cocoa or with Coconuts), a shrub of the order Erythroxylaceæ, of which the leaves furnish an important narcotic and stimulant. The shrub is 6 or 8 feet high, and somewhat resembles a blackthorn bush; the leaves are ovate-lanceolate, simple, and with entire and slightly waved margins, and strongly marked veins, of which two on each side of the midrib run parallel to the margin. It has been in use from a very remote period among the Indians of South America, and was extensively cultivated before the Spanish conquest. Many of the Indians of the Peruvian Andes are to this day excessively addicted to it, and its use is quite general among them, besides extending to men of European race. The dried leaves are chewed with a little finely powdered unslaked lime, or with the alkaline ashes of the Quinoa (q.v.), or certain other plants. An infusion is also occasionally used. An habitual coca-chewer takes a dose about four times daily. In soothing effect it recalls tobacco, but its influence is a much more remarkable one. It greatly lessens the desire for ordinary food, and at the same time permits of much more sustained exer-

tion, even without sleep; it affects the nervous mechanism of respiration, so that the difficulty of breathing, so common in the ascent of long and steep slopes at high elevations, is little felt. These properties readily explain its high esteem among



Coca (*Erythroxylon Coca*):  
a, a flower; b, fruit.

the Indians, to whom long and difficult journeys, heavy burdens, and constant privation have always been familiar.

**COCAINE.**—In Europe, little importance was attached to coca until the veteran pharmacologist Christison awakened interest by personally verifying in old age its sustaining powers. Investigations followed, and the alkaloid *cocaine*, upon which the active properties mainly depend, has now come into regular use as a local anæsthetic, by help of which not merely some of the operations of dentistry, but much more serious surgical operations, can be performed without chloroform. To oculists it is of special value, at once dilating the pupil and removing all sensibility. Cases of intoxication and abuse are not infrequent with the leaves, and the 'cocaine habit' has now to be guarded against both in Britain and the United States.

**Cocana'da**, a seaport and headquarters of Godavari district, Madras, 315 miles N. of Madras. Its roadstead is comparatively safe, and it exports cotton, oil-seeds, sugar, rice, and cigars. Pop. 50,000.

**Cocceius**, or KOCH, JOHANNES, a distinguished theologian, was born at Bremen in 1603, and studied at Hamburg and Franeker. In 1636 he became professor of Hebrew there, and in 1650 of Theology at Leyden, where he died in 1669. His chief work is the *Lexicon et Commentarius Sermonis Hebraici et Chaldaici Veteris Testamenti* (Leyden, 1669), the first tolerably complete dictionary of the Hebrew language. Cocceius held very peculiar hermeneutical principles, which enabled him to discover the whole New Testament in the Old. The representation abundantly employed in the former of a covenant between God and man, usurped the place of the New Testament doctrine of the Fatherhood and Sonship; and Cocceius carried the 'covenant theology,' as it is called, to an absurd extreme (see COVENANT). The most complete exposition of his views is in his *Summa Doctrinae de Fœdere et Testamento Dei* (1648).

**Coccej**, HEINRICH FREIHERR VON, born at Bremen, March 25, 1644, studied jurisprudence and philosophy in Leyden from 1667 to 1670, and

went from thence to England. In 1672 he was made professor of Law at Heidelberg; in 1689, at Utrecht; and in 1690, at Frankfort-on-the-Oder. In 1713 the emperor named him a baron of the realm. Cocceji died in 1719. His work on civil law (*Juris Publica Prudentia*, 1695) was long used as a text-book.—His youngest son, SAMUEL, born at Heidelberg in 1679, acquired no less renown. He too, in 1703, became professor at Frankfort-on-the-Oder, filled several honourable state-offices, and was ultimately the chancellor of Frederick the Great. He died in 1755. He reformed the Prussian administration of justice, and published several works on law.

**Coccidæ.** See COCCUS.

**Coccidia**, a group of sporozoa which live as parasites in mammals, birds, and other animals, chiefly within the cells of an epithelium, and may cause serious disease (coccidiosis). The conjugation of a large female and a small male gamete results in the formation of an oocyst, which passes out of the host. When swallowed by a new host, it breaks up into a number of individuals which attack the cells, and multiply asexually for several generations, eventually producing a new sexual generation.

**Coccinella.** See LADY-BIRD.

**Cocco**, **Coco Root**, or EDDOES, plants of the genus *Colocasia*, and of the nearly allied genus *Caladium*, of the order Araceæ, widely cultivated in tropical and subtropical countries for their edible starchy root-stocks, of which the food-value broadly corresponds to the potato. These are deprived by roasting or boiling of the characteristic acidity of the order, which, indeed, some of them possess in a comparatively small degree. They are sometimes included under the name *Yam*, but are totally different from the true *Yam* (q.v.). The names more strictly belong to *Colocasia antiquorum*, a stemless plant with ovate leaves, and flowers enclosed in a cylindrical erect spathe. This is a native of India, but was early introduced to Egypt and the Mediterranean countries, whence it has now passed even to America. For the kindred *Alocasia macrorrhiza*, also of economic importance in different parts of the world, see TARO. Many species of these and allied genera are to be seen in European hothouses, where their handsome foliage has gained them an important place.

**Coccoliths** are small saucer-like discs found abundantly in the Atlantic ooze, probably unicellular algae. They are sometimes called *coccolites*, a word also used to denote a greenish kind of Augite (q.v.).

**Coccoloba.** See SEASIDE GRAPE.

**Coccomilia**, or CUCUMIGLIA (*Prunus coccomilia*), a species of plum, a native of Calabria, where the bark—particularly of the root—is used for the cure of intermittent fevers.

**Coccos'teus**, a genus of fossil placogonoid fishes, pertaining to the Devonian and Old Red Sandstone system. The head and trunk were protected by bony plates, covered with tubercles, but the rest of the body was naked. The mouth was furnished with small teeth.

**Cocculus Indicus** (Ital. *coccola*, 'a berry') is the fruit of the *Anamirta Cocculus*, a climbing shrub found in the eastern parts of India, and in the Malayan Archipelago. It was introduced into Britain in the 16th century for the purpose of stupefying fish so that they might be caught by hand. It acts as an acrid narcotic poison, and when the berries are thrown into a stream it quickly poisons any fish in the neighbourhood. It contains a crystalline principle called picrotoxin,

which is very poisonous. It imparts to beer a bitter taste, and at the same time a fullness and apparent richness, but its use is now forbidden under heavy penalties, as the effects are very harmful.



*Cocculus Indicus* :

a, branch with leaves; b, panicle of female inflorescence, c, a female flower; d, the same with sepals removed; e, male flower; f, fruit. (From Bently & Trimen.)

In Russia and elsewhere it is a popular remedy for tapeworm, lice, &c.; but when applied to the scalp it is not unattended with danger, as several deaths have occurred from its use.

**Coccus**, a genus of insects in the order Hemiptera, and type of a family (Coccidæ), including many forms very injurious to plants, and a few others which have come to be of use to man. For the latter, see COCHINEAL, LAC, MANNA, WAX. As general characteristics may be noted the beaded feelers, the general absence of wings in the female, the degeneration of suctorial proboscis and posterior wings in the males, and the peculiar history of both sexes. The young forms are somewhat tortoise-like, and run about on plants with some activity. The adult females attach themselves by their proboscis to a juicy part of the plant, and surrender themselves to feeding and maternity. They often become berry-like, plump, much resembling excrescences, or else very flat and scale-like. In the latter form they are often called scale-insects. The body always degenerates more or less, and after fertilisation becomes simply a case, or eventually a dead covering for the eggs and larvæ. The young males also come to rest, and undergo a peculiar metamorphosis. From the resting larva an elegant male insect results, with developed anterior, but degenerate or aborted posterior wings. The males fertilise the females, but being without suctorial proboscis, are probably short-lived. In fact, both male and female adults seem to fall victims to the characteristics of their sex. The young shelter for a while under the dead female, and then start for themselves. For the important species and related genera, see the articles above referred to.

**Coccyx**. See SPINAL COLUMN.

**Coccyzus**. See CUCKOO.

**Cochabamba**, a central department of Bolivia, with offshoots of the Eastern Cordilleras, and extensive plateaus. The climate is equable and healthy. The metals of the department include tin, copper, gold, and silver; and its fertile valleys render it the richest as well as the most picturesque district of the republic. Agriculture and cattle-raising are the chief occupations; but, as else-

where in Bolivia, trade is sadly hampered by the want of roads. A railway to Oruro was opened in 1917. Area, 23,300 sq. m.; population, 600,000. The capital, Cochabamba (8396 feet above the sea), on a tributary of the Guapay, was founded in 1565, as Ciudad de Oropesa. It has a so-called university and high school, and an industrious population (about 30,000), with considerable manufactures.

**Cochba**. See BAR-COCHBA.

**Cochin**, a native state of India, politically connected with Madras, between the British district of Malabar and the state of Travancore, with the Arabian Sea on the SW. It contains 1361 sq. m., and 1,000,000 inhabitants. Its hydrography is singular. The Western Ghats, which have here an elevation of fully 4000 feet, intercept the south-west monsoon, and render the coast one of the most humid regions in the world during June, July, August, and September. As the space between the mountains and the sea is almost on a level with the tide, the countless streams have each two contrasted sections—a plunging torrent and a sluggish river ending in a brackish estuary. Further, these estuaries, almost continuously breasted by a narrow belt of higher ground, form between them a backwater or lagoon of 120 miles in length, and of every width between a few hundred yards and 10 miles, which communicates at only three points with the ocean. The forests produce the coconut, teak, red cedar, and many other woods, while the low country produces drugs, dyes, and gums. The great mass of the population are Hindus, but there are also some Mohammedans and Christians (of the Syrian and Roman confessions), and a few Jews. The capital is Ernakolam. Cochin formed a treaty with the East India Company in 1798. See A. K. Iyer, *Cochin Tribes and Castes* (1912).

**Cochin**, once the capital of the principality above described, but now a seaport of the district of Malabar, in the presidency of Madras, stands on the south side of the principal channel between the open ocean and the backwater mentioned in the preceding article. In spite of the bar, Cochin is next to Bombay on this coast for shipbuilding and maritime commerce, the annual exports reaching a value of £700,000. Here the Portuguese erected their first fort in India in 1503. They were supplanted by the Dutch in 1663; and in 1796 Cochin was captured by the British. Population, 20,000, of whom half are Christians and one-fifth Mohammedans (fanatical Moplahs, descendants of the old Arab traders). Close by, in the native state, is another Cochin.

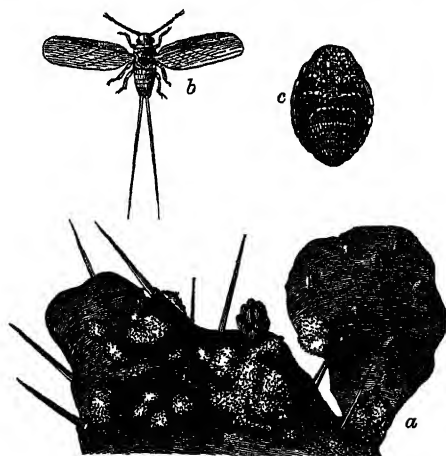
**Cochin-China** is a name sometimes applied to Annam (q.v.), but is specifically used, also for French Cochin-China, a colonial possession of France, occupying the south extremity of the Indo-China peninsula, from 8° 35' to 11° 40' N. lat., and from 104° 26' to 107° 30' E. long., bounded N. by Cambodia and Annam; area, 23,400 sq. m. Through nearly its whole extent Cochin-China is low and almost flat. To the north and east, however, the ground rises into the hills of Cape St Jacques, Ba-ria, and Bien-hoa, and the mountain of Dienba. Cochin-China is watered in the west by two branches of the Mekhong (q.v.), the Han-giang and the Tien-giang, which follow a nearly parallel course for about 120 miles. In the east the Dong-nai River flows from north-east to south-west, receiving the Saigon River from the north-west. The Little Vaco flows parallel to and south of the Saigon River. These rivers are all connected with one another by the innumerable *arroyos* and canals which intersect Cochin-China in all directions. The climate alternates between the rainy season,

from April to October, when it rains almost every day, and the dry, from October to April, when no rain falls. The temperature rises in the dry season to 95° F. by day and 62° by night, and in the wet season varies between 68° and 86°. Of all hot climates that of Cochín-China shows perhaps the least considerable variations. The climate is trying, but its insalubrity has been much exaggerated. The soil, mostly alluvial, is exceedingly fertile, producing the best rice in the world. Sugar-cane, tobacco, cotton, arachis, mulberry, indigo, maize, tea, betel, hemp, coffee, pepper, cardamoms, beans, sweet potatoes, coconuts, areca nuts, and bananas are raised. The province of Bien-hoa and the north of Saigon do not yield to the finest lands of India in the luxuriance of their vegetation and the beauty and variety of their fauna. The province of Vinhlong owes its Annamite name of *vuông* ('garden') to the abundance, variety, and exquisite taste of its fruits.

The population was returned in 1921 as 3,795,613, of whom the vast majority are Annamites by race, the remainder Cambodians, Chinese, Malays, Malabaris, with about 7000 Europeans. There is a considerable immigration from various parts of Asia, amounting to nearly 25,000 in some years, only partly balanced by departures. There is much fishing, especially on the rivers; and fish, fish-oil, isinglass, and shrimps are among the most important exports. The shipping is mainly that of Saigon (q.v.). A railway of 50 miles between Saigon and Mytho, in operation since 1885, is the oldest railway in French Indo-China. Several other railways have since been built, and others are in course of construction. The colony is divided into 21 provinces. It has a representative in the French Chamber. Saigon is the capital not only of Cochín-China, but of French Indo-China as a whole. See Russier and Brenier, *L'Indo-Chine Française* (1911). For an account of the natives and history, see ANNAM; and for fowls, POULTRY.

**Cochineal**, a dyestuff employed in dyeing scarlet and crimson, and in the preparation of the pigments Carmine and Lake (q.v.).

Cochineal consists simply of the bodies of the females of a species of *Coccus* (q.v.), called *C. cacti*, because it feeds upon plants of the Cactus family,



Cochineal (*Coccus cacti*):  
a, living on cactus (*Opuntia*); b, male; c, female.

particularly on one, therefore designated the cochineal plant, but known in Mexico as the Nopal (*Opuntia coccinellifera*), figured in the article

CACTACEÆ. This plant is nearly allied to the prickly pear, and assumes a somewhat tree-like form. The insect as well as the cactus are natives of Mexico and other warm parts of America, but they are now cultivated chiefly in Guatemala. This cultivation was carried on by the Mexicans long before the country was known to Europeans. The insect is not uncommon on wild cacti in Texas and Florida. Both plant and insect have been successfully introduced into the Canary Islands, Algeria, Java, and Australia. But the attempt to produce cochineal in India has been practically a failure.

The cochineal insect is a small creature, a pound of cochineal being calculated to contain 70,000 in a dried state. The male is of a deep-red colour, and has white wings. The female, which is wingless, is of a deep-brown colour, covered with a white waxy powder; flat beneath, convex above.

In some parts of Guatemala large plantations of Nopal exist for the cultivation of the *C. cacti*. Before the rainy season commences, branches of this cactus plant covered with these insects are cut off and stored in buildings to protect them from the weather. When the wet season is over, four or five months afterwards (October), the plantations are again stocked from these supplies. Little 'nests' of some vegetable fibre, each containing about a dozen females, are placed on the spines of the cacti. The eggs are soon deposited, and when the young females are developed, they spread over the plants, attaching themselves to the leaves, and looking more like vegetable excrescences than insects. They become covered with a cottony substance. The first crop of pregnant females, only these being valuable for cochineal, is gathered in December, and several more crops are obtained till the following May.

In the Canary Islands the insects are reared in winter and put out on the cactus leaves from May to July. Small gauze bags containing pregnant females are hung on the cactus plants, from which the young when developed spread over the leaves. In August and September, just before the females are ready to deposit their eggs, they are collected in trays, and those gathered in one day are placed in the evening in an oven heated to 150° F. They are afterwards more thoroughly dried in the sun. Hot iron and boiling water are also used in killing the insects. According to the way the insect is killed and dried, the cochineal is known in commerce as silver or black; an inferior kind being sometimes called foxy. The colouring principle of cochineal is called cochinealin or carminic acid, and the insects scarcely yield more than 10 per cent. of pure dye, although the amount is generally supposed to be much greater. Carmine has also been demonstrated in other kinds of coccus and in aphides.

The cochineal industry has suffered very much through the introduction of aniline dyes.

**Cochlaeus**, or DOBENECK, JOHANN, Luther's opponent, was born near Nürnberg, about 1479, and died a canon of Breslau in 1552. See German monographs by Otto (1874) and Getz (1886).

**Cochlæa**. See EAR.

**Cochlæaria**. See SCURVY GRASS.

**Cochrane**, LORD. See DUNDONALD.

**Cochrane**, ROBERT, a Scottish architect or mason, by James III. created Earl of Mar. Angus and other lords hanged him with three more royal 'favourites' over Lauder Bridge in 1482.

**Cockade** (Fr. *cocarde*, or *coquarde*), an ornament or knot of ribbon or rosette of leather, worn either as a military or naval decoration, or as the badge of a political party. Cockades made of ribbons of the national colours were worn by

soldiers during the wars of the 18th century, the white and red being united in the combined army of France and Spain. In 1767 an authoritative regulation was issued that every French soldier should wear a cockade of white stuff; and in 1782 cockades were prohibited to all but soldiers. From this time till the Revolution the cockade was an exclusively military badge; and, both in France and England, 'to mount the cockade' was synonymous with becoming a soldier. After the Revolution, the tricolor ribbon took the place of the white cockade.

In England, after the expulsion of the Stuart family, the white cockade became the distinctive mark of the adherents of the exiled house, in opposition to the orange of Nassau and the black of Hanover; it is a favourite theme in Jacobite songs. The black cockade, to be seen on the hats of officers' servants, was unknown in Britain till the accession of the House of Hanover, and was then introduced by George I. from his German dominions. It seems to be understood that the right to use it belongs not only to naval and military officers, but also to the holders of some offices of dignity under the crown, including privy-councillors, officers of state, supreme judges, &c., and some would extend it to deputy-lieutenants. The privilege is one of which the law takes no cognisance. See **BADGE**.

**Cockatoo**, a popular name for several genera and species of parrots (*Psittaci*), which may be associated in a family of *Cacatuidæ* or *Plissolophinæ*. Some of them are well known as decorative birds. The general characteristics are the tuft on the head, the strong high beak with a notch behind the point, the frequently bright colours of the plumage, the long wings, the loquacious habit. The cockatoos inhabit Australia, Tasmania, New Guinea, and the Indian Archipelago. The word which the birds seem to say, and which is curiously represented by the English *cockatoo*, is said to be Malayan for 'old father,' and to have been taught to the birds by their captors. Of the genus *Plissolophus*, fifteen Australian and Malayan species are known—e.g. *Pl. sanguineus*, *Pl. molluccensis*, *Pl. cristatus*. The great palm cockatoo (*Microglossus aaterimus*) is the strongest of the parrot tribe, and measures about two feet in length; its colour is mostly black; its special home is New Guinea. The crestless Nasiterna, the smallest of all the parrots, also inhabits New Guinea. The black cockatoos (*Calyptorhynchus*) form another important genus in Australia. The cockatoos feed mainly on fruits and seeds, but do not disdain insect larvæ.

**Cockatrice**, a fabulous monster, often confounded with the Basilisk (q.v.), and regarded as possessing similar deadly powers. To the charms of the basilisk it added a dragon's tail, armed with a sting; and it shared also its power of destroying by a glance, so often referred to in Shakespeare and other early writers. In medieval art the cockatrice is an emblem of sin generally, and the special attribute of St Vitus. The name occurs in the English authorised version of the Old Testament, where the original Hebrew word means evidently 'venomous serpent.' In Heraldry the cockatrice is represented as a winged monster having the head, body, and feet of a cock, the tongue barbed, and the tail of a dragon.



Cockatrice:  
in Heraldry.

**Cockayne**. See **COCKNEY**.

**Cockburn**, SIR ALEXANDER, judge, was born 24th December 1802, studied at Cambridge, was called to the bar in 1829, and soon became distinguished as a pleader before parliamentary com-

mittees. In 1847 he became member of parliament for Southampton in the Liberal interest, became Solicitor-general and was knighted in 1850, was made Chief-justice of the Common Pleas in 1856, and Lord Chief-justice in 1859. He succeeded to a baronetcy in 1858. He was prosecutor in the Palmer case; and among the many famous trials over which he presided were the Wainwright case and the Tichborne case. He represented Britain in the Alabama case. He died 20th November 1880.

**Cockburn**, ALISON, poetess, was born 8th October 1713, the daughter of Robert Rutherford, laird of Fairnilee, Selkirkshire. In 1731 she married Patrick Cockburn, advocate, and in 1753 was left a widow, with an only son, who predeceased her in 1780. She died 22d November 1794, having for sixty years and more been a queen of Edinburgh Society: in person she was not unlike Queen Elizabeth. Of her lyrics the best known is the exquisite version of *The Flowers of the Forest* ('I've seen the smiling of Fortune beguiling'), commemorating a wave of calamity that swept over Ettrick Forest, and first printed in 1765. Mrs Cockburn in 1777 discerned in Walter Scott 'the most extraordinary genius of a boy;' in 1786 she made Burns's acquaintance. See *Songstresses of Scotland* (vol. i. 1871), and Craig-Brown's *Letters of Mrs Cockburn* (1900).

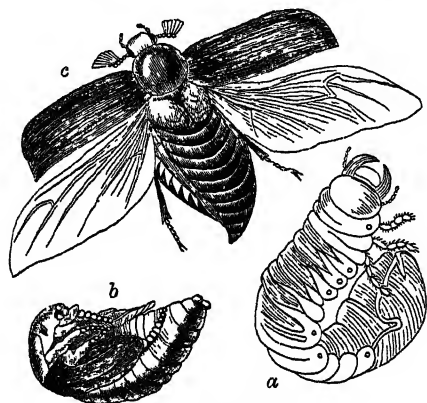
**Cockburn**, HENRY, Scottish judge, was born 26th October 1779, perhaps at Cockpen, but more probably in the Parliament Close of old Edinburgh. He entered the High School in 1787, and the university in 1793, 'being kept,' in his own words, 'nine years at two dead languages which we did not learn.' Dugald Stewart's lectures, then, 'were like the opening of the heavens,' they 'changed one's whole nature;' and through a debating club he became the companion of Jeffrey, Horner, and Brougham, from whom he imbibed Whig opinions, greatly to the annoyance of the hereditary Toryism of his family. He was called to the Scottish bar in 1800; and in 1807 his uncle, the all-powerful Lord Melville, gave him an advocate-deputeship—a non-political post, from which, on political grounds, he 'had the honour of being dismissed' in 1810. He rose, however, to share with Jeffrey the leadership of the bar, and with Jeffrey was counsel for three prisoners accused of sedition (1817-19). His powers were better adapted for success with a popular than with a professional tribunal. Simple, clear, and impressive, at times pathetic, humorous at times, and, when he pleased, eloquent, but always unaffected, always Scottish, he would urge his case with an earnestness and candour that was all but irresistible. A zealous supporter by pen as well as by tongue of parliamentary reform, he became Solicitor-general for Scotland under the Grey ministry in 1830; had the chief hand in drafting the Scottish Reform Bill; was elected Lord Rector of Glasgow University (1831); in 1834 was made, as Lord Cockburn, a judge of the Court of Session; and three years later a lord of justiciary. He died, 26th April 1854, at Bonally Tower, his beautiful home by the base of the Pentlands since his marriage in 1811, and was buried near Jeffrey in the Dean Cemetery, Edinburgh.

Besides five or six pamphlets, and as many articles in the *Edinburgh Review*, dealing mostly with legal and parliamentary reform, Cockburn was author of an admirable *Life of Jeffrey* (1852), and of four posthumous works—*Memorials of his Time* (1856), *Journal, 1831-44* (2 vols. 1874), *Circuit Journeys* (1888), and *Examination of Trials for Sedition in Scotland* (2 vols. 1888). The first three of these form a kind of autobiography, into which are woven characteristic anecdotes of old-world Scottish life, and graphic sketches of the men who composed the brilliant

circle of Edinburgh society in the first four decades of the 19th century. Withal they illustrate his love of nature and veneration for antiquity.

**Cockchafer** (*Melolontha vulgaris*), a common beetle of the Lamellicorn section, too well known in Europe for its voracious destruction of both crops and foliage. It is a comparatively large beetle, about an inch in length; generally of a reddish-brown colour; with fine hairs, scanty on the wing covers, but thick on the breast; and with the expanded ends of its feelers divided in the leaflet-like manner characteristic of Lamellicorns. In Scotland they are less abundant than in England.

The males appear first, usually in the month of May, and are soon joined by their partners. They fly with a whirring noise, and being hungry as well as active, do great damage to many of our common trees. After some weeks of flight, the females heavy with eggs deposit these in the ground and thereafter die. In a month or so the larvæ develop, but do not attain winged life for



Cockchafer (*Melolontha vulgaris*):  
a, full-grown larva; b, pupa; c, perfect insect.

four years. Meanwhile they are anything but idle, are in fact most voracious, and do great damage to crops and herbage. In some years when the conditions are unhappily favourable, they commit ravages estimated in millions. In the fourth year of larval life the young beetles bury themselves, and fall for two months into the usual quiescence of the pupa stage. The liberated insect works its way to the surface, and takes its flight in the spring of the fifth year. In warm seasons and regions the period of larval life may be shortened. The adults do most of their disastrous work in the twilight. The only riddance seems to be the exposure of the larvæ by harrowing, and the destruction of young and old by every possible means. Rooks and other birds, insectivorous animals, and other beetles help to reduce their numbers. They have oftener been plagues on the Continent than in Britain, but in 1574 their corpses are said to have clogged mill-wheels on the Severn, and in 1688 they clung like swarming bees on the trees and hedges in Galway. *Melolontha hippocastani* is another very destructive European species. The May bug of the United States (*Lachnosterna quercina*) is an allied form of similar habits.

**Cocker.** See SPANIEL.

**Cocker,** EDWARD, schoolmaster and author, was born in 1831, and died in London in 1875. His book on arithmetic was the first English work of the kind really adapted to commercial life, and became so widely known that the

name of Cocker is as indissolubly associated with accuracy in figures as that of Murray with the rules of grammar. He attained considerable success as a teacher of arithmetic and writing in London, and is mentioned repeatedly in Pepys's *Diary*, who qualifies him as 'very ingenious and well read in all our English poets.' Cocker published over thirty works on writing or arithmetic, but the famous book so often reprinted, *Cocker's Arithmetick*, was posthumous, being dated 1678, and edited by John Hawkins. De Morgan has contended, apparently on insufficient grounds, that this book, which passed through 112 editions, was not really Cocker's work at all. Among other works published under his name are an English dictionary, and the *Muses' Spring Garden*, which contains some quaint verses of his own composition.

**Cockerill,** JOHN, manufacturer, born in Lancashire in 1790, was the son of William Cockerill (1759-1832), an inventor and machinist who in 1807 settled at Liège in Belgium. John, with an elder brother, succeeded to their father's business in 1812, established a woollen factory in Berlin in 1815, and in 1817 founded the famous works at Seraing (q.v.). He died at Warsaw, 19th June 1840; in 1867 his remains were brought to Seraing, where his statue was erected in 1871.

**Cockermouth,** a town of Cumbeland, 25 miles SW. of Carlisle, and 12 NW. of Keswick. It is pleasantly situated in an agricultural district, and has a walk a mile long beside the Derwent. A ruined castle, founded towards the close of the 11th century, crowns a bold height on the left bank of the Cocker, near its influx to the Derwent. It became Mary Stuart's prison in 1568, and in 1648 was dismantled by the parliamentarians. Near Cockermouth is a tumulus, Toot's Hill; and at Pap Castle are remains of a Roman camp. Wordsworth was born in Cockermouth in an old-fashioned house, still standing; Dalton in the country near by. Population, 5000. Till 1867 Cockermouth returned two members to parliament; till 1885 (when it was incorporated in the county), one.

**Cock-fighting** was common among both the Greeks and the Romans, as to-day it is common in India, the Malay countries, and Spanish America. In England it flourished for fully six centuries, the cockpit at Whitehall having been erected and patronised by royalty. In 1709 a German visitor to London describes the Gray's Inn cockpit as 'round like a tower, and inside just like a *theatrum anatomicum*, the benches rising all round;' with the scene at a cock-fight Hogarth has made us familiar. Cock-fighting was prohibited in 1365, in 1654, and in 1849; but it is still sometimes practised in spite of prohibition. Newspaper readers are familiar with paragraphs on cock-fights interrupted by the police, and fines are from time to time inflicted.

The favourite breed of fighting-cocks is the game-fowl (see POULTRY), and very large sums have been given for chicks. Much art is displayed in the training of cocks, and in trimming and preparing the cock for the combat; the fastening on of the spurs is a matter of considerable experience. Young cocks are called stags; two years is the best age. In fighting a match, a certain number of cocks to be shown on either side is agreed upon, and the day before the match the cocks are shown, weighed with the greatest nicety, and matched according to their weights. Their marks are all also carefully set down to prevent trickery. The cocks within an ounce of each other in weight are said to '*fall in*,' and are matched. Those which do not fall in are matched to fight what are called '*byes*.' Those which do

fall in come into the *main*. The main is fought for a stake upon each battle, and so much for the main, or the winner of the most battles in the main; while the byes have nothing to do with the main, and are usually fought for smaller sums. A middling size is considered the best, and from 3 lb. 6 oz. to 4 lb. 8 oz. is the medium. Cocks sometimes fight in silver spurs, but more often in steel. In a Welsh main the cocks fight until only one is left alive. By the Act of 1849, a penalty of £5 may be levied on any person keeping fighting-cocks, letting a cockpit, or otherwise connecting himself with cock-fighting, for every day that he shall so act.

Strange to say, cock-fighting was a specially sanctioned annual sport of public schools, the schoolmaster receiving a regular tax from the boys on the occasion, which was on Shrove Tuesday. It was so in the days of Henry II.; and in his *Scholemaster* (1570) Roger Ascham announced his intention, never fulfilled, of writing a 'Book of the Cock-pitte,' as 'a kinde of pastime fitte for a gentleman.' As late as 1790 the income of the schoolmaster of Applecross in Ross-shire was formally said to be composed of salary, fees, and *cock-fight dues*. And Hugh Miller, in *My Schools and Schoolmasters*, gives an account of the yearly cock-fights in the grammar-school of Cromarty about 1812. The yet more barbarous custom of throwing sticks at cocks fastened to stakes, was also long practised at Shrove-tide. The slang *cock-shy* is a survival.

**Cockie-leekie** is in Scotland a kind of soup made of a fowl boiled with leeks.

**Cock Lane Ghost.** In the year 1762 London was thrown into a state of extraordinary excitement by the reported existence of a ghost in the house of one Mr Parsons, in Cock Lane, Smithfield. Strange and unaccountable noises were heard in the house, and a luminous lady, bearing a strong resemblance to one who, under the name of Mrs Kemt, had once resided in the house, but who had died two years before, was said to have been seen. Dark suspicions as to Mr Kemt having poisoned the lady were immediately aroused, and were confirmed by the ghost, who, on being interrogated, answered, after the fashion of the spirits of our own day, by knocking. Crowds were attracted to the house to hear the ghost, and the great majority became believers. At length a plan was formed by a few sceptics to ascertain the real origin of the noises. Parsons's daughter, a girl eleven years of age, from whom they supposed the sounds to proceed, was taken to another house by herself, and threatened with the imprisonment of her father in Newgate if she did not renew the rappings that evening, the noises having for some time been discontinued. She was discovered to have taken a board with her into bed, and when the noises took place, no doubt was entertained that they had all along been produced by similar methods. A prosecution was then raised by Mr Kemt, and Parsons was condemned to stand thrice on the pillory for imposture and defamation. Among those who visited the house was Dr Johnson, but it is not true that, with all his natural bent to easy belief in the supernatural, he was one of the dupes of this miserable imposture. Churchill's gross caricature of Pomposo's credulity in his tiresome poem of over four thousand lines, *The Ghost*, was mere false and malicious slander, and deserved the payment that the burly Johnson promised to give Foote upon his own stage if he persisted in taking him off in the same way. See A. Lang's *Cock Lane and Common Sense* (1894).

**Cockle** (*Cardium*), a large and typical genus of bivalve molluscs (Lamellibranchs). The thick,

ribbed, heart-shaped, equal-valved shell, and the large knee-bent 'foot' are characteristics well known to every one. The shell is closed by two muscles; the hinge has large teeth; there are two minute respiratory siphons. About two hundred living species are known, and have a very wide distribution, though most abundant in the tropical seas. They live freely and gregariously, generally buried in the mud or sand. The foot is used for burrowing, but by it the cockle can also jump a few inches. *C. edule* is very largely eaten, and is often sold in great quantities on the streets of British towns. The fossil forms are very numerous, and increase from the Silurian onwards. (For figure and structure, see BIVALVES.)

**Cockle.** See CORN-COCKLE.

**Cocklebur** (*Xanthium*), a small but very widely distributed genus of Composite. The flowers are in unisexual heads, the male heads being at the ends of the branches. The female head has only two flowers, which are so enclosed in a prickly involucre that only the styles project through openings in its two horns. In fruit the involucre is hard and woody, about an inch long, and covered with hooked prickles, forming a bur which is very troublesome to sheep and other animals. So effective is this means of dissemination that it is difficult to determine the native region of the plants. Of the three species which have become familiar pests in the United States, one may be American; the others are probably introduced from the Old World. The progress of one species has been traced from the east of Europe. It reached Wallachia in 1828 on the manes and tails of Cossack horses. Hungarian cattle and wool brought it to Regensburg, and so to Hamburg. In South Africa the value of wool was so seriously affected by cocklebur that stringent laws for its eradication had to be enacted.

**Cockney**, a familiar name for a Londoner; the earlier meaning of which was a foolish, effeminate person, or a spoilt child. The original meaning is very obscure, but in Chaucer *cokenay* (a trisyllabic word) had much the same meaning as this. Professor Skeat points out its obscurity of meaning in two famous passages in *Piers Plowman* (x. 207), and in the last stanza of the 'Tournament of Tottenham' in Percy's *Reliques*. The word occurs twice in Shakespeare (*Twelfth Night*, IV. i. 15; and *Lea*, II. iv. 123), and there with the meaning, according to Schmidt, of a person who knows only the life and manners of the town. The origin of the word *cockney* has been much debated. Wedgwood, followed by Skeat in his 'Errata,' connected it with the French *coquin*, 'a rogue;' itself, according to Littré and Scheler, derived through a Low Latin *coquinus* from Latin *coquus*, 'a cook' or 'kitchen-scullion.' Diez doubted this, and assumed a connection with the old Norse *kok*, the throat. But according to Sir J. A. H. Murray, the word *cokeneye* or *cokenay* means really *cocks'-egg*, i.e. either simply a hen's egg or a diminutive hen's egg; then a 'nestle-cock,' a mother's darling, a cockered or pampered or effeminate person. *Cocken* is genitive plural; *ay* or *ey* the native English word (O.E. *æg*), which has been displaced by the cognate Old Norse *egg*.

**Cock of the Plains.** See GROUSE.

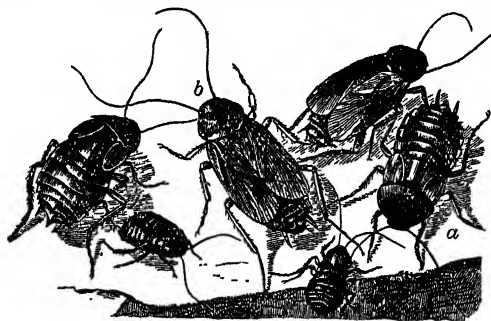
**Cock of the Rock** (*Rupicola*), a genus of South American Passerine birds in the family of Cotingidæ or Chatterers (q.v.), well known for the dancing and display by which the cock birds recommend themselves to the hens. The bill is high and strong, the tail short and straight, the sole naked; the feet are strong and stout. The male is remarkable for a lofty, laterally compressed crest. In the best-known species (*R. crocea*), from

Guiana and the north-east of Brazil, the male is predominantly orange-red in colour, with a dark purple-red crest, and decidedly larger than the sober brown female. It is about the size of a common pigeon.

**Cock of the Woods.** See CAPERCAILZIE.

**Cockpit**, in a ship of war, was the name given to the compartment in the lower part of the ship where the wounded were attended to during action. In the modern navy certain flats below the water-line are fitted up for the purpose. It also means an enclosure for cock-fighting; and the name was given to a 17th-century theatre in London on a site once occupied by a cockpit.

**Cockroach**, a family (Blattidæ) of insects within the order Orthoptera, which likewise includes locusts, grasshoppers, crickets, leaf-insects, earwigs, &c. They are wrongly called beetles. Familiar enough as pests, cockroaches require no minute description. The antennæ longer than the body—i.e. over an inch—the bent-down head (half-hidden by the large first thoracic plate), the long spiny legs compressed terminally, the flat broad segmented abdomen, the cigar-shaped anal appendages (which are supposed by some to represent a pair of rudimentary abdominal legs), are among the more striking external features. The two adult sexes in the common cockroach are readily distinguished, since the female has a somewhat broader abdomen, and only slight traces of wings. In the male, the anterior wings form stiff opaque wing-covers (*tegmina*), while the posterior pair are membranous, really wing-like, and folded longitudinally; in the female, the *tegmina* are very small, and the posterior wings only suggested by marks. Certain cockroaches, however, are wingless in both sexes. There are complex copulatory and egg-laying structures in the respective sexes.



Common Cockroach :  
a, female; b, male.

The essential male organs atrophy in the adult males. The eggs are surrounded by a peculiar hard capsule, which the female carries about for a long time, but eventually attaches by a glutinous secretion to some suitable sheltering object. This cocoon, in the common species, usually contains sixteen eggs, one from each of the ovarian tubes. Like other true Orthoptera, the cockroaches have no marked metamorphosis in their life-history. The larvæ, when developed, appear to soften the edges of a side slit in the inclosing capsule, and emerge through this into active life. They pass through no fasting quiescent state, and when hatched, differ from the adults only in minor quantitative details. They are said to moult seven times before becoming quite adult in the fifth year of their life.

Cockroaches are voracious insects, devouring both animal and vegetable substances, which they seek out by aid of their almost certainly olfactory

antennæ. Their mouth organs (three pairs of jaws) are very typical, and well adapted for biting. The juices of the mouth leave a disgusting smell on the objects over which the insects pass. They are nocturnal in habit, most abundant in warm countries, fond of sheltering in houses, and notoriously a pest to bakers and millers. To get rid of them a tame hedgehog is often employed, or they may be caught in large numbers in a slippery milk basin, baited with treacle, and led up to by a piece of wood which cannot be regained from the bottom. The commonest species in Britain (*Periplaneta orientalis*) had reached England by 1624, perhaps from the Crimea, where it has been found far from man's habitations; *P. americana* has found its way hither in bales, &c., from America. The German cockroach (*Blatta* or *Phyllodromia germanica*) is a troublesome, widely distributed form, which appears, however, to go to the wall before our common pest. Another form (*Blatta* or *Ectobia lapponica*) of smaller size, which occurs commonly in the woods of north and central Europe, is specially important in Lapland, where it sometimes does great injury by devouring the winter stores of salted fish. The largest form known is a native of South America and the West Indies, which measures about 3 inches in length, and makes a loud drumming noise. The cockroach is an ancient insect, having been actually found in Silurian strata. As a tolerably evolved, and yet not too highly specialised type, it is a very convenient type for study. See Miall and Denny, *The Cockroach* (1886); Carpenter, *Insects* (1899); Lucas, *British Orthoptera* (1920).

**Cockscomb** (*Celosia cristata*), an East-Indian annual of the order Amarantaceæ, familiar in conservatories, often also planted out in warm borders, especially in the southern parts of Britain. It grows with an upright stem, which becomes flattened upwards, divides, expands, and forms a sort of wavy crest, covered with pointed bracts, and bearing on its surface many very small abortive flowers, so crowded as often to present a rich velvety appearance. The colours are various, and often very brilliant. In the wild species, however, the flowers are of ordinary type, and in simple spikes and panicles; while in the so-called *C. aurea*, a golden variety formerly much cultivated, only a few flowers of the base of the inflorescence are perfect, the other being represented only by bracts and scales; while in the cockscomb proper the monstrosity known as *Fasciation* (q.v.) has further taken place.

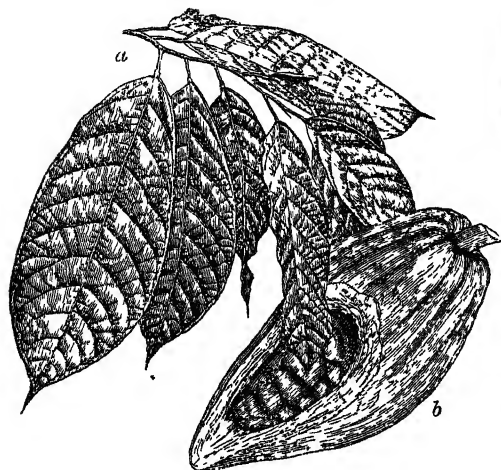
**Cock's-foot Grass** (*Dactylis*), a genus of Grasses, closely allied to Fescue (*Festuca*), but differing in habit. The Common or Rough Cock's-foot Grass (*D. glomerata*) is a native of both palæarctic and nearctic regions, and is very abundant in Britain. It furnishes an important part of both natural and artificial pastures. In America this grass is called Orchard Grass, and is extensively cultivated. To this genus belongs also the Tussock Grass (q.v.). See PASTURE, GRASSES.

**Cockton**, HENRY, comic novelist, was born in London in 1807, and died 26th June 1853 at Bury St Edmunds, where eleven years earlier he had married and settled in business. Unless for their illustrations, all of his ten works are almost forgotten but one—*Valentine Voe, the Ventriloquist* (1840).

**Cocoa**, or CACAO. The different kinds of cocoa are prepared from the seeds of trees of the genus *Theobroma*.

The genus *Theobroma* (Gr., 'food of the gods') belongs to the natural order Sterculiaceæ (q.v.), and contains a number of species, trees of moderate size, with large undivided leaves and clustered flowers, all natives of the tropical parts of America.

By far the most important species of this genus is *T. cacao*, to which the name cocoa-tree is often exclusively appropriated. It is extensively cultivated in tropical America and the West Indies, and its cultivation has been introduced into some parts of Asia and Africa. The fruit is somewhat like a cucumber in shape, is 6 or 8 inches long,



Cocoa (*Theobroma cacao*):  
a, branch with leaves; b, fruit (partly in section).

yellow, and red on the side next the sun; the rind is thick and warty, the pulp sweetish, and not unpleasant; the seeds numerous, compressed, and not unlike almonds, with a thin, pale, reddish-brown, fragile skin or shell, covering a dark-brown, oily, aromatic, bitter kernel. These seeds are the *cocoa beans* of commerce; when bruised so as to be reduced to small pieces, after being shelled or decorticated, they become *cocoa nibs*. The cocoa-tree produces larger seeds in cultivation than in a wild state. The tree attains its full vigour and productiveness in seven or eight years, and generally yields two principal crops in the year. When gathered, the fruit is subjected to five days' fermentation in earthen vessels or in heaps on the ground, and then opened by the hand; or it is buried for a while in the earth till the pulp becomes rotten. The latter method is said to produce the best cocoa (*earthed cocoa* or *cacao terre*). The seeds are then roasted.

The average composition of the shelled and roasted bean is, in round numbers, about as follows. There is considerable variation in different samples.

(Hydrocarbon) Cocoa-butter.....	51
(Nitrogenous food) Gluten, albumen, &c.....	22
(Carbo-hydrates) Starch, gum, &c.....	13
Water.....	5
Mineral matter.....	3½
Indigestible woody matter (cellulose).....	3
Theobromine.....	2½

100

This expresses a very high nutritive value, as will be understood by comparing it with the constituents in a beefsteak, which has 19 per cent. of nitrogenous matter, 4 of fat, no carbo-hydrates such as starch or gum, 5 of mineral matters, and 72 per cent. of water. Cocoa-butter, which is extracted from ordinary cocoa (but is left in what is to be manufactured into sweet chocolate), is largely used to adulterate butter; is an essential constituent of many ointments, toilet soaps, and bon-bons; and is of almost as much commercial value as the cocoa itself. In order to render its large amount of nutritious

matter digestible, the nut must be prepared. The best mode of preparation is by crushing and continuous grinding under rollers until the whole is reduced to an impalpable paste. This, when dried, adheres, and forms a hard cake. In this form it is now supplied to the navy and many merchant ships, and forms a most valuable beverage-food for sailors when scraped or pounded and boiled for a short time in water. The large amount of fatty matter and nitrogenous food renders it especially suitable for men exposed to cold and fatigue. It is a most valuable reserve food for travellers, so much of both heat-giving and flesh-forming nutriment being concentrated in a given bulk and weight. It is thus used by Swiss and Tyrolean mountaineers in the form of edible chocolate. For the preparation of chocolate, see CHOCOLATE.

An infusion of the broken and roasted shells, which are set aside in preparing the best qualities of chocolate, is used in Italy, Spain, and other countries as a cheap substitute for coffee, and bears the name of *miserable* ('poverty stricken'). The pulp of the fruit is eaten in the countries in which the tree grows, and a kind of spirit is obtained from it by fermentation and distillation.

Another mode of preparation consists in adding large quantities of cooked farinaceous material to the ground cocoa, mixing in a pasty condition, then drying. The mixture may contain but little cocoa, producing, with boiling water, merely a gruel flavoured with cocoa. Those who prefer such mixtures will find it economical to prepare their gruel or porridge themselves, and add cocoa to it. By using whole or ground cocoa nibs, a cocoa beverage may be obtained, but for this it is necessary to subject the nibs to very long boiling; a whole day is desirable. The full and peculiar flavour of the nut comes out, and much of the butter floats on top, while the cellulose and other insoluble constituents remain as sediment.

The *Theobromine* or special crystallisable alkaloid of cocoa resembles that of tea and coffee, but contains a larger proportion of nitrogen, and appears to be less stimulating in its action on the nervous system. Some regard it as highly nutritious.

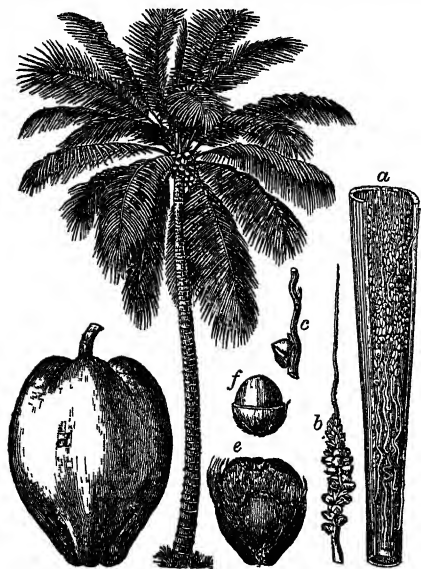
Allegations of slavery induced the British manufacturers of cocoa to send Mr Cadbury to the Portuguese islands of S. Thomé and Principe, from which a great part of the world's supply came. On receiving his report in 1909, they determined to buy no more from these islands until the labour system was changed.

In South Carolina the earth-nut is roasted and used as a spurious cocoa; and in Spain the root of the earth chestnut (*Cyperus esculenta*) is similarly used. See ADULTERATION.

**Coco de Mer.** See COCONUT (DOUBLE).

**Coconut** is the better form of what since Dr Johnson's time has often been spelt *Coccol-nut*; *coco*, 'mask,' being the Portuguese name given to the nut from the resemblance of its lower part to a mask. It is the well-known fruit of a species of palm, *Cocos nucifera*, perhaps originally a native of tropical America, or, as some would have it, of the Indian coasts and South Sea Islands, now diffused over all tropical regions, generally succeeding best in sandy soils, not necessarily near the sea. It is always one of the first of the larger plants to establish itself in the low islands of the Pacific Ocean, so soon as there is soil enough, its nuts being widely distributed by marine currents, while the thick husk protects the embryo from injury. It has a cylindrical stem, about 1½ feet in diameter, and from 60 to 90 feet high, with many rings marking the places of former leaves, and bearing at its summit a crown of from sixteen to twenty leaves, which generally curve downwards, and are from 10

to 15 feet in length. The short racemes bear from five to fifteen or more nuts; and ten or twelve of these racemes, in different stages, may be seen at once on a tree, about eighty or one hundred nuts being its ordinary annual produce, or in modern plantations two hundred and fifty. The tree bears fruit in from seven to eight years (sometimes four years) from the time of planting, and continues productive for seventy or eighty years, the fruit being



Coconut Palm (*Cocos nucifera*):

a, portion of young spathe, with enclosed inflorescence; b, branch of spatix; c, smaller portion enlarged, showing a female flower below and male flower above; d, coconut—e, husk cut open, showing hard endocarp, at f opened to show the single seed.

gathered four or five times annually. This affords to the inhabitants of many tropical coasts and islands great part of their food; it is not only eaten as it comes from the tree, both ripe and unripe, being filled in a young state with a pleasant milky fluid, but it is also prepared in a variety of ways. For the structure of the fruit, see PALMS.

The kernel of the coconut contains more than 70 per cent. of a fixed oil called Coconut Oil, or Coconut Butter, which must not be confounded with the fixed oil of the chocolate, known as cocoa butter. The oil is itself an important article of commerce, being much employed in Europe for the manufacture of candles and of soap. A great impulse has been given to the import by the enormously extended use of coconut oil for edible and cooking purposes (including the making of biscuits and confectionery), and for the manufacture of margarine and other butter substitutes—nut-butter, 'nutter,' &c.—which keep better than cows' butter. It has been recommended as a substitute for lard in the preparation of ointments. It may be used instead of cod-liver oil in consumption, for which purpose it is more palatable and less likely to cause nausea. It is obtained by pressure of copra (dried kernels), or by boiling over a slow fire, and skimming off the oil as it floats on the surface. A quart may be obtained from seven or eight coconuts, and the residue is valuable for cattle-food cake. The oil, which in the tropics is used as a lamp-oil and as an unguent, is liquid in the ordinary temperatures of tropical countries, but in colder climates becomes a white, solid, butter-like oil. It becomes liquid about 74° F. (23·3° C.). It can be separated by compression in

the cold into a more liquid portion called *olein*, and a more solid part termed *cocostearin*, or *cocosin*, which is of complex constitution, and contains at least six fatty acids.

The root of the coconut palm possesses narcotic properties, and is sometimes chewed instead of the areca-nut. The terminal bud (*Palm Cabbage*) is esteemed a delicacy, and trees are often cut down for the sake of it; the central part of the young stem is also succulent and eatable.—The saccharine sap (*toddy*) of this, as of some other palms, is an esteemed beverage in tropical countries, either in the state in which it is obtained from the tree, or after fermentation, which takes place in a few hours; and from the fermented sap (*palm wine*) a spirituous liquor (*arrack*) is obtained by distillation. The juice is often also in the East Indies boiled down to yield sugar (*jaggery*). A variety of arrack is also distilled from the fermented milk.

The dried leaves of the coconut palm are much used for thatch, and for many other purposes, as the making of mats, screens, baskets, &c., by plaiting the leaflets. The midribs of the leaves supply the natives of tropical coasts with oars.—The wood of the lower part of the well-grown stem is very hard, takes a beautiful polish, is employed for a great variety of purposes, and is imported into Britain for ornamental joinery, under the name of Porcupine Wood.—The fibrous tissue of the less mature stems is made into cordage. A kind of gum is also frequently obtained from the stem.—By far the most important fibrous product of the coconut tree is Coir (q.v.), the fibre of the husk of the imperfectly ripened nut. The husk of the ripened nut is used for fuel, and also, when cut across, for polishing furniture, scrubbing floors, &c.

The shell of the coconut is made into cups, goblets, ladles, &c., and is often polished or carved. Within the nut there is occasionally found a small stony substance, of a bluish-white colour, 'a sort of vegetable bezoar,' called in India *Calappa*, to which the Chinese ascribe great virtues. There are about 30 species of the genus, mostly South American, of which *C. butyracea* and *C. coronata* may be mentioned as specially important sources of oil and starch respectively.

**Coconut, DOUBLE** (also called Sea or Maldivé Coconut, or Coco de Mer), is the fruit of the *Lodoicea Seychellarum* palm. Its huge double kernel, the largest fruit known, requiring some ten years to ripen, has long had an extraordinary value over a large area in the East. As a sovereign antidote to poison, and long known only from specimens thrown up on the Maldivé coasts, it was supposed to grow on a submarine tree, and had other fables attached to it. The tree on which it grows is peculiar to some of the Seychelles Islands, reaches a height of 100 feet, and has very large fern-like leaves.

**Coconut Beetle** (*Batocera rubus*), a large Longicorn beetle, the larvæ of which are very destructive in coconut plantations, eating their way in all directions in the stems of the younger trees. They are destitute of feet, large and pulpy, and of repulsive aspect, but are esteemed a luxury by the coolies of the East. They resemble the *grugru* worms of South America.

**Cocoon**, the silken sheath spun by the larvæ of many insects in passing into the pupa or resting stage. The cocoon proper is due to the secretion of special spinning glands, situated anteriorly or posteriorly, but larval hairs and foreign objects of many kinds may also be utilised. The amount of secretion, the arrangement of the threads, and the completeness of the covering vary very widely; nor is the presence of any cocoon whatever essential to the pupa stage. The most typical and perfect

cocoons are those of many moths, a familiar example being that of the silkworm. The delicacy, neatness, and labour exhibited by these last silken robes make them as marvellous as they are useful. See CATERPILLAR, CHRYSALIS, INSECTS, and especially SILK.

**Cocos.** See COCONUT, KEELING ISLANDS.

**Cocy'tus**, a river of Epirus, a tributary of the Acheron, supposed to be connected with the lower world. Homer makes it a branch of the Styx; Virgil makes the Acheron flow into the Cocy'tus.

**Cod** (*Gadus*), a genus of bony fishes in the soft-rayed order (Anacanthini), and type of a family (Gadidae) which includes some valuable food-fishes, such as Ling (Molva), Hake or 'Stockfish' (Merluccius), Burbot (Lota), &c. The genus *Gadus* itself is undoubtedly the most valuable. A moderately elongated body with small smooth scales, the three dorsal and two anal fins, the distinctness of the tail from the fins, the position of the pelvic limbs on the throat, the toothed vomer and toothless palatine, are among the more important distinctive features. The genus includes about a score of species, distributed in the cold and temperate seas of the northern part of the globe, and well known to be very abundant off Newfoundland, at the Lofoten Islands, and on the Dogger Bank. They seem to follow the herring shoals. As part of our food-supply, and as sources of cod-liver oil, the species of *Gadus* are of great economic importance.

Besides the cod proper (*G. morrhua*), the following species are well known: the Haddock (q.v., *G. aeglefinus*), the Whiting (q.v., *G. merlangus*), the Bib or Whiting-pout (*G. luscus*), the Power-cod (*G. minutus*), the Pollack (*G. pollachius*), the Coal-fish (*G. virens*).

The cod itself is too familiar an animal to demand description. It attains a length of 2 to 4 feet, and may weigh as much as 100 lb. The sensitive barbule on the chin is tolerably long. The colour varies considerably. A smaller variety (dorse) is sometimes distinguished—e.g. in the Baltic. The cod occurs between 50° and 75° N. lat. in great profusion, to a depth of 120 fathoms, but is not found nearer the equator than 40° lat. It spawns from January to May, according to the climate, and it is only at this season that numbers crowd together. The cod is very voracious, and feeds at the bottom on crustaceans, molluscs, worms, and even on small fishes. They are very prolific, and it has been calculated that the roe of a large female may contain towards 9 million eggs. The productiveness of the great banks of Newfoundland excels that of all others, but the cod-fisheries near the coasts of Sweden, Iceland, and the north of Scotland are also important. The Dutch were engaged in the cod-fishery as early as the middle of the 14th century, and the English resorted for this purpose to the coasts of Iceland about the same period. The French have also engaged largely in the cod-fishery. The fishery is always carried on by means of lines and hooks, partly by *long-lines* and partly by *hand-lines*. Whelks and the like are used for bait. One man has been known to catch from 400 to 550 fish, on the banks of Newfoundland, in ten or eleven hours; and eight men to take eighty score in a day on the Dogger Bank. Great quantities of dried cod are carried from Newfoundland to the West Indies, and are consumed also in the Roman Catholic countries of the south of Europe. The principal seat of the cod-liver oil industry, in which other species are also utilised, is on the Norwegian coast. The preserved 'sound' or swim-bladder of the cod is esteemed a delicacy. It is also used in a dried state as isinglass. See Day's *British Fishes*, and Günther's *Introduction to the Study of Fishes*.

**Coda** (Ital., 'a tail'), a passage at the end of a musical composition, intended to round it off and give a sense of completeness in form. In early music it consisted often of a few simple chords; but it was enlarged, by Beethoven more especially, into a feature of the greatest importance and dimensions, it being one of the most characteristic features in the form of his symphonies; and other composers have with rare exceptions followed his lead. See SYMPHONY.

**Code** (Lat. *codex* and *caudex*). The primary meaning of the Latin word was the trunk or stem of a tree; afterwards it came to signify in a special sense wooden tablets bound together, and covered with a coating of wax, which were used for writing on. After parchment and paper were substituted for wood, the name *codex* was similarly applied to them. By Cicero and writers after him it was also often used to signify a book of account (e.g. *Codex rationum*); it was also used to indicate a MS. volume or book; but it was not till still later, in the times of the emperors, that it was used to express a collection of laws.

In its modern sense the word *Code* may be defined as a systematic statement of the laws of a country (either the whole law, or any special department of it) having the authority of an act of the legislature. In other words, it is the expression of the law of a country, in whole or in part, in a systematic and authoritative form. This definition distinguishes it, on the one hand, from a *digest*, which, in modern usage, properly signifies a collection of the decisions and rules of the common law arranged on a methodical plan, and, on the other hand, from a *consolidated statute*, which is nothing more than the incorporation of all the statutes in force relating to a particular branch of the law into one general enactment. While the *digest* differs from a code in so far as it wants the authority of a legislative enactment, the *consolidated statute* differs from it in that it does not deal with the unwritten or common law.

Whether it is for the advantage of a community that its laws should be expressed in the form of a code is a question which has been much discussed both in Great Britain and abroad. On the Continent it has been practically settled in the affirmative, while in Great Britain and in some of the states of America (particularly the state of New York) the controversy is still keenly maintained. Two principal objections urged by the opponents of codification may be thus summarised: (1) that it checks the natural growth of the law and hinders its free development; and (2) that, as law is progressive, there would be no finality—that it would be necessary to be constantly altering the code in order to adapt it to the new conditions of society. The answer usually made to the first of these objections is, that although law is a flexible and progressive science, it is nevertheless capable of being known as it exists at any given time, and if so it must be capable of being expressed in language. 'The law of a country,' observes the late Dudley Field, the distinguished American jurist, 'may be likened to its language, and to make a code of the one is like making a dictionary of the other.' If the law is not expressed in language, it must almost necessarily be left to the fluctuating opinion of judges to say whether a particular set of facts is in any given case of legal effect or not. To the second of the above objections the answer is: Granted that a code cannot be made for all time, there is nevertheless no reason why any changes required by altered conditions of society should not be adequately met by periodical revision. A commission of lawyers might be appointed for that purpose, and revision might take place, say, every ten

years. On the other hand, the arguments specially urged in favour of codification are: (1) that it simplifies the law, by getting rid of a vast mass of statutes and judicial decisions, whose authority has become more or less doubtful; and (2) that by simplifying the law it is made accessible to and comprehensible by ordinary citizens.

Historically, the name code has been given to a number of compilations or collections of laws, both of ancient and modern times, though some of these do not properly conform to the definition of code, in its modern sense, that we have given above. For convenience' sake we may divide them into three classes, viz. I. Primitive Codes; II. Codes of Roman Law during the Empire; III. Modern Codes.

I. PRIMITIVE CODES.—Among a number of early civilised peoples we find that attempts were made, more or less thorough, to put their customs and laws into writing in a definite shape. The object of these early efforts at codification seems to have been to make known to the peoples concerned the customs and laws under which they lived, rather than to put these into systematic and artistic form. Three of these primitive codes, of which we have some definite knowledge, may be mentioned, viz. the so-called Code of Hammurabi, or Khammu-rabi (see BABYLONIA), the Tables of Gortyn, and the Twelve Tables of Rome. The Code of Hammurabi was discovered in the beginning of this century. It is carved on diorite, and its supposed date is about 2250 B.C. It is thus the oldest known code in the world. Despite its antiquity, many of its provisions show a considerable degree of enlightenment.

The 'Tables of Gortyn' were discovered at Gortyn in Crete about 1884, carved on rock in a mill stream. Their date is generally supposed to be about the first half of the 5th century B.C. A number of their provisions, e.g. in the matter of adoption, have a similarity to the laws of the Twelve Tables, and throw considerable light on the early laws of Greece. The Twelve Tables (q.v.) is generally held to have been published in 303 A.U.C. (351 B.C.), though this date has been challenged, as being much too early, by Professor Pais of Turin and Professor Lambert of Lyons. Unlike the two codes last mentioned it is not extant, but a large number of its laws have been handed down to us by ancient writers in a more or less fragmentary shape, and it has thus been found possible to restore it to some extent. The Twelve Tables, though containing provisions relating to public as well as private law, did not embody the whole law; in particular, the rules of procedure were omitted. Other primitive codes or quasi-codes, such as the Laws of Solon, it is unnecessary to notice.

## II. CODES OF ROMAN LAW DURING THE EMPIRE.

—By the Romans during the empire the term Code (*Codex*), as applied to a collection of laws, was technically given to the constitutions (i.e. the *decreta*, *rescripta*, &c.) of the emperors, and had not its more extensive modern meaning. Notable codes in this narrow signification were: (1) *Codex Gregorianus*, (2) *Codex Hermogenianus*, (3) *Codex Theodosianus*, (4) *Codex Justinianus* (or *Justinianus*).

The first two of these it is unnecessary to describe here. They were both the work of private hands, although they were ultimately declared authoritative by a decree of Valentinian and Theodosius. The Gregorian is supposed to have been published about the end of the 3d century, and the Hermogenian a few years later. Only fragments of each have been preserved. About the other two codes a few words must be said.

*Codex Theodosianus*, named after the Emperor Theodosius the Younger, during whose reign it was compiled. The original idea of Theodosius was to prepare a complete body of the law, collected from the writings of the jurists as

well as the constitutions of the emperors, but his instructions to this effect were never carried out. The *codex*, as we have it, occupied three years in preparation, and was promulgated as law for the Eastern empire on 1st January 439, and a few days thereafter adopted and declared to be law for the Western empire by Valentinian III. This *Codex Theodosianus* has been in a great measure preserved. It consists of sixteen books, which are subdivided into titles, and a chronological order in the arrangement of the constitutions has been followed. All but the first five books (containing the purely private law) have come down to us. By means, however, of the so-called *Breviarum Alaricianum*, mentioned below, it has been possible to reproduce a considerable portion of the earlier books. From other sources also a number of genuine constitutions not to be found in Alarie's Breviary were during the 19th century recovered. The best edition of this code is that of Mommsen, published in 1904, but the old edition of Jac. Gothofredus, published in 1665, is still valuable for the celebrated commentary he there made upon it.

*Codex Justinianus*, named after the Emperor Justinian, in whose reign it was prepared. In the year 528 A.D. a commission of ten persons, with the famous Tribonian at their head, was appointed by Justinian to compile a code, incorporating in it the laws, so far as still in force, of the earlier codes of Gregorianus, Hermogenianus, and Theodosius, and also the various constitutions issued subsequent to these codes. The work was performed in fourteen months, and it was then declared that the new code should supersede the older compilation. A second edition of this work, revised and having a number of new enactments of Justinian himself incorporated, was promulgated in 534 under the name of the *Codex repetita praelectionis* (i.e. Code of the Revised Version). This is what has come down to us, and forms part of the *corpus juris*. It consists of twelve books, each divided into titles, the titles being composed of laws (constitutions).

The name Code is often also given in modern times to Justinian's compilations as a whole (i.e. the *Digest*, *Codex*, *Institutes*, and *Novels*); in other words, the *corpus juris*. And this is not altogether inaccurate, as undoubtedly the *Digest* and *Institutes* received statutory force from Justinian, and the compilations thus taken as a whole comply so far with the definition of a code already given. As no attempt was made, however, to fuse the common law and constitutions into a systematic whole, the *corpus juris* does not truly represent a code in the modern sense. (See JUSTINIAN.)

Along with the four *codices* just mentioned, as falling under head II., may be taken—

*Romano-Barbarian Codes*.—In some respects they approach more nearly the true conception of a code than those just considered. Several collections were made of the laws of the barbarians of western Europe after they had become free from the domination of Rome. To three of these collections the name of the Romano-Barbarian Codes is usually applied. They are (1) the *Edictum Theodorici*, compiled, about the year 500, under Theodoric, king of the Ostrogoths, and consisting of 154 sections (unsystematically arranged), dealing with all departments of the law, its materials being derived mainly from the Gregorian, Hermogenian, and Theodosian Codes. (2) The *Lex Romana Visigothorum*, prepared under Alaric, king of the Visigoths, and published in the year 506. This collection was one of great importance, and during a considerable part of the middle ages was treated in western Europe as the principal authority for Roman law, exercising great influence upon the laws of the barbarians. It was compiled by commissioners, appointed by Alaric, who derived their

materials in great part from the Theodosian Code, and the 'Sentences' of Paul, and the Institutes of Gaius. This codex is commonly described as the *Breviarum Alaricianum*. (3) The *Lex Romana Burgundionum*, also published about the beginning of the 6th century, under Gundobald, king of the Burgundians. It was compiled from much the same sources as the code of Alaric II., but was much less important.

III. MODERN CODES.—As already observed, the idea of a code in the modern sense—a complete statement of the whole law, or any particular department of it—was not realised by the ancients. Of modern codes there are an immense number of more or less excellence. The following may be noticed :

(1) *Prussian Code*.—The first of the modern codes (leaving out of view certain *ordonnances* of a general nature promulgated at an early date in France and some other countries, which hardly deserve the appellation Code) was the celebrated *Landrecht* of Prussia—the *Code Frédéric*—published in 1751. This work was due to the genius of Frederick the Great, and was intended by him firmly to cement the union between the various parts of his kingdom. In the introductory plan (or *projet*) Frederick tells what induced him to undertake the work—viz. the great uncertainty in the law arising out of the want of uniformity in the customs and statutes prevailing in the different parts of his dominions, and the excessive and costly litigations due to this uncertainty. This code has been entirely superseded by recent German codes to be noticed below.

(2) *Code Napoléon*.—This is the most celebrated of the modern codes. At the time of the great Revolution there was an endless variety of particular laws and customs (*droit écrit et droit coutume*) prevailing in the different parts of France, entailing great uncertainty and expense in the administration of justice, and preventing anything like true solidity and unity in the nation. Napoleon realised the necessity of the unification of the local laws by a code applicable to the whole country. No doubt, a good deal had been done towards unification by the preparation of an admirable act of *ordonnances* in the reigns of Louis XIV. and Louis XV., but they only went a small way in rectifying the evils. The *Constitution* of 1791 and *Projet de Code Civil* of Cambacérès (q.v.) partly anticipated the *Code Napoléon*, which, elaborated in four months by a commission comprising Tronchet and three others, was published and promulgated between 1804 and 1810. It consisted of five parts—viz. the 'Code Civil,' dealing with the main body of the private law; the 'Code de Procédure Civile,' the 'Code de Commerce,' dealing with the laws relating to commercial affairs; the 'Code d'Instruction Criminelle;' and, finally, the 'Code Pénal.' Each of these five parts was independent of the others, though prepared on the same system and governed by a uniformity of plan. In order to prevent absolutely an appeal in any case to the authority of the old laws and customs, it was expressly enacted that if cases should occur for which the code had made no provision, the judge should decide according to what he might consider to be good sense and equity or ancient custom—the code in this respect differing from some other modern codes, which require that any questions unprovided for by it shall be referred by the judge to a legislative commission for decision. The *Code Napoléon* (or, as it has been re-christened under the Republic, the *Code Civil*) remains in force as the law of France at the present day, and despite many defects in its original construction—necessitating a large number of interpretative commentaries—it has, beyond doubt, proved a great boon to that country. Napoleon (though he had,

of course, no share in the legal work performed by Cambacérès, Tronchet, and others) is said to have been prouder of it than of any of his victories. The best test of its excellence is that it has been (in whole or part) the model for a large number of Continental codes—e.g. those of Belgium, Italy, and Greece.

(3) *German Codes*.—Prior to the constitution of the German empire of 1871, two important codes of the German commercial law had been prepared and adopted by the North German Confederation. These were the *Wechsel-Ordnung*, codifying the laws relating to bills of exchange, which was published in 1848, and the *Allgemeines Handelsgesetzbuch*, codifying the whole commercial law, exclusive of bills of exchange and bankruptcy, which was published in 1861. After 1871 these two codes were made applicable to the whole of the empire, and three other departments of the law were codified—viz. the law of bankruptcy (*Konkursrecht*), the law of procedure, and the criminal law. After the Franco-Prussian war a commission was appointed for codifying practically the whole private law of Germany, exclusive of the departments just mentioned. This enormous work was successfully accomplished after about twenty years' labour, and the new code came into force on 1st January 1900, and is known as the *Bürgerliches Gesetzbuch*.

Nearly all the states of Europe now possess codes of their private law—e.g. Austria, Belgium, Italy, and Spain. Japan also has codified its law.

(4) *United States Codes*.—In most of the states codification, either of the whole law or of particular branches of it, has been effected. At the same time it is noticeable that in one or two of the states the expediency of codifying the private law is still much controverted. This is particularly the case with the state of New York, where in 1857-65 a draft civil code was prepared (mainly by the distinguished jurist, Dudley Field), but did not receive the sanction of the legislature. This draft civil code was adopted by California and Dakota, and many of its provisions have passed into the laws of Montana, Utah, Wyoming, and other states. A penal code was adopted by New York in 1882.

(5) *British and Colonial Codes*.—The main results in the way of codification achieved in the United Kingdom are the Bills of Exchange Act (1882), the Partnership Act (1890), the Sale of Goods Act (1893), and the Marine Insurance Act (1910). By the Bills of Exchange Act the statute and common law of the three kingdoms relating to this important department of mercantile jurisprudence was in great measure reduced to the form of a code; though it did not profess entirely to shut the door of the common law in questions affecting bills—decisions prior to the act being still authoritative so far as they are not inconsistent with its express provisions. But in other respects it fulfils the proper requirements of a code. Having been drafted with much care and skill, it has, since it came into force, proved of great value and benefit to the mercantile community in the way of diminishing litigation and otherwise. Efforts have been and are now being made by law-reformers (prominent among whom was Sir James F. Stephen) to have other branches of the law codified, and more particularly the law of evidence and the law of crimes, and criminal procedure. An excellent code exists in Canada, and in India several branches of the law have been codified by the celebrated Anglo-Indian codes. The criminal code of India was drawn up in the year 1837 under the auspices of Lord Macaulay, though it was not promulgated till 1860.

For codes in another sense, see SIGNALLING, TELEGRAPH, CRYPTOGRAPHY.

**Codeine**, an alkaloid obtained from poppy heads. See POPPY.

**Codex** (pl. CODICES : see CODE for etymology), the name applied to ancient manuscripts, as of the classics or of the Scriptures. Of the latter class the four great Codices are the Codex Sinaiticus, discovered in 1844 and 1859 in the monastery of Mount Sinai by Tischendorf, and the Codex Vaticanus, both of the 4th century; and the Codex Alexandrinus (see under ALEXANDRIA) and Codex Ephraemi of the 5th century. All four originally contained the Old and New Testament complete, but none are perfect copies, while the last, besides having great lacunæ, is almost illegible. See PALÆOGRAPHY; BIBLE.

**Codiaum.** See CROTON.

**Codicil** (Lat. *codicillus*, diminutive of *codex*), a supplement to a will, whereby anything omitted is added, or any change demanded by the altered circumstances of the testator or the beneficiaries, is effected. A codicil is authenticated in the same manner as a will, and possesses the same privileges when holograph, or written by the hand of the testator himself. See WILL.

**Codilla** is the coarsest part of hemp and also of flax, sorted out and separated from the rest.

**Codlin Moth** (*Carpocapsa pomonana*), the moth whose larvæ cause the 'worm-eaten' apples, which fall prematurely off.

**Cod-liver Oil** is generally obtained from the livers of the common Cod (q.v.), but likewise from allied species, as ling, dorse, coal-fish, torsk, &c. In these fish the Adipose Tissue (q.v.) containing oil is almost entirely confined to the liver, in which they agree with the shark tribe, whilst in other fish, as in the herring and salmon, the oil is diffused over the entire structure of the animal. The supplies of medicinal cod-liver oil used to be derived mainly from Newfoundland, but Norway now supplies the bulk of that used in Great Britain. The most famous of the Norwegian fishing-grounds is that of the Lofoden Islands. On the outer shores of these islands immense shoals of fish begin to arrive in December, but owing to the storms to which the coasts are liable, only a comparatively small number of boats engage in the fishing. In the beginning of January the fish pass in between the islands to the calmer waters of the Vestfjord to spawn. Then the fishermen, assembling in immense numbers, catch the fish by net or baited line. The fishing-grounds being near the shore, the fish are at once cleaned, and the livers removed. These may be treated in different ways, the various qualities of cod-liver oil being the result. The finest oil, known as 'non-freezing pale oil,' is obtained by warming the livers by means of steam heat, when the oil separates, and is either removed by straining or by allowing it to float to the surface. It is then cooled to 14° F. (-10° C.), and filtered, either by mechanical pressure or in the usual way. A white tallow-like substance remains in the flannel filter, and a bright cod-liver oil passes through, which is now capable of being exposed to frost without turning turbid.

In the case of those fisheries which are situated at some distance from the shore, the livers are placed in tanks, till a sufficient quantity has been collected, with the result that partial putrefaction occurs. The oil so obtained is of a dark-brown colour, and has a nauseous empyreumatic taste.

A still coarser variety is manufactured for use in leather-making. In it the livers of cod, herring, haddock, &c. are indiscriminately used, a very fishy-tasted oil being the result.

Cod-liver oil consists mainly of oleic, stearic, and palmitic acids, in combination with glycerine. In addition to these, *gaduin*, a substance of biliary origin, but possessing no recognised medicinal

virtues, is present along with a little iodine and bromine. With nitric acid, cod-liver oil yields a purple colour, changing to a brown; while a drop of sulphuric acid produces a violet colour, soon changing to brownish-red.

Cod-liver oil is one of the most important remedies in the *Materia Medica*. Although highly esteemed on the Continent, it was not till 1841, when Professor Hughes Bennett (q.v.) of Edinburgh wrote a treatise on it, that it came into general use in Britain. It is valued in cases of pulmonary consumption, chronic rheumatism, and gout.

**Codogno**, a town of northern Italy, 17 miles SE. of Lodi by rail; pop. 10,000.

**Codrington**, SIR EDWARD, a British admiral, was born of a good old Gloucestershire family, 27th April 1770, and entered the navy in 1783. In 1794 he was lieutenant of Lord Howe's flagship, and took a prominent part in the action off Ushant on the glorious 1st of June. At Trafalgar, in 1805, he was captain of the *Orion*, and leader of a squadron. He afterwards served in the North Sea, in Spanish waters, and in North America, and rose to the rank of vice-admiral in 1821. In 1826 he was appointed commander-in-chief of the Mediterranean squadron, and in that capacity took the leading part in the battle of Navarino (q.v.), which destroyed the Turkish navy. In reward for this victory he received the Grand Cross of the Bath, with Russian and French orders; but the battle being considered an 'untoward event,' Codrington was recalled. He attained the full rank of admiral of the red in 1837, and in 1839 was appointed commander-in-chief at Portsmouth. He was M.P. for Devonport from 1832 to 1839. He died April 28, 1851. The 'Narrative' written to prove that at Navarino he had not exceeded his instructions, is printed in the *Memoir* by his daughter, Lady Bourchier (2 vols. 1873).—His son, GENERAL SIR WILLIAM JOHN CODRINGTON, G.C.B. (1804-84), was commander-in-chief in the Crimea from 11th November 1855.—Another son, ADMIRAL SIR HENRY JOHN CODRINGTON, K.C.B. (1808-77), took part in the destruction of St Jean d'Acre, and served in the Baltic in 1854-55.

**Codrus**, the last king of Athens, was the son of Melanthus, and according to Greek legend, sacrificed his life for his country about the year 1068 B.C. A war raging between the Athenians and Dorians, the oracle declared that the victory should belong to those whose king was slain by the enemy; whereupon Codrus, attiring himself as a peasant, entered the Dorian camp, and having picked a quarrel with some of the soldiers, contrived to have himself slain. See ARCHON.

**Cody**, SAMUEL FRANKLIN (1862-1913), popularly known as 'Colonel' Cody, and distinguished as a kite-flier and aeronaut, was born at Birdville in Texas, and perished by accident near Aldershot. His first record as an aeronaut and biplane-builder was in England in 1908, and he gained the prize for a circuit of Great Britain in 1911. He was no relation of 'Buffalo Bill' (William Frederick Cody; 1846-1917) of the 'Wild West' Show, born in Iowa.

**Coefficient**, the numerical or literal factor prefixed to an unknown quantity in any algebraic term. Thus in the expression  $ax - 2by^3 + \sqrt{3}x^2 - (a+5)y$  there are four terms, and the coefficients are, in order,  $a$ ,  $2b$ ,  $\sqrt{3}$ , and  $(a+5)$ . A special and very important instance is found in the phrase *Differential Coefficient* (see DIFFERENCE) of a given function with reference to one or more of the variables involved. In the theory of equations, also, coefficients play an important part: thus, in the cubic  $x^3 + ax^2 + bx + c = 0$ , we know that (supposing

the 3 roots are  $p, q, r$ )  $p + q + r = -a$ ,  $pq + qr + rp = b$ , and  $pqr = -c$ .

**Coehoorn**, or COHORN, MENNO, BARON VAN, called the Dutch Vauban, was the son of a captain of infantry, and born near Leeuwarden in 1641. He studied fortification and mathematics at Franeker, and already captain of a company in his sixteenth year, he greatly distinguished himself at the siege of Maestricht, and in various battles. At the siege of Grave, in 1673, he demonstrated that the small portable mortars named after him might be advantageously employed. Coehoorn covered himself with honour at Senef (1674), before Kaiserswerth (1689), and at Fleurus (1690). He fortified Namur, and defended it against Vauban in 1692; besieged that fortress in 1695, and retook it; was appointed lieutenant-general and director-in-chief of the Dutch fortifications, and fortified several towns, of which Bergen-op-Zoom was considered his masterpiece. In the war of the Spanish succession he defeated the French more than once, and took Huy and Limburg. He died at The Hague, on his way to meet Marlborough, 17th March 1704. He left two important works on fortification.

**Coe horns**—named from the military engineer who introduced them—are small bronze Mortars (q.v.),  $\frac{3}{4}$  cwt. in weight, and of  $4\frac{1}{2}$  inches calibre. Being easily carried, they are useful in sieges, to annoy working parties, and in situations where guns cannot be employed, such as the attack of hill-forts in India.

**Cœlenterata**, or CœLENTERA, a great division of the animal kingdom, including zoophytes and medusoids (Hydrozoa), jelly-fishes (Scyphomedusæ), sea-anemones and corals (Anthozoa), and the aberrant class of free-swimming Ctenophores. With the exception of three or four fresh-water polyps, and as many fresh-water medusoids, all are marine.

Cœlenterates are almost always radially symmetrical animals, in which the primary long axis of the gastrula embryo becomes the long axis of the adult. This kind of symmetry, as opposed to the bilaterality of more vigorous animals, is well suited for easy-going sedentary life, or for somewhat aimless floating and leisurely swimming in the open sea. In many cases, as in sea-anemones, the superficial radial symmetry does not hold quite good when the details of internal structure are considered. As the name Cœlenterate is intended to express, there is no body-cavity (or coelom), distinct from the digestive cavity (enteron) and its outgrowths. In the simpler forms the primary opening of the enteron becomes the mouth of the adult, but in the more specialised forms there is an (ectodermic) oral invagination which forms an inturned gullet-tube. Between the external ectoderm and the internal endoderm of the body-wall, there is developed to a variable extent a middle supporting stratum, or mesogloea, often of gelatinous consistency. This is the 'jelly' of jelly-fishes. In the simplest cases the mesogloea is a secretion quite devoid of cells; but cells may secondarily migrate into it from the endoderm. In the aberrant Ctenophores, a more definite mesoderm (as in higher animals) is established at an early stage in development. The contrast between mesogloea and mesoderm is in part a question of degree, but it is usual to distinguish the Cœlenterates as diploblastic (two-layered) animals, in contrast to the triploblastic (three-layered) higher forms. The general retention of the embryonic radial symmetry, the absence of a coelom, and the usual non-development of a definite mesoderm may be said to mark off the Sponges and the Cœlentera from the higher animals, most of which show bilateral symmetry, a triploblastic embryo, and a distinct body-cavity (Coelomata).

Throughout the Cœlenterates characteristic stinging-cells or cnidoblasts are almost invariably present, and they do not occur elsewhere. In most of the Ctenophores, which some would separate off because of their numerous divergent features, the stinging-cells are usually replaced by adhesive cells. A typical stinging-cell contains a coiled protrusible lasso, lying in an irritant gelatinous substance. They are microscopic weapons, which function only once, and are very useful in paralysing small animals used as food.

The Cœlenterates exhibit two main types of structure—polypoid and medusoid—which recur in diverse forms throughout the series of classes, and may be both present in the course of one life-history, illustrating the phenomenon known as Alternation of Generations (q.v.). The polypoid type, cylindrical and tubular, with a crown of tentacles around the mouth, is well suited for sedentary life. Multiplication by budding is common, and often results in the formation of great colonies with hundreds of united individuals, among which there may be considerable division of labour or polymorphism. In many cases, again, the sedentary polyps form calcareous skeletons, resulting in the production of diverse kinds of 'coral.' The medusoid type is specialised for locomotion, and is illustrated by the small swimming-bells or Hydro-medusæ, and the larger jelly-fishes or Scyphomedusæ. The medusoids may also form elaborate colonies like the Portuguese man-of-war, and show a polymorphism even more extraordinary than any that occurs in sedentary polypoid colonies.

The Cœlenterates may be conveniently divided into four classes. (i.) The Hydrozoa include the fresh-water hydras, the hydroid zoophytes (Tubularians, Sertularians, Campanularians, &c.), the free-swimming medusoids liberated as sexual individuals from many of the hydroid colonies, the calcareous millepores or Hydrocorallinae, the Tachymedusoids which usually exist only in the medusoid form, and the free-swimming Siphonophora, like the Portuguese man-of-war, colonies of modified medusoids. It is probable that the entirely extinct Graptolites (q.v.) were Hydrozoa. (ii.) The Scyphomedusæ or Acraspeda include the true jelly-fishes and some sedentary fixed forms of this type known as Lucernarians. (iii.) The Anthozoa or Actinozoa include (1) the sea-anemones, the madrepore corals, and the black-corals or Antipatharians, which are all united as Zoantharia or Hexacoralla; and (2) the Alcyonarians or Octocoralla, such as Dead-men's Fingers (Alcyonium), organ-pipe coral (Tubipora), red-coral (Corallium), and Sea-pens (Pennatula). (iv.) The Ctenophora are delicate free-swimming forms, such as *Berœ*, very divergent from the rest.

See Fowler and Bourne in Lankester's *Treatise on Zoology*, part ii. (1900); and Hickson in the *Cambridge Natural History*, vol. i. (1906).

**Cœle-Syria** ('Hollow Syria'), now called by the natives El-Buk'a'a, 'the deep plain,' a valley of Syria, extending between the ranges of the Lebanon and Anti-Lebanon. It is 1706 feet above the sea, and is watered by the Orontes (now El-Asi). Above the valley stand the ruins of Baalbek.

**Cœlom**. See BODY-CAVITY.

**Cœnobites** (Gr. *koinos*, 'common,' and *bios*, 'life'), the name given to those monks who live together, in contradistinction to anchorites or hermits, who withdraw from all society, and live in a solitary fashion. See MONACHISM.

**Coffee** (Turkish *qahveh*, from Arabic *qahveh*, originally meaning 'wine'). This well-known beverage is an infusion of the roasted seeds of trees of the genus *Coffea*, notably *Coffea Arabica*, a native of Abyssinia, early introduced into Arabia

and many parts of Africa, and later into many of the tropical countries colonised by Europeans. There are some forty species of *Coffea*, but few of them seem to possess valuable properties; the seeds of *C. Mauritiana*, prepared in the same way, are bitter and slightly emetic. The genus belongs to the natural order Rubiaceæ. It has a tubular 4-5-cleft corolla, and a succulent fruit containing two cells lined with a cartilaginous membrane, and each containing one seed.

In a wild state, it is a slender tree of 15-25 feet high, with few branches; in cultivation,



Coffee; branch with fruit.

it is seldom allowed to become more than 6-10 feet high, and is made to assume a sort of pyramidal form, with horizontal branches almost from the ground. The leaves are evergreen, opposite, very shining, oblong, and leathery; the flowers are small, clustered in the axils of the leaves, and snow-white; the whole appearance of the tree is very pleasing; and the smell of the flowers is delicious. The ripe fruit is dark-scarlet, the seeds (incorrectly called *beans* or *berries*) semi-elliptic and of a horny hardness.

The coffee-tree succeeds only in countries where the average temperature of the year is about 64-70° F. In Peru and Quito it is acclimatised at an elevation of 6000 feet, where, however, frost never occurs; but as it delights in a moist atmosphere, it nowhere thrives better than in tropical islands. In the hothouses of Britain the coffee-tree frequently flowers and the fruit ripens. Coffee plantations are laid out pretty much in the same way everywhere. In quadrangles, bordered by fruit-trees, the coffee-trees stand in rows; they are pruned to the same height, and the ground between them is carefully kept clear of weeds. Where the climate is dry, abundant irrigation is necessary, but the supply of water is cut off as the fruit begins to ripen, in order to improve the aroma of the seeds. The tree yields its first crop in the third year; from a full-grown tree it may amount to a pound of coffee beans. As the coffee-tree continues flowering for eight months, its fruits are at any given time of very unequal ripeness; in the West Indies and Brazil three gatherings are therefore made annually. For the dry method the fruits are placed on mats or large floors specially adapted for the purpose, where they are

dried by the sun's rays, being meanwhile frequently turned. They are passed between rollers to remove the dry pulp of the fruit, and the membranes which enclose the seeds. The coffee is afterwards freed from impurities by winnowing, and conveyed in bags to the seaports. The wet method of preparation is more efficient. The fruits are placed in a tank and run off in a stream of water into a machine which removes most of the pulp. The remainder is got rid of by fermenting and washing. The fruits are then dried, by sun or artificially, or both, and the outer 'parchment' and inner 'silver-skin' are removed by another machine. The various grades are sorted out by a sizing machine. According to care bestowed on preparation, there are great differences in quality and price.

The earlier history of the coffee-tree is not very clear. Coffee was not known to the Greeks or Romans; but in Abyssinia and Ethiopia it has been used from time immemorial. In Arabia it was certainly in use in the 15th century, and over the rest of the East in the 16th century. Towards the end of the 17th century, Wieser, a burgo-master of Amsterdam, carried the coffee-tree from Mocha to Batavia, where it was soon extensively planted, and at last young plants were sent to the botanical garden at Amsterdam, from which the Paris garden obtained a tree. A layer of this was carried out to Martinique in 1720, where it succeeded so well that in a few years all the West Indies could be supplied with young trees. A large industry in Nyasaland has sprung from a plant sent from Edinburgh Botanic Gardens. Brazil is the chief producer of coffee.

The devastation of the Ceylon plantations by the leaf-disease (see CEYLON) led to the introduction of the stronger, but coarser, *Coffea Liberica*, or Liberian Coffee. *Coffea robusta*, discovered in 1898 in the Congo region, has since 1900 been cultivated in Java and the Federated Malay States. It grows more rapidly than *C. Liberica*, fruits sooner, is stronger, less dependent on weather and climate, and less subject to attacks from leaf-disease. It is grown in rubber plantations, where it competes so seriously with the rubber plants that it has to be cut out after five years. Several other West and Central African species are in cultivation.

Cheaper substitutes are Chicory (q.v.), dandelion root, carrot, the seeds of the common yellow iris, and the seeds of *Astragalus Beticus* or *Svedish Coffee*. They are prepared by roasting like coffee. But all these substitutes want the most important constituent of true coffee, *caffeine*. Ground coffee is subject to great Adulteration (q.v.).

In France and other Continental countries ground coffee is largely mixed with caramel or burnt sugar. This is for the most part prepared by skilfully roasting the 'foots' or dregs obtained in the refining of sugar. In moderate quantities it imparts a flavour considered by many to improve the infusion. The so-called 'French coffee' now so largely sold in England contains more or less of caramel—commonly much more than is desirable, its commercial value being very small. A rough test or indication of this is easily obtainable by dipping a bright silver or plated spoon into the infusion. The caramel infusion adheres to the spoon much more decidedly than the pure coffee infusion, and leaves a darker stain. Infusion of chicory behaves similarly to that of caramel.

The leaves of the coffee-tree are used in the western part of Sumatra instead of the seeds. They are prepared by quick drying in a manner similar to that in which tea-leaves are prepared, and in this state contain even a larger proportion of caffeine than the coffee beans of our shops.

Coffee owes its exhilarating and refreshing properties to the presence of three substances: (1)

*Caffeine* (q.v.), which occurs in the roasted bean to the extent of  $\frac{1}{2}$  to 1 per cent.; (2) a *volatile oil*, which is not present in the raw bean, but is developed during the process of roasting to the extent of only one part in about 50,000 of the roasted coffee; and (3) astringent acids, resembling tannic acid, but called *caffeo-tannic* and *caffeic* acids. The average composition of un-roasted coffee is as follows:

Caffeine . . . . .	0.8
Legumin (vegetable Caseine) (q.v.) . . . . .	13.0
Gum and sugar . . . . .	15.5
Caffeo-tannic and Caffeic acids . . . . .	5.0
Fat and volatile oil . . . . .	13.0
Woody fibre . . . . .	34.0
Ash . . . . .	6.7
Water . . . . .	12.0
	100.0

When the beans are roasted till they assume a reddish-brown colour, they lose 15 per cent. by weight, and gain 30 per cent. in bulk; when further roasted till they become chestnut brown, they have lost 20 per cent. by weight, and increased 50 per cent. in bulk; whilst if the roasting is continued till the beans become dark brown, they lose 25 per cent. in weight, and acquire 50 per cent. in bulk. When the roasting is carried too far, more or less charring is the result, and a disagreeable burnt smell is produced, which tends to overcome the natural pleasant aroma.

In Britain coffee is usually under-roasted, probably in order to escape the loss of weight, as the roaster is also the retailer. But in France, in Norway, in Germany, and other countries where it is roasted at home, the roasting is carried to the dark-brown stage. The superiority of the coffee made in these countries has been attributed mainly to this and the use of freshly roasted and ground coffee. The Norwegian peasant usually adds a very small quantity of butter to the beans while roasting; her simple apparatus, like a covered shovel or frying-pan, she continues shaking all the time while over the fire. Every tourist praises the result.

The important offices which coffee fulfils are, to allay the sensation of hunger; to produce an exhilarating and refreshing effect; and, according to some authorities, to diminish the amount of wear and tear, or waste of the animal frame. See DIET, DIGESTION, FOOD.

An endless variety of apparatus have been contrived—some of them of great complexity—for preparing coffee for the table. The chief object aimed at is to obtain the liquor free from all sediment. The simplest and cheapest device is that of placing a bag or metal strainer—by means of a suitable rim—in the upper part of the coffee-pot, placing the ground coffee in this, and pouring boiling water through it. Or the ground coffee may be simply placed in a saucepan or coffee-pot, hot water poured upon it, and boiled for a few minutes. After this the grounds will settle down, and the coffee may be poured off fairly clear.

Many forms of coffee-pot have been devised in which atmospheric pressure is applied for forcing the hot water through the ground coffee resting upon a metal strainer, doing this in such a manner that the water shall all pass through while just at the boiling heat, and then shall leave it.

The question whether coffee should be boiled at all, or simply infused like tea, has been much discussed. In countries where pure coffee is used, boiling is practically in favour. It has been shown, experimentally, that pure coffee is improved by two or three minutes' boiling, while chicory is rendered bitter and unpalatable by such treatment. Soyer recommends that, before the boiling water is poured in, the saucepan should be set dry on the fire, and the powder stirred till it is quite hot, but not in the least burned. In France an equal measure of

boiling milk is added to a very strong infusion in making *café au lait*. The chief effect of adding chicory to coffee is to deepen the colour. When milk is added to coffee it should be boiled; cream may be used without boiling. The Turks drink it thick with sediment; some Arabs make a tea-like beverage from the dried pulp; the Somali boil the berries in oil, and soak maize in the mixture. Raw coffee beans are improved by age. Essence of coffee is a highly concentrated infusion, mixed to the consistence of treacle with extract of chicory and burnt sugar; mixed with boiling water, it makes a tolerable beverage.

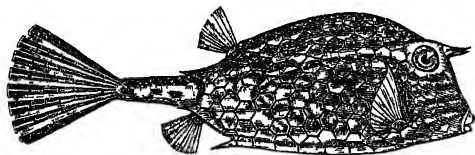
The destructive coffee-bug is a *Coccus* (q.v.), specifically *Coccus* or *Lecanium adomdum*. *Hemileia vastatrix*, the fungus which causes leaf-disease, is one of the Uredinæ. Bright orange patches appear on the leaves. The fungus grows within the leaf, and puts forth spore-bearing filaments through the stomata.

**Coffee-houses** were first heard of in Europe at Constantinople, in the middle of the 16th century, and are spoken of as among Turkish habits by Burton (1621) and Bacon (1627). They were introduced at Venice in 1645. Jacobs, a Jew, opened one at Oxford in 1650. The first in London was set up about 1652 in St Michael's Alley, Cornhill, by Pasqua Rosee, a Ragusan. The Rainbow was the second (1656). The first coffee-house in France was opened at Marseilles in 1671, and some years later an Armenian kept one in Paris. The *Café Procope* (1725), the first of the Parisian literary cafés, was founded by a Sicilian, Procopio Cuttelli. The *Régence* became favoured in after-years by the *romantiques*. Coffee-houses were established in Sweden in 1674, at Hamburg in 1679, and at Vienna in 1683. In 1675 an attempt was made by Charles II. to suppress them by proclamation as the resort of political agitators. For nearly a century they were in England much what they have remained in France to the present day, free and open clubs. Among the most famous were Garraway's, where tea was first retailed, and Jonathan's, both in Change Alley, the latter the stock-jobbers' resort; Dick's; Lloyd's (q.v.); the Jerusalem, one of the earliest city news-rooms; Don Saltero's, at Chelsea, with an absurd museum of curiosities; St James's, the resort of the Whigs from the reign of Queen Anne to the close of George III.; and Wills's, the predecessor of Button's, and the resort of Dryden. Addison and Swift patronised Button's. Other coffee-houses were Tom's in Birchinn Lane, Cornhill; the Bedford, Tom King's, and the Piazza, in Covent Garden; the Chapter in Paternoster Row; and Child's in St Paul's Churchyard. Cocoa and chocolate houses were coffee-houses under other names. See Robinson's *Early History of Coffee-houses* (1893).

**Cofferdam**, a watertight structure used in engineering for excluding the water from the foundations of bridges, quay walls, &c., so as to allow of their being built dry. Cofferdams are generally formed of timber piles driven close together (called sheeting) in two or more rows, according to the depth of water and the nature of the bottom, the space between the rows, which may vary from 4 to 10 feet, being spooned out, down to the solid and impervious bottom, and filled up with clay puddle. Sometimes they are made of only one row of piles of the full height, caulked above low-water, with a low or dwarf row outside to confine the puddle up to that level, or, where there is no wave or current, with a mere bank of clay thrown against the outside; and occasionally the upper work is formed of horizontal planking, fixed on open main piles, and caulked in the joints. When the bottom is rock, so as to prevent piles being driven, and is not much

below low-water, cofferdams are occasionally formed of two stone walls, with a space between filled with clay. Cofferdams require to be strongly shored within, to prevent their being forced inwards by the pressure of the external water; and the rows of piles require to be strongly bolted together, to resist the pressure of the clay puddle, which otherwise would burst them. This method of founding is now seldom practised; it is costly and obstructive to the stream. See CAISSON.

**Coffer-fish** (*Ostracion*), a peculiar genus of bony fishes in the small order Plectognathi, and in the family Sclerodermi, which also includes the file-fishes. The body is inclosed in a firm box formed of hexagonal bony scales fitted into one



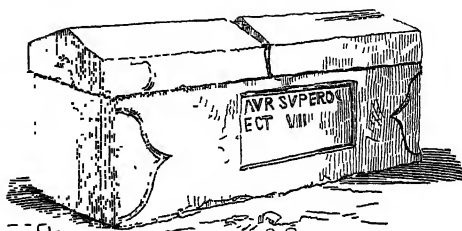
Coffer-fish.

another like a mosaic. The snout, the bases of the fins, and the end of the tail are the only soft-skinned parts. Over a score of species are known from tropical and subtropical seas. The best-known form is *O. quadricornis* from the tropical Atlantic. See GLOBE-FISH, and SUN-FISH.

**Coffin** (Lat. *cophinus*, Gr. *kophinos*, in both languages signifying a basket, coffer, or chest, but never a coffin). Coffins for the bodies of the dead constructed of wood are known to have been used in prehistoric times in Europe. The earliest form of the wooden coffin is simply a suitable length of an oak-tree trunk split, and hollowed out for the reception of the body. Two such coffins containing the skeletons of a man and a woman of the bronze age, with their clothing undecayed, and their weapons, are preserved in the museum at Copenhagen. The wooden coffins of the iron age were sometimes of tree trunks, and at other times of hewn planks fastened with clinker nails. From Bede we learn that the English occasionally employed wood; but the common people, both then and in the Norman and subsequent eras, were simply wrapped in cloth, and so put into the ground. The same custom has been followed by some monks (as the Carthusians) down to the present time, and is still in use among the poorer classes in the East. See EMBALMING.

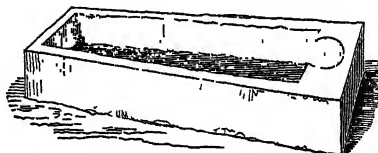
It has been keenly disputed amongst scholars, whether it was more usual with the Greeks to bury their dead or to burn them (see BURIAL); but both customs unquestionably prevailed. Greek coffins were called by various names (*soroi*, *puetoi*, &c.), and composed of various materials, the most common being baked clay, or earthenware. Their forms also varied. In Rome the ancient practice was to bury the dead, not to burn them; though under the Empire, and previous to the recognition of Christianity, the latter custom became almost universal. The coffin in Rome was called *arca* or *loculus*, and was frequently made of stone, sometimes of a peculiar kind of stone brought from Assos, in Troas, which was said to consume all the body except the teeth in forty days, and which, from this circumstance, was called *sarcophagus*—an eater of flesh (see SARCOPHAGUS). Roman stone coffins, both of the heathen and early Christian time, have been found in Britain. Cremation was repugnant to the feelings of the primitive Christians, who buried their dead in receptacles of stone. These were either hewn out

of the rock as in the catacombs, or were sarcophagi elaborately sculptured with scenes from Scripture history and emblems of the faith. The simplest form of stone coffin was that used in prehistoric



Roman Stone Coffin, found at York.

times throughout Europe, consisting of unhewn stones set on their edges, so as to cover the sides and ends of the grave, one or more flat stones being then laid over the body to form a lid. This form of rude stone cist or coffin was continued long after the introduction of Christianity in most European countries, and many ancient cemeteries, formerly regarded as pagan and prehistoric, are now recognised as Christian by the orientation of their stone-lined graves. To these succeeded stone coffins, which were commonly used for persons of the higher classes throughout the middle ages; and so late as 1686 the antiquary Dugdale was buried



Stone Coffin, Temple Church, London.

in a stone coffin. These stone coffins were generally of a single block, commonly tapering from the upper end. In the hollow for the reception of the body, there was from the 12th century a part peculiarly fitted for the head, and a hole in the bottom to allow of the escape of moisture. Such coffins, for the most part, were not buried deeply in the earth, and were frequently placed so near the surface that the lids were visible, which, within a church, often formed part of the pavement, and were covered with elaborate sculpture representing crosses and other ornaments. Sometimes they were even above the ground altogether, and thus became the originals of the table-tombs and altar-tombs of the middle ages. Lead coffins were also occasionally used in the middle ages, as those in the Temple Church in London testify, but the slight wooden cases now in common use appear to be of comparatively recent origin. The practice of surrounding the wooden shell with a coffin of lead, and inclosing both in an oak casket, is, for sanitary reasons, to be discouraged. Even a wooden coffin, if well made, greatly retards decomposition, and keeps the process long incomplete; and to remedy this the use of wicker coffins, of white or stained osiers, has been suggested. In America, however, zinc or copper lining and lids of heavy French glass are employed by undertakers to render their work as far as may be airtight and indestructible; and of late years caskets of zinc or copper, and even of iron or rolled steel, have come into use. The modern hexagonal form of coffin is peculiar to Great Britain. The sides of the American casket are parallel, the ends either rounded or broken into three panels; the exterior is sometimes ornamented with carved work,

but is more commonly covered and draped with broadcloth, velvet, or satin, fringed and tasseled. Expensive woods and silvered handles and nails are frequently employed; and the lid may have a removable face glass. French and German coffins are of a similar shape, but plainer. The colour in Germany is usually brown. At Leipzig formerly coffins were always painted green, as a symbol of hope.

**Coggeshall**, a town of Essex, on the Blackwater, 44 miles N.E. of London. It has a school, founded by Sir Robert Hitcham (1636), remains of a Cistercian abbey (1142), a good Decorated church (restored 1868), and some manufactures of silk, velvet, and lace. It is supposed to have been the Roman *Canonium*, and the remains of a Roman villa have been found. John Owen was minister here. Ralph de Coggeshall, abbot here (1207-18), wrote a *Chronicon Anglicanum* (of the period 1161-1224), edited by J. Stevenson in 1875. See Beaumont's *History of Coggeshall* (1890).

**Cognac**, a town of France, in the department of Charente, on an old castle-crowned hill over the Charente, 42 miles S.E. of Rochefort by rail. The cultivation of the vine and distillation of Brandy (q.v.) form the chief industry of the district; in the town casks and bottles are manufactured, and sulphate of lime. Francis I. was born at Cognac. Pop. 19,000.

**Cognate**. See AGNATE.

**Cognizance**, in Heraldry, a Badge (q.v.), in the more restricted sense of that term.

**Cognoscenti** (Ital., from Lat. *cognosco*, 'I know'), persons professing a critical knowledge of works of art, and of a somewhat more pretentious character than amateurs.

**Cogno'vit** (viz. *actionem*, 'he has confessed the action'), in the law of England, is the defendant's written confession that the plaintiff's cause against him is just and true. By this confession before or after issue, the defendant suffers judgment to be entered against him without trial, in which case the judgment is called judgment by confession.

**Cogswell**, JOSEPH GREEN, LL.D., American bibliographer, born at Ipswich, Massachusetts, in 1786, studied at Harvard and Göttingen, and was professor of Geology at Harvard from 1820 to 1823, when he established the Round Hill School with Bancroft (q.v.). He was for some years editor of the *New York Review*, and, with Halleck and Washington Irving, assisted in planning the Astor Library, of which he was for many years superintendent. He died in 1871.

**Cohabitation**. See CONCUBINAGE, MARRIAGE.

**Cohesion** depends upon the molecular forces which keep together the parts of bodies, and are insensible at sensible distances. In the case of a small body these forces are much more efficient in keeping the parts together than are the mutual gravitational attractions of the parts. On the other hand, in the case of a large body, such as the earth, gravitation is much more powerful in preventing rupture than cohesion. The term *adhesion* is generally, though quite unnecessarily, used when the cohering particles are dissimilar—as when water clings to glass.

After the parts of a body have been separated, so as to form an incoherent mass, the force of cohesion may be again brought into action by the application of pressure sufficient to force the particles close enough together. Thus two smooth, freshly cut pieces of lead can be made to adhere by slight pressure accompanied by a screwing motion. Also two very smooth slabs of marble adhere, if pressed together, so that considerable force must be exerted to separate them. Barton made a set of cubes with surfaces so true that, if twelve of them were

piled one over the other, the whole series could be lifted by raising the upper one. Lead pencils are made by applying pressure to powdered graphite, so as to make it cohere.

**Cohesion Figures**. See SURFACE TENSION.

**Cohoes**, a prosperous manufacturing city of Albany county, New York, on the Hudson, at the mouth of the Mohawk, 3 miles above Troy, and on the Erie Canal. It has large cotton-mills, knitting-mills, and woollen-mills, besides iron-foundries, and manufactures of axes, piping, machines, boxes, &c. Pop. 23,000.

**Cohort**, in the ancient Roman armies, was a portion of a legion, consisting usually of 600 men. Generally, there were ten to a Legion (q.v.).

**Cohune Nuts and Oil**. See PALM.

**Coif** (Fr. *coiffe*, Ital. *cuffia*, 'a cap'), a covering for the head in general, but more especially the close-fitting cap of white lawn or silk, originally worn by Serjeants-at-law (q.v.). Like the *Binetta* (q.v.), it always represented distinct rank and dignity. Its use on all professional and official occasions was both an obligation and a privilege. Later it was the custom to wear a small skull-cap of black silk or velvet over the white coif; and in the beginning of the 18th century, when the fashion of powdered wigs in lieu of natural hair invaded the law-courts, in order that the badge of the order might not be concealed, the perquiers contrived a small round patch of black silk edged with white, to be worn on the crown of the wig. The notion that the coif was a device merely to conceal the tonsure of the monkish lawyers rests only on a loose conjecture of the commentator Spelman, and, though carelessly fostered by Lord Campbell, may be assigned to the same category as the conceit, preserved in Brand's *Antiquities*, which derives the head-dress from a child's caul worn for luck. See Serjeant Pulling's *Order of the Coif* (1884).

**Coimbatore**, the capital of a district of Madras Presidency, on the Noyil, 304 miles S.W. of Madras by rail. It lies 1437 feet above the sea, is well built and drained, and has a cool temperature that renders it a comparatively suitable residence for Europeans. Pop. 47,000. Pop. of district, 2,000,000.

**Coimbra**, capital of the Portuguese province of Beira, on a hill above the river Mondego, here crossed by a stone bridge, 135 miles N.N.E. of Lisbon by rail. Its streets are steep, narrow, and dirty, its manufactures confined chiefly to earthenware and combs, and its interest consists mainly in its historical associations. The place derives its name from the Roman *Conimbria*, traces of which lie to the south; it was held by the Goths, and from them passed to the Moors, from whom it was finally conquered in 1064, by Fernando the Great, aided by the gallant Cid. Coimbra was the capital of Portugal for about two centuries and a half from its erection into a kingdom, in 1139, and many of the early kings are buried in and around the old town. Of the public buildings, the most noteworthy are the older of the two cathedrals, the church of San Salvador, and the ruined convent of Santa Clara; across the river is the *Quinta das Lagrimas* ('House of Tears'), where Inez de Castro (q.v.) was murdered. The university of Coimbra, long the only one in Portugal, was originally established at Lisbon in 1288, but was permanently transferred here in 1537. It has five faculties and some 1300 students, and is still held in repute; attached to it are a museum, an observatory, a botanical garden, and a library of 200,000 volumes. Pop. 20,000.

**Coín**, a town of Spain, 20 miles W.S.W. of Málaga, with marble-quarries; pop. 12,000.

**Coining.** The privilege of coining money being an exclusive prerogative of the crown, the crime of counterfeiting the king's money, as it was called, was declared to be treason, both by the common law of England and by many statutes. In Scotland, there continued to be some differences in regard to this crime, even after the Union had extended the treason laws of England to that kingdom, and prosecutions were in use to be laid at common law. That practice is now abandoned, and the laws of the two countries were assimilated by a series of statutes, which are codified in the Act of 1861 passed to consolidate the law relating to offences against the coin. All such offences are now prosecuted under this statute. By this act it is a high crime and offence, punishable by penal servitude for life, to counterfeit gold or silver coin; or to colour coin or metal with intent to make it pass for genuine gold or silver coin; or to buy, sell, or import counterfeit gold or silver coin; or unlawfully to make, mend, buy, sell, or possess instruments used in fabricating gold or silver coin; or to convey such instruments out of the mint. To impair or diminish or lighten gold or silver coin (as by clipping or sweating) is punishable with fourteen years. It is an offence punishable with penal servitude for seven years to unlawfully possess gold or silver taken from any coin; or to counterfeit copper coin; or unlawfully to make, mend, buy, sell, or possess instruments for counterfeiting copper coin; or to deal in base British copper coin; or to utter or import base foreign gold or silver coin. Several offences of a less heinous nature are dealt with in the act. In order to bring these offences within the limits of the statute, it is not necessary that the resemblance of the false to the true coin shall be very perfect; for the statute deems every offence complete 'although the coin be not in a fit state for uttering, or the counterfeiting be unfinished or imperfect.' For false bank-notes, see **FORGERY**.

In the United States, the crime of counterfeiting coin or money is punishable with fine and imprisonment at hard labour for a term of from two to ten years; and includes falsely making, forging, or counterfeiting coins or notes, postal money orders, postal cards, government stamps of all kinds, and government securities, as also importing, possessing, uttering, or passing false coins or notes with fraudulent intent. Mutilating and debasing the coin is also counterfeiting, but is not so severely punished as the making of counterfeit coins.

For coinage and coins, see **MINT**, **NUMISMATICS**, **MONEY**, **BULLION**, **CURRENCY**.

**Coir**, or **COCONUT FIBRE**, is the fibre of the husk of the coconut. The husks are steeped in water, in pits, for six months, or even for a year, and then beaten with a stick till the fibre readily separates. The material is largely used for floor-matting where there is much traffic, and for making hall and door mats; also for coarse brushes, for ships' fenders, and, to some extent, for ropes and cables. In the South Sea Islands ropes of coir fibre, made by the natives, are extensively used. Coir rope, on account of its lightness, possesses some advantages for maritime purposes. The Chamærops (q.v.) is sometimes called the coir-palm.

**Coire.** See **CHUR**.

**Cojute.** See **JOB'S TEARS**.

**Cojutepeque**, a town of San Salvador, Central America, 15 miles E. of the capital; pop. 10,000.

**Coke**, a fuel obtained by carbonising a bituminous 'caking' coal, in specially designed ovens at high temperatures, whereby its volatile constituents are driven off. The character and density of the product depend, primarily, upon the percentage of 'volatiles' expelled from the coal at

900° to 1000° C. (say 1650° to 1830° F.), and also, in a secondary degree, upon the temperature to which it is subjected, and upon the character and amount of ash associated with the coal. The best coking coals are those containing between 18 and 30 per cent. of 'volatiles.' The strength and quality generally of the coke from coals yielding more than 30 per cent. 'volatiles' deteriorates, at first gradually, and then rapidly, as the percentage of such volatiles increases. The higher the temperature at which the coal is carbonised (*ceteris paribus*) the harder and more valuable is the resulting coke; also a coal with a highly ferruginous ash yields a stronger coke than another (otherwise similar) coal with a non-ferruginous ash.

Coke is a hard, brittle, porous solid, with a steel-gray colour, and, in the best qualities, somewhat metallic appearance, and it does not soil the fingers when handled. It is chiefly valued for the intense heat which it develops on combustion in a good air draught, and for its smokeless burning. It contains, besides carbon and mineral ash, small quantities of hydrogen, nitrogen, sulphur, and oxygen; the best cokes, when dried, contain upwards of 90 per cent. of carbon, and less than 8 per cent. of ash, and have a calorific value of upwards of 13,000 B.Th.U.s. per lb. The moisture content should not exceed 3 per cent.

The principal uses of coke are: (1) as a blast-furnace fuel in iron, copper, and lead smelting, and for this purpose a combination of hardness with a fair degree of porosity is sought for; (2) as a foundry cupola fuel, and for firing crucible furnaces in the manufacture of high-class crucible steel, aluminium and brass melting, and the making of alloys generally, for which purposes hardness and low sulphur content are important; (3) in the manufacture of water-gas; and (4) as a domestic fuel. For the two last-named purposes an inferior 'gas-coke' is preferably used.

Formerly metallurgical coke was universally manufactured by the wasteful 'bee-hive' oven process, involving the loss of the whole of the valuable by-products (*vide infra*), and even to-day this obsolete method is still largely in vogue in Great Britain and the United States, although it has long ago been entirely abandoned in Germany and in Europe generally in favour of the much more scientific and economical 'by-product recovery' oven system. But in the year 1917 some 8700 by-product ovens were operating in Great Britain, with a total carbonising capacity of 17.5 million tons of coal per annum, and it is presumably only a question of time before the 'bee-hive' oven process entirely disappears. The average yields of by-products obtainable per 100 tons of coal carbonised are, approximately, 4.5 tons of tar, 1.0 ton of ammonium sulphate, 300 gallons of crude benzol, 500,000 cubic feet of gas of gross calorific value 500 to 550 B.Th.U.s. per cubic foot (in addition to that consumed in firing the ovens), and a small quantity of naphthalene, whilst the yield of coke is somewhat higher in the new process than in the old.

In the 'by-product recovery' process the coal is carbonised in rectangular ovens, 30 to 35 feet long, by 18 to 24 inches wide, by 6 to 7½ feet high, fired by the combustion in horizontal or vertical side flues of about half the gas evolved during the process. The air-supply to these flues is pre-heated at the expense of the sensible heat in the burnt gases, by passage through some form of heat recuperative or regenerative system. The ovens are built in batteries of from 30 to 60 ovens, capable of carbonising 150 to 350 tons of coal per day. The ovens are connected with suitable plant for the recovery of the aforesaid valuable by-products. The surplus gas obtained is used for power and heating purposes in metallurgical (steel) works and, in some

localities, as a public supply for lighting and heating. Coke is also produced in large quantities in the manufacture of coal-gas in retorts ('gas coke'), but gas coke is generally inferior in quality to metallurgical coke for industrial purposes, although the coke from the modern vertical gas retorts is generally harder and of better quality than that from horizontal retorts.

**Coke, SIR EDWARD**, jurist, was born of a good old Norfolk family, at Mileham, 1st February 1552. From Norwich grammar-school he passed in 1567 to Trinity College, Cambridge, in 1571 to Clifford's Inn, in 1572 to the Inner Temple; and he was called to the bar in 1578. His rise was rapid—from recorder of Coventry (1585) to member for Aldborough (1589), Solicitor-general (1592), Speaker of the House of Commons (1593), Attorney-general (1594), Chief-justice of the Common Pleas (1606), Chief-justice of the King's Bench and privy-councillor (1613). Meanwhile he had married twice, first, in 1582, Bridget Paston, who brought him £30,000, and died 27th June 1598; next, nineteen weeks later, Lady Elizabeth Hatton, the granddaughter of his patron, Lord Burghley. The rancour shown by him in the prosecutions of Essex and Southampton, Raleigh, and the Gunpowder conspirators (1600-3-5) has gained him little credit with posterity; but from 1606 he stands forth as a vindicator of the national liberties, opposing, unlike Bacon, every illegal encroachment on the part of both church and crown. He dared to cite Bracton's words to James's face, that 'the king should be subject not to man, but to God and the law'; alone of twelve judges, he resisted the royal prerogative; and in the Overbury case he showed an indiscreet zeal to come at the real truth. His removal from the bench on most trivial grounds (November 1617) was aggravated by a quarrel with his wife; and though ten months afterwards he was recalled to the council, his conduct in parliament from 1620 as a leader of the popular party, an opponent of Spain and of monopolies, estranged him for ever from the court party. In 1621-22 he suffered nine months' durance in the Tower; still, old though he was, he carried his opposition into the next reign, the Petition of Right (1628) being largely his doing. He died at Stoke Poges, 3d September 1634, and was buried at Tittleshall in his native county.

Coke was a great lawyer, withal an honest lover of legality, but too bitter and narrow-minded to be really a great man. His four *Institutes* (1628-44) deal with tenures, statutes, criminal law, and the jurisdiction of the several law-courts. The first of these, and most famous, which in 1832 reached a 19th edition, is the so-called *Coke upon Littleton* (q.v.)—a commentary that, in spite of its puerile etymologies, has still a real, if mainly historical, value. Eleven of the thirteen parts of his epoch-making Law Reports were published during his lifetime (1600-15); and the whole, translated out of the original French and Latin, fills 6 vols. in Thomas and Fraser's edition (1826). Mr G. P. Macdonell mentions six minor works in his able and exhaustive article on Coke in the *Dictionary of National Biography* (vol. xi. 1887). See also the Lives by Woolrych (1826) and C. W. Johnson (2 vols. 1837). For a descendant, see LEICESTER OF HOLKHAM.

**Coke, THOMAS**, Methodist bishop, born at Brecon in 1747, graduated in 1768 at Oxford, from which university he received the degree of D.C.L. in 1775. He settled as a curate in Somersetshire, but a course of open-air preaching and cottage services, initiated after his introduction to John Wesley in 1776, brought about his dismissal by his rector, and he joined the Methodists, by whom he was attached to the London circuit. In 1782 he

became first president of the Irish conference, and he was elected president of the English conference in 1797 and 1805. In 1784 he was set apart by Wesley as 'superintendent' of the societies in America, to which country he made nine voyages, the last in 1803, and where his outspoken opposition to slavery aroused much hostility; in 1787 he induced the American conference to alter his title to that of bishop. In 1784 Coke had drawn up the first plan of the Methodist foreign missions, and to this cause he devoted the later years of his life with untiring zeal and skill, retaining to the last the direct control of the system he had created. He died in the Indian Ocean on a missionary voyage to Ceylon, 3d May 1814. He published, besides religious works, extracts from his *American Journals* (1790), a *History of the West Indies* (3 vols. 1808-11), and, with Henry Moore, a Life of Wesley (1792), intended to forestall Whitehead's labours, with whom the two others, being joint literary executors, had disagreed.

**Col** (Fr., 'neck'), in Geography, is a depression or pass in a mountain-range. In those parts of the Alps where the French language prevails, the passes are usually named cols—as the Col de Balme, the Col du Géant, &c.

**Cola Nut.** See KOLA NUT.

**Colard, MANSION**, the first printer of Bruges, was of French extraction. He published twenty-one works, all in French, save one Latin one; and died in 1484.

**Colberg**, or KOLBERG, a seaport and watering-place of Prussia, in the province of Pomerania, on the Persante, near its mouth in the Baltic, 170 miles NNE. of Berlin by rail. It stands on a hill, surrounded with three suburbs. The principal church dates from 1316. In 1102 Duke Boleslaus of Poland vainly besieged Colberg, which endured long sieges in the Thirty Years' War, in the Seven Years' War, and again in 1807, when it was most gallantly defended against the French. No longer a fortress, Colberg has manufactures of chemicals and soap, and salmon and lamprey fisheries. Pop. 30,000.

**Colbert, JEAN BAPTISTE**, one of the greatest French statesmen, was born at Rheims in 1619. Before he was twenty years of age he obtained a post in the War Office under Le Tellier, and at once began a very successful career. In 1651 he entered the service of the great minister Mazarin, who soon employed him in most important affairs of state. On his death-bed Mazarin warmly recommended Colbert to Louis XIV. 'I owe you everything,' Mazarin is reported to have said to the king, 'but I pay my debt to your majesty in giving you Colbert.' It was in 1661 that Colbert became the chief-minister of Louis XIV. He found the finances in a ruinous condition, and immediately began his reforms. Fouquet, the superintendent under Mazarin, was found guilty of impoverishing the state by his maladministration, and imprisoned for life. The farmers of the state-revenues were forced to yield up the resources of the crown of which they had fraudulently possessed themselves. The debts of the state Colbert reduced by arbitrary composition. In all the departments of finance he introduced order and economy as far as he could. So complete and thorough was the change which Colbert effected, that in ten years the annual revenue had risen to 104 million livres, of which 27 were spent in collection and administration; whereas, when the management of the finances was intrusted to him, the revenue amounted to only 84 million livres, and 52 millions were absorbed in its collection. The financial reforms of Colbert, however, only served as a

basis for a thorough reorganisation of the entire administration. He took measures to improve agriculture. Commerce was extended, roads and canals—including that of Languedoc—were made. In every way he sought to apply the protective system then in vogue to promote the industries of France. He organised anew the colonies in Canada, Martinique, and St Domingo, and founded others at Cayenne and Madagascar. He found France with a few old rotten ships, and in a few years had provided her with one of the strongest fleets in the world, with well-equipped arsenals and a splendid body of seamen. Colbert improved the civil code, introduced a marine code of laws, and drew up the so-called *Code Noir* for the colonies.

While attending to material interests, he did not neglect the arts and sciences; all men of learning and genius found in Colbert a generous patron. The Academies of Inscriptions, Science, and Architecture were founded by him. In short, Colbert was the patron of industry, commerce, art, science, and literature—the founder of a new epoch in France. His aim was to raise the strength of France by developing every side of the national life. In this he entirely succeeded during the early part of the reign of Louis XIV., but his work was not destined to last; the wars of Louis and the extravagance of his court undid all that had been accomplished by Colbert. The rigorous order and precise rules which he established might be beneficial in such hands as his own, but when abused by a selfish or incompetent despotism, could only have the most mischievous results. Colbert died in 1683, bitterly disappointed at seeing the failure of his plans for the regeneration of France. The people were so enraged with the oppressive taxes, for which they blamed him, that his corpse had to be removed from his house by night in order to avoid their fury. Colbert had indeed carried out many measures that were arbitrary and oppressive. He had served a despotic king, who posed as the representative of all that was fair in the government, and left the disagreeable tasks of administration to his ministers. See his *Lettres, Instructions et Mémoires* (8 vols. 1862–82); Lives by Clement (1892), Neymarck (1877), and Gourdauld (6th ed. Tours, 1885); studies by the Comte de Cosnac (1892), and La Roncière (1919, 1920).

**Colburn, ZERAH**, a mathematical prodigy, born in Vermont, U.S., in 1804, displayed such remarkable powers of calculation that in 1810 his father left Vermont to exhibit him. At this period he answered correctly such questions as 'How many hours in 1811 years?' in twenty seconds; and a few years later much more complicated problems were solved with equal rapidity. He was shown in Great Britain, and for some time in Paris; from 1816 to 1819 he studied at Westminster School at the expense of the Earl of Bristol. His father died in 1824, and he returned to America; here he was a Methodist preacher for nine years, and from 1835 professor of Languages in Norwich University, Vermont, where he died 2d March 1840. His remarkable faculty disappeared as he grew to manhood.

**Colchester**, an ancient municipal and (till 1918) parliamentary borough in Essex, on the right bank of the Colne, 51 miles N.E. of London, and 12 miles from the sea. It is built on the ridge and sides of a promontory, with a port on the river at a suburb called the Hythe, which has a quay for vessels of 150 tons. It is a town of special historical and antiquarian interest. Before the Roman conquest of the island it was the British 'Royal Town' of *Cunobelin* (the *Cymbeline* of Shakespeare): and when the Emperor Claudius

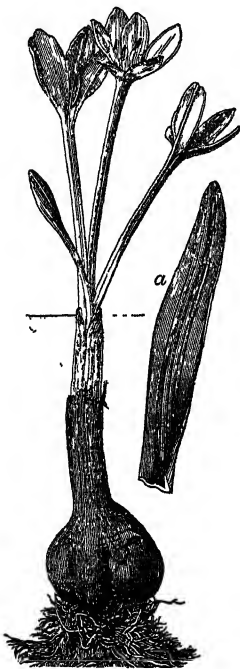
had conquered the south-eastern part of the island, he founded a *colonia* here—the first Roman town in Britain. There are still many remains of *Camulodunum*. The walls are the most perfect Roman walls in England. Immense quantities of pavements, coins, pottery, and other Roman remains have been found. Roman streets and houses have been traced. A large cemetery has yielded a valuable collection of sepulchral remains. Many of these are in the town museum, which is housed in the castle, the largest Norman keep in England. Its substructure seems to have been a Roman temple. The tower of Holy Trinity Church has all the characteristics of Saxon architecture. In the Norman west front of St Botolph's Priory the Roman bricks are a striking feature; and all the old churches have an intermixture of Roman brick in their walls. The Domesday Survey is very full, and gives a complete census of the people. Two taxations of the beginning of the 13th century give not only a complete census of the inhabitants, but also an inventory of their domestic furniture and stock-in-trade, and present a complete view of an English borough of the period. The Protestant refugees from the Low Countries at the end of the 16th century introduced the bay and say (baize and serge) trade, which became an important manufacture, and spread into the neighbouring towns and villages. Colchester was one of the eight 'Dutch Congregations' incorporated by royal license. The wars with Spain in the reign of Queen Anne closed the markets for these goods, and the trade died out. The only important historical event of later times was the siege of Colchester, one of the last events of the Civil War between Charles I. and the parliament. The royalists of Essex and Kent under Goring took possession of the town, and were besieged by Fairfax from the middle of June 1648 till the middle of August, when the town, starved out, surrendered, and Sir Charles Lucas and Sir George Lisle were executed by sentence of court-martial. From 1895 Colchester had a bishop-suffragan under St Albans; since 1913 under Chelmsford.

The chief cause of the prosperity of the town throughout its history has been that it was the principal town and natural market of an extensive and fertile corn-growing district, inclosed on three sides by the rivers and the sea. It was during the great continental wars of the beginning of this century, and has again in later times become, a large military depot; and the number of troops quartered here, with their officers and their families, have contributed to its prosperity. The fishery of the Colne and its creeks has for centuries been famous for its oysters, and has been a valuable portion of the property of the corporation, to which it has belonged from the Norman Conquest, or even before. There is a Technical and University Extension College. Colchester has never been the county town, owing probably to its being too far down in the Essex peninsula. Pop. (1851) 19,443; (1881) 28,395; (1921) 43,377. See *Cutt's Colchester* (1888), Benham's *Colchester Worthies* (1892), and *The Red Paper Book of Colchester* (1903).

**Colchester, CHARLES ABBOT, LORD**, Speaker of the House of Commons, was born at Abingdon, Berkshire, 14th October 1757. He was educated at Westminster School (1763–75) and Christ Church College, Oxford, and in 1779 entered the Middle Temple. In 1792 his practice was bringing him £1500 per annum; and two years later he received the post, worth £2700, of clerk of the rules in the Court of King's Bench. Returned to parliament as a strong Tory in 1795, he effected in his first session an improvement in the legislation regarding temporary and expiring laws; and it is due to his exertions that municipal bodies receive a copy of all new acts as soon as they are printed. The country

is mainly indebted to him for the Private Bill Office and for the royal record commission, whose proceedings he for many years superintended. But his greatest service was in the Act (1800) for taking the first census. In 1802 he was elected Speaker, the duties of which high and honourable office he continued to discharge with as much impartiality as distinction until May 1817, when ill-health compelled him to resign. He received a pension of £4000 a year, and was raised to the peerage as Baron Colchester, his father having been rector of All Saints, Colchester. He died 7th May 1829. See his *Diary and Correspondence* (3 vols. 1861), edited by his son Charles, second Lord Colchester (1798-1867), who was postmaster-general in 1858.

**Colchicum**, a genus of Liliacæ, sub-order Melanthacæ. The species, which are few in number, are stemless, with flowers half subterranean like the crocus, the limb of the perianth and



Meadow Saffron  
(*Colchicum autumnale*):  
a, a leaf.

part of the tube only rising above ground. The flowers much resemble crocus-flowers, but are readily distinguished by having six instead of three stamens, and three styles instead of one. The superior ovary does not remain to ripen underground, but after the flowering is over, rises in the form of three little follicles slightly adhering to each other, on a lengthened stalk. The only British species is *C. autumnale*, the Meadow Saffron, sometimes also, but incorrectly, named Autumn Crocus, which is plentiful in meadows and pastures in some parts of England and of the continent of Europe. The flowers are pale purple; they appear in autumn, unaccompanied by any leaves; the leaves, which are large and broadly lanceolate, appear in spring, when the stalk which bears the ripening fruit arises amongst them. The whole plant

is very acrid and poisonous, chiefly owing to the presence of an alkaloid called *Colchicine* or *Colchicia*. Cattle are not unfrequently injured by it in pastures where it abounds. It is a valuable medicinal plant, and is administered, in small doses, to allay the pain of gout and rheumatism. Repeated doses produce vomiting, purging, increase of the urinary secretion, and profuse perspiration. The parts chiefly used for medicinal purposes are the corm (popularly called the root) and the seeds. The seeds are round, brown, rather larger than mustard-seed. Other species of colchicum appear to possess similar properties. The *hermodactyls* of the druggists' shops, which for many centuries have enjoyed an extensive celebrity for soothing pains in the joints, and are brought from the Levant, are believed to be the corms either of *C. variegatum* or *C. bulbocodoides*. *C. autumnale* is not unfrequent in flower-borders, particularly a variety with double flowers.

**Colchis**, a province of ancient Asia, on the east coast of the Pontus Euxinus or Black Sea, situated north of Armenia and south of the Caucasus. Colchis was famous in Greek mythology as the land of Medea (q.v.) and the goal of the Argonauts (q.v.); afterwards it was better known to the Greeks as the seat of some colonies of the Milesians. It was noted for its wines and fruits. The principal town was Dioscurias; the principal river the Phasis. The Colchians were at one time subject to Persia, and subsequently to Mithridates, king of Pontus, and ultimately passed under the mighty empire of Rome.

**Colcothar** is the name given by the alchemists to the red powder (mainly red oxide of iron) which remains in the retorts when green vitriol or the sulphate of iron is calcined. It is used for polishing glass and the like, and is called *crocus* by artists.

**Cold** is the term by which we signify a relative want of sensible heat. There are therefore no determinate boundaries between cold and heat, and it is a mere arbitrary distinction to call the degrees of the thermometer below the freezing-point degrees of cold. When the atmosphere, or any substance which comes in contact with our body, is at a lower temperature than the skin, it absorbs heat from it, and we call it cold. See **HEAT**.

The physiological action of cold on the animal organism requires a brief notice. All animals (the warm-blooded animals to the greatest extent) have a certain power of maintaining the heat of the body, in defiance of external cold, as has been shown in the article **ANIMAL HEAT**. This power is mainly due to a process analogous to combustion, in which carbon and hydrogen taken into the system in food are made to unite with oxygen derived from the air by respiration. If the combustible materials are not duly furnished, or if the supply of oxygen be deficient (as in various diseased conditions), there must be a depression of temperature. Now, if the temperature of a bird or mammal (except in the case of hibernating animals) be lowered about 30° below its normal standard (which in birds ranges from 100° to 112°, and in mammals from 96° to 102°), the death of the animal is the result. The symptoms indicating that an animal or a man is suffering from a depression of the temperature of the body are—retardation of the circulation of the blood, causing lividity of the skin, which is followed by pallor, in consequence of the blood being almost entirely driven from the surface through the contraction of the vessels; a peculiar torpor of the muscular and nervous systems at the same time manifests itself in an indisposition to make any effort or exertion, and in intense sleepiness. The respiratory movements become slower (see **RESPIRATION**), and the loss of heat goes on, therefore, with increasing rapidity, till the fatal limit is reached, and death supervenes.

In hibernating animals (the marmot, dormouse, bat, &c.) the power of generating heat within their own bodies is very slight, their temperature following that of the external air, so that it may be brought down nearly to the freezing-point. See the articles **hibernation**, **FAST**, **SLEEP**, **LIFE**, **DESICCATION**; also, for other phenomena connected with cold, **HEAT**, **CLIMATE**, **FREEZING**, **ICE**, **THERMOMETER**, **TEMPERATURE**, **GAS**.

Great or prolonged atmospheric cold is a most powerful depressing agent, and is a fruitful cause of disease and even of death. Whenever the temperature of the atmosphere is suddenly reduced, and particularly when it is reduced below the freezing-point, a considerable addition takes place to the mortality of the country at large. The

effects of cold are, in ordinary circumstances, most apparent among the aged and the very young, and among those suffering from chronic disease; but when a very low temperature is long continued, even the healthy are sure to suffer, when impoverished so as not to have sufficient means of external warmth in their homes. The most direct effects of cold are in the production of what is commonly called Frost-bite (q.v.).

Cold is applied in various ways in the treatment of disease. In some forms of fever, a cold bath, or cold wet pack, is the best means of reducing a very high temperature which of itself threatens life. In many inflammations relief is best obtained by the local application of ice, or of a coiled tube through which cold water circulates. The tonic and stimulating effects of a temporary application of cold are familiar in the cold morning bath, or the use of cold water sprinkled on the face of a person who has fainted. The disease commonly termed a 'cold' has been already described under CATARRH.

**Cold Cream** is the term applied to an ointment containing rose-water which is used as a mild and cooling dressing for the skin. It may be prepared by melting together almond-oil five parts, spermaceti one part, and white wax one part. Three parts of rose-water are then added with brisk stirring, which is continued till the whole is cool, and of a soft creamy consistence. As cold cream prepared in this way is liable to turn rancid, glycerine is sometimes added, or the almond-oil is replaced by white vaseline. Cold cream is a pleasant application to irritated surfaces, protecting them from the influences of the weather, and promoting the healing of wounds and chapped hands.

**Cold Storage.** See REFRIGERATION, ICE, PRESERVED PROVISIONS.

**Coldstream**, a town of Berwickshire, 15 miles SW. of Berwick, on the Tweed, over which there is a fine bridge by Smeaton (1766). At Coldstream was the famous ford by which Edward I. entered Scotland in 1296. By this ford also the Scots invaded England in 1640. Being convenient as a Border town, Coldstream, like Gretna Green and Lamberton toll-bar near Berwick, was formerly celebrated for its clandestine marriages. Pop. 1300.

**Coldstream Guards**, a regiment in the Foot Guards (see GUARDS), the oldest in the British army except the 1st Foot, now called the Royal Scots. Raised in 1660 by General Monk at Coldstream, it was at first called 'Monk's Regiment'; but when parliament consented to give a brigade of guards to Charles II., this corps, under the name of Coldstream Guards, was included in it. See the history of Col. Ross (1896).

**Coldwater**, capital of Branch county, Michigan, 156 miles E. of Chicago, on the Lake Shore Railway, has several foundries, flour-mills, engine-works, cement-works, shoe-factories, and a state public school; pop. 6000.

**Cole**, SIR HENRY, was born at Bath, 15th July 1808, educated at Christ's Hospital, and became assistant-keeper of the Records in 1838. He wrote much for the newspapers and reviews, and under the name of 'Felix Summerly' produced about twenty children's books. He was chairman of the Society of Arts, did valuable service on the committee of the Great Exhibition of 1851, was the founder of the South Kensington Museum, and in 1860 became its director. For his services on innumerable committees and councils, and in promoting valuable reforms, he was made K.C.B. in 1875; and he held several foreign decorations. He died 18th April 1892. See his Autobiography (2 vols. 1884).

**Cole**, THOMAS, painter, born at Bolton-le-Moors in 1801, removed to America in 1819, where he became one of the best-known landscape-painters. In 1830 two of his pictures appeared in the Royal Academy, and he afterwards made sketching tours through England, France, and Italy; but all his best landscapes were American. He died 11th February 1848.

**Cole**, VICAR, landscape-painter (especially of Surrey scenes), was born at Portsmouth, 17th April 1833, and from 1853 was a frequent contributor to Royal Academy exhibitions. Chosen A.R.A. in 1870, and R.A. in 1880, he died 6th April 1893. See Life by R. Chignell (3 vols. 1898).

**Colebrooke**, HENRY THOMAS, the pioneer of Sanskrit scholarship in Europe, was born in London, 15th June 1765, the son of Sir George Colebrooke, banker, and eventually chairman of the board of directors of the East India Company. He was educated at home, and early showed a strong disposition for mathematical studies. In 1782 his father's influence procured him a writership in the Bengal service. He was a voracious reader, and his alert mind found its relaxation in the change from administrative to scientific labour. His duties as revenue officer at Tirhut led him to make a minute study of the state of husbandry in Bengal, and his Remarks thereon (Calcutta, 1795, privately printed) formed so searching a criticism of the existing policy that the work could not be published in England. At Purneah his legal functions led him to study Indian law and learn Sanskrit; and he began in 1794 publishing essays on Indian religion, poetry, and science in the *Asiatic Researches* of the recently founded Asiatic Society of Calcutta. His removal in 1795 to the magistracy of Mirzapur gave him the opportunity of cultivating the acquaintance of the learned men of the neighbouring Sanskrit college at Benares, and with this advantage he brought out his *Digest of Hindu Law on Contracts and Successions* (translated from the Sanskrit, 1798, 4 vols. Calcutta). A mission to Nagpur (1799-1801) interrupted his work, and on his return he was appointed a judge of the new court of appeal at Calcutta, and at the same time honorary professor of Hindu Law and Sanskrit at the college of Fort William. Yet he contrived during this busy period to publish the first (and only) volume of his *Sanskrit Grammar* (1805), based upon Pāṇini and the native commentators, to write his famous articles on the Vedas and on the sect of Jains, besides many other valuable essays for *Asiatic Researches*, and also to supplement his *Digest* by *Two Treatises on the Hindu Law of Inheritance* (1810). Before this he had reached the eminence of a seat on the governor-general's council (1807), and was using his influence earnestly in the direction of administrative reform and the encouragement of oriental studies. He retired in 1814, and devoted himself to scholarly work in England, especially to eastern science. Several of his essays in *Asiatic Researches* related to Hindu astronomy, meteorology, mathematics, geology, and botany. He contributed also to the *Transactions of the Astronomical Society*, to the *Quarterly Journal of Science*, the Linnæan and the Geological Societies, as well as, more especially, to the Royal Asiatic Society, which he helped to found in 1823. His last years were troubled by care, blindness, and much bodily suffering, endured with fortitude; and on 10th March 1837 he died at the age of seventy-two. His translation of the *Sāṅkhya Kārika* was posthumously edited by Professor H. H. Wilson. His work as a Sanskrit scholar possessed the highest merits of extreme conscientiousness and caution, scientific accuracy, and a stern repression of the tendency to fanciful exaggeration which marked the early theories of European

scholars on Indian science and religion. His life has been well written by his son, Sir T. E. Colebrooke (1873), and his immense services to Sanskrit scholarship are lucidly criticised in Max Muller's *Biographical Essays* (1884).

**Colenso**, JOHN WILLIAM, D.D., Bishop of Natal, the son of a Cornish gentleman, was born at St Austell, January 24, 1814. He was educated at St John's College, Cambridge, where he graduated as second wrangler in 1836, and became fellow and assistant-tutor of his college. From 1838 to 1842 he was an assistant-master at Harrow, and for the next four years a tutor at Cambridge. Appointed, in 1846, rector of Forncett St Mary, Norfolk, he published *Miscellaneous Examples in Algebra* in 1848, *Plane Trigonometry* in 1851, and *Village Sermons* in 1853, in which same year he was appointed first Bishop of Natal. With that energy of character which always distinguished him, Dr Colenso at once began a close study of the natives and of the Zulu language, and after a time prepared a grammar and dictionary, and made a translation of the English Prayer-book and a portion of the Bible, printing them in his own house. In 1860 he memorialised the Archbishop of Canterbury against compelling those natives who had already more than one wife to renounce polygamy as a condition to baptism, alleging that he could find no warrant for such compulsion either in the gospel or in the ancient church. In 1861 he published his *Translation of St Paul's Epistle to the Romans, commented on from a Missionary Point of View*, in which he objected to the doctrine of eternal punishment. He next announced that he had become convinced of the improbability of many statements of facts and numbers in the historical books of the Bible; and in 1862 there appeared the first part of his work on *The Pentateuch and the Book of Joshua Critically Examined*. This treatise brought down upon its writer an avalanche of criticism and remonstrance. He had called in question the historical accuracy and Mosaic authorship of the books cited, and his work was condemned as heretical by small majorities in both Houses of Convocation of the province of Canterbury. The bishop was entreated to resign his see by his episcopal brethren, some of whom inhibited him from preaching in their dioceses. The second part of his work appeared in 1863. Convocation censured him in the succeeding year, and he was declared to be deposed from his see by his Metropolitan, Bishop Gray of Capetown. He appealed from this judgment in 1865, when the Privy-council declared the deposition to be 'null and void in law.' The bishops constituting the council of the Colonial Bishops Fund, however, refused to pay him his income, upon which he appealed to the Court of Chancery. On October 6, 1866, the Master of the Rolls delivered an elaborate judgment, ordering the payment of the bishop's income, with all arrears and interest, unless his accusers should bring him to trial for heresy; but this they declined to do. Immediately before Dr Colenso's return to his diocese in August 1865, his English friends presented him with £3300 as a testimonial. The Anglican community at the Cape was now divided into two camps, and although Dr Colenso remained the only bishop of the Church of England in Natal, Bishop Gray publicly excommunicated him, and in 1869 consecrated Dr W. K. Macrorie as Bishop of Maritzburg, his authority practically extending over the same diocese. In 1874 Dr Colenso visited England to report upon the affairs of his diocese to the Archbishop of Canterbury, and to consult with the heads of the church upon its relations to the new see of Maritzburg. While in England he pleaded the cause of Langalibalele,

a dispossessed Zulu chief. On his return to South Africa he warmly espoused the interests of the natives against the oppression of the Boers, and the encroaching policy of the Cape officials. He opposed the attitude of Sir Bartle Frere and the home government during the Zulu war, and earnestly strove to make peace between the contending parties. Owing to his exertions, Cetwayo was allowed to visit England and plead for his rights. Dr Colenso's defence of the aboriginal claims lost him much valuable support; but the bishop and his daughter never swerved from what seemed to them to be the wisest as well as the only honourable course to pursue towards the natives of South Africa. In addition to the works already named, Dr Colenso was the author of *Ten Weeks in Natal* (1855); *The New Bible Commentary Literally Examined* (1871-74); *Lectures on the Pentateuch and the Moabite Stone* (1873); and a volume of *Sermons* (1873). His critical analysis of the Pentateuch, completed by a seventh part in 1879, had some influence on contemporary thought; but from the progress of criticism, his contentions have ceased to be of primary importance. Colenso died at Durban, Natal, 20th June 1883. See his *Life* by Sir G. W. Cox (2 vols. 1888).

**Colenso**, a small town in Natal, 15 miles S. of Ladysmith by rail, where the Tugela River is crossed by the railway from Ladysmith to Durban. It is famous on account of the disastrous defeat there of General Buller, on 15th December 1899, on his first attempt to relieve Ladysmith during the Boer war.

**Coleoptera**. See BEETLE.

**Colepeper**, JOHN, was a native of Sussex, but, save that he had seen much foreign service, little is known of him till his return for Kent in 1640 to the Long Parliament. There he pursued a course much the same as Hyde's (see CLARENDON), and in January 1642 was created Chancellor of the Exchequer, a twelvemonth later Master of the Rolls, and in 1644 Lord Colepeper. With Hyde he attended Prince Charles to the western counties, and from Jersey he brought him to Henrietta Maria, to whose party he thenceforth attached himself. He lived to see the Restoration, dying on 11th June 1660. He was an able, far-seeing councillor, but rough and unstable.

**Coleraine**, a seaport in County Londonderry, on the right bank of the Bann, 4 miles from its mouth, 33 by rail N.E. of Londonderry, and 61 N.W. of Belfast. It has manufactures of fine linens, pork-curing, distilling, and important fisheries in the river. The Bann is here spanned by a fine stone bridge, 288 feet long, which connects Coleraine with its suburb on the left bank of the river, Waterside or Killowen. Vessels of 200 tons can discharge at the quay—those of greater burden lie at Portrush, 6½ miles off. Population, 7800. Until 1885 Coleraine returned a member to parliament.

**Coleridge**, HARTLEY, eldest son of the great Coleridge, was born, an eight months' child, at Clevedon, Somersetshire, 19th September 1796. Very early he showed uncommon parts, and a singular power of living entirely in a make-believe world of dreams and imagination. Wordsworth's lovely and touching poem to the child at six years of age was strangely and sadly prophetic of his after-life; hardly less the concluding lines of his own father's two poems, *The Nightingale* and *Frost at Midnight*. Hartley was brought up, after the separation of his parents, by Southey at Greta Hall, and was educated chiefly at Ambleside school. In 1815 he went to Oxford as postmaster of Merton College. His scholarship was great but unequal, and not such as to lead to high distinc-

tions in the schools. His failure after no less than three attempts to gain the Newdigate filled him with 'a passionate despondency,' from which he turned for relief to a fatal remedy. When at length he had gained with credit an Oriel fellowship, at the close of his probationary year he was judged to have forfeited it mainly on the ground of intemperance. 'The sentence might be considered severe,' says his brother; 'it could not be said to be unjust.' Unhappily it ruined his life, crushed his spirit, and made recovery impossible. With £300 given him by the college, Hartley spent the next two years in London, then tried for four or five years taking pupils at Ambleside, occasionally writing for *Blackwood's Magazine*, next lived some time at Grasmere, and then went to live at Leeds with one Bingley, a publisher, for whom he agreed to write a biographical work on the worthies of Lancashire and Yorkshire. Of these but thirteen lives had already been written when Bingley failed. These were published under the titles of *Biographia Borealis* (1833) and of *Worthies of Yorkshire and Lancashire* (1836). Bingley also printed a small volume of his poems in 1833. Hartley next returned to Grasmere, the only remaining interruptions to his ordinary life being two short and not unsuccessful intervals of teaching at Sedburgh grammar-school. His father, who died in 1834, made a special provision for him in a codicil to his will, and his mother's death in 1845 made him by an annuity completely independent. He continued to write poetry, and wrote a life of Massinger for an edition projected by Moxon. His days were spent in fitful study, lonely reverie, and wanderings over the Lake Country, with, unhappily, occasional lapses into intemperance. The dalesmen everywhere treated 'Poet Hartley' with a singularly affectionate respect, not without a kind of awe at his *eerie* appearance, his abstracted air, his small stature, prematurely white hair, and gentle manners. He loved children and animals, and was fondly loved by them in return. He died 6th January 1849, and was buried beside what was soon to be Wordsworth's grave.

Hartley Coleridge's poetry falls short of the great, but sometimes approaches it, and even nearly. It is graceful, tender, and sincere, pervaded throughout with a charm of a nature rare and almost unique, alternately wise and playful, and often perfect in the expression of the thoughts it has to convey. He is greatest in the sonnet—a form which seems exactly to have been the measure of his powers, or rather of the fitful periods of his poetic passion. *Leonard and Susan*, a narrative in blank verse, and *Prometheus*, a dramatic fragment, are the only poems of any length.

His *Poems* were collected by his brother Derwent, with a *Memoir* (1851); also his *Essays and Marginalia* (1851). See also Miss Towle, *A Poet's Children* (1912).

**Coleridge, LORD.** John Duke Coleridge (eldest son of Sir John Taylor Coleridge, the great poet's nephew, and himself the biographer of Keble) was born in 1821, and educated at Eton and Oxford, was called to the bar in 1847, and was for some years leader of the western circuit. Appointed recorder of Portsmouth in 1855, he took silk in 1861, and from 1865 to 1873 represented Exeter in parliament. He was successively Solicitor-general (1868), Attorney-general (1871), Chief-justice of the Common Pleas (1873), and (1880) Lord Chief-justice. An occasional contributor to the reviews, and a man of exceptional culture and polished eloquence, he died 14th June 1894.

**Coleridge, SAMUEL TAYLOR,** was born at Ottery St Mary, Devonshire, October 21, 1772, where his father was vicar, and master of the grammar-school. He was the youngest of ten

children of his father's second marriage. A singularly precocious child, he had read the *Arabian Nights* in his fourth year; but he said of himself, 'I never thought as a child.' On his father's death he was sent, in his ninth year, to be educated at Christ's Hospital, where he had Charles Lamb for a school companion. He was poorly fed, and badly taught; but he plunged with eagerness into a whole library of literature, and read Homer and Virgil for the mere pleasure of it. Remaining at Christ's for eight years, he became head of the school, and showed a remarkable capacity for assimilating all sorts of knowledge. He was a mental rover from his boyhood onwards, with a very miscellaneous intellectual appetite. At school he translated the hymns of Synesius, studied works on medicine in Latin, on metaphysics in Greek, and fell in love with the sister of one of his companions. His last years at school, however, were years of suffering. He used to bathe in the New River, plunging into the water with his clothes on, and after a swim, resumed his games, or returned to his books, without changing his garments. The inevitable result was rheumatic fever and other ailments. While at school he had a passing attraction not only to his schoolmate's sister, but to the shoemaker's craft. This was a short-lived fancy; and in October 1791 he passed to Jesus College, Cambridge, a few months after Wordsworth had taken his B.A. degree, and left the university. During his first year at college he did good work in classics, and became one of four selected candidates for the Craven scholarship in 1793; but his bent not being mathematical, and having little chance of winning the chancellor's medal, he gave himself up to general literature. He also became interested in politics, took a strong position on the Liberal side, and won distinction, even thus early, as a marvellous talker. He got into difficulties in Cambridge, through extravagance in furnishing his rooms, became depressed, and in a panic fled to London, where he enlisted in the 15th Dragoons, under the name of Silas Tomkyn Comberbacke (a name assumed to conceal and yet reveal his identity as S. T. C.). He never could learn, however, how to manage a horse, never rose out of the awkward squad; and a chance accident disclosing his knowledge of classics, led to his discovery by his friends, and to his being bought out of the service. At the close of the summer term, he went on a visit to Oxford; and there, at Balliol College, he for the first time met Southey. In July he took a pedestrian tour in North Wales, after which he went to Bristol, and there again met both with Southey and with Robert Lovell, the latter of whom had just married a Miss Fricker, to whose sister (Edith) Southey had engaged himself. Coleridge at once followed his example, and became engaged to another sister (Sara); and amongst them they formed the Quixotic plan of emigration to the banks of the Susquehanna in America, where they were to form a 'Pantisocracy'—an ideal community on the principles of Communism. Two hours of daily labour were to suffice for providing the necessities of life, the rest of their time being devoted to intellectual work and social converse. They were to have all things in common; and, as a result of the experiment, were to bring in a golden age, for themselves and others. It was a dream; and it passed, as dreams do.

Coleridge had left Cambridge without taking a degree. In the late autumn of 1794 he went up to London, and there renewed his acquaintance with Lamb. But in December he was brought back to Bristol by Southey, who feared he might come under some new fascination in the metropolis. He had to find the means of livelihood, not on the Susquehanna, but in the west of England; and

he began a course of miscellaneous lecturing on literary and political subjects. It was now that he made the acquaintance of Joseph Cottle, the Bristol bookseller, who became so kind a friend. Cottle offered to publish a volume of poems for him, giving him thirty guineas for the copyright; and, vexed at his delay in completing the volume, subsequently offered him a guinea for every hundred lines of verse he would write, after this first volume was printed. With this promise, and what he thought provision for life, he ventured to marry; and in October 1795 Sara Fricker became Mrs Coleridge. They went at once to a small cottage, which is still to be seen at Clevedon in Somerset. Here, however, Coleridge did not long remain. We find him in Bristol in December getting his first volume of poems ready for the press (it was published in April 1796), and at the same time attempting to start a weekly journal to be called the *Watchman*, which was to contain general news, parliamentary reports, literary intelligence, and reviews. In his efforts to float this journal he went north to Birmingham, Manchester, Sheffield, &c., to procure subscribers. He succeeded in starting it, Cottle being the publisher; but it only reached its tenth number, and failed—the generous publisher bearing all the loss. Coleridge next tried the experiment of preaching in the Unitarian chapels around Bristol. Cottle gives an account of his appearance in one of these at Bath on a Sunday, 'in blue coat and white waistcoat,' to discourse on the corn laws and the powder tax. This eccentricity did not last. Another friend, and a somewhat remarkable man—Thomas Poole of Nether Stowey—provided him with a small house and garden in the village of Stowey; and there Coleridge went to live, in January 1797, with his wife and child (whom he had named Hartley, from his admiration for the philosophy of David Hartley). Poole also very generously raised a sum of money to provide an annuity for his friend.

Before this date Coleridge had made the acquaintance of Wordsworth. In the early spring of 1796 Wordsworth went up to Bristol from Racedown in Dorsetshire, to see both Coleridge and Southey; and, in a list of authors with whom he was acquainted, drawn up by Coleridge in March of that year, Wordsworth's name occurs. In the following year Coleridge went down from Stowey to Racedown to return the visit. As late as 1845 Mrs Wordsworth gave a graphic account to Sara Coleridge of her father's 'leaping over a gate, and bounding down a pathless field' on this first visit to Racedown. In July 1797 the Wordsworths moved from Racedown to Alfoxden, partly to be nearer Coleridge; and during that winter—which William and Dorothy Wordsworth spent in Somerset—Coleridge was their almost daily companion, roaming the woods and coombs of the Quantocks with them, or spending the night at Alfoxden. Wordsworth and he discussed together the principles of poetry, and planned a joint volume of verse to illustrate these principles; Wordsworth undertaking to invest commonplace themes with an imaginative interest, by disclosing what underlay them; and Coleridge taking supernatural or romantic incidents, humanising the stories so as to give new life to them. This was the origin of the *Lyrical Ballads*, the little volume which more than any other marked a new departure in poetical literature at the beginning of the 19th century. To it Coleridge contributed the *Ancient Mariner*. The book was published in 1798.

This meeting of Coleridge and Wordsworth was one of the most remarkable conjunctions of genius in the literary history of England, and the days they spent together in Somerset were perhaps the

most joyous in their lives. While living at Nether Stowey, Coleridge kept up the practice of occasional preaching; and 'to prevent the necessity of his going into the ministry,' another admiring friend, Josiah Wedgwood, sent him a draft for £100. He returned it to the donor; but, soon afterwards, Coleridge accepted an annuity of £150 from the brothers Wedgwood, given to him on the condition that he would devote his life wholly to poetry and philosophy. In 1798 he started with the Wordsworths for Germany, crossing from Yarmouth to Hamburg; and while Wordsworth went to Goslar, Coleridge proceeded to Ratzeburg, to study the language and literature of the country. He moved on to Gottingen in January 1799. An interesting picture of his life in Germany is given in Satyrane's Letters. He returned to England in June; in August we find him at Stowey; and in September in Yorkshire with the Wordsworths. They had some idea of settling together, to renew the fellowship of the Quantock days. On the approach of winter, however, Coleridge went up to London, and there translated *Wallenstein*, one of the best bits of work he ever did. He now made fresh attempts at journalism, and wrote both prose and verse for the *Morning Post*; but, while some of his articles were admirable, he was such an irregular contributor, that his connection with the *Post* lasted only for a few months. In July he went north to Keswick, and took up his residence at Greta Hall, which Southey also made his home in 1803. At Keswick he continued his poetic work, and wrote the second part of *Christabel*. The Wordsworths had now been settled for some time at Dove Cottage, Grasmere, and there Coleridge was their frequent guest. Dorothy Wordsworth's Grasmere journal (ed. Knight, 1897) is full of allusions to his visits, and to the wonderful friendship of these days—a friendship immortalised in her brother's *Stanzas written in a pocket copy of Thomson's Castle of Indolence*. But during the years he spent at Keswick, Coleridge came under the influence of what was henceforward to be the very curse of his life. His health had never been robust; rheumatism and neuralgia had tortured him; and, becoming his own doctor, he had recourse to the anodyne of opium. Little by little the habit grew, and the 'Kendal black drop' at length enslaved him. It injured his constitution and killed his imagination; it enfeebled his will and destroyed his sense of truth and honour. Few things in literature are so pathetic as his own lament over the deterioration of his nature, in his *Dejection, an Ode*. The details of this malady, and what it led to, have not yet been fully told.

Charles Lamb came to visit him at Keswick in 1802. In 1803 he started with the Wordsworths, on their memorable Scottish tour; but left them in a fortnight, and did wonderful feats of walking alone. He now thought of many plans for the recovery of health, which were really but plans to flee from his own shadow. The frugal Wordsworth forced him to accept a loan of £100. He was befriended by others, and he sailed for Malta in April 1804. There he became secretary to the governor, Sir Alexander Ball, an office for which he was entirely unsuited. His letters from abroad were hypochondriacal, valetudinarian, and sad in many ways. From Malta he went to Sicily, to Naples, and to Rome; but he had to leave Italy with some abruptness, an order, it is said, having been issued by Napoleon for his arrest, on the ground of some republican utterances years before; and the vessel in which he sailed being chased by a French cruiser, he threw all his papers (which included many of Wordsworth's poems) overboard. In August 1806 he returned to England. It is unnecessary to trace his subsequent wanderings to and fro, from

London to Keswick, to Penrith, to Coleorton, to Bristol, and to Bridgwater. At London he began what might have been a very remarkable series of lectures at the Royal Institution; but the experiment failed, for the same cause as previous ones had failed. He next thought of a fresh venture in journalism, and projected a new weekly paper, *The Friend*, for which he got a number of subscribers. It was printed at Penrith at his own expense. The Wordsworths took him into their house at Allan Bank, Grasmere, for the winter; and while Coleridge wrote most of the papers for *The Friend* himself, Wordsworth supplied him with some of the articles, and Sarah Hutchinson transcribed them week by week for the press. The paper lived from August 1809 to March 1810. The habit of opium-eating, which had now obtained a fatal ascendancy, could not be hidden from his friends; and at this juncture the Wordsworths, with the greatest delicacy, tried their utmost to help and to befriend him. They were misunderstood. He went up to London in 1810, and a strange cloud (the full story of which has yet to be told) obscured for a time the old relationship between the households. A partial estrangement lasted for some years, but was at length overcome by the friendly offices of Henry Crabb Robinson.

During Coleridge's later years in London he lived for four years with an old Bristol friend, John Morgan, at Hammersmith. He first tried the experiment of lecturing on Shakespeare. Occasionally his appearances were brilliant; more usually they were absolute failures. His conversational powers, however, seem to have increased, while his success as a lecturer diminished. All his life he had been in the habit of receiving gifts freely from such friends as the Beaumonts, and the Wedgwoods, from Stuart, and Wordsworth, and De Quincey; and though he occasionally did generous things to others, his neglect of the primal duties to his own family put a severe strain upon the tie that bound these friends to him.

The remaining years of his life were spent at Highgate with Mr and Mrs Gillman, whose kindness and consideration were unbounded. Though a wreck of his former self, the baleful opium-habit lessened, as Coleridge grew older, and he was able to do a good deal of miscellaneous writing. Some of his best prose work was written at Highgate. Though a dreamy and often unintelligible sage, he became a sort of oracle to a circle of enthusiastic admirers that gathered round him, and he completely fascinated the young men, who made their weekly pilgrimages to Gillman's house to hear him talk. As the years went on, his health somewhat improved, and he was even able to make occasional visits. In 1829 he took a short tour with the Wordsworths, accompanying the poet and his daughter to the Rhine. He died on the 23d July 1834, and was buried at Highgate.

As a Poet, Critic, and Philosopher (the three functions having been combined by Coleridge as they had never been by any previous Englishman) he was certainly a star of the first magnitude in the firmament of letters. For originality, insight, grace, musicalness, deft subtlety of thought, naturalness and charm of diction, he had only one rival amongst the poets of the Renaissance. It is true there have been greater poets in England, but there has been no greater poetical critic in British literature. Coleridge was a critic of poets (and the poets have, as a rule, been the best critics of each other). As yet there is no estimate of the literary revival which Coleridge and Wordsworth inaugurated that is superior to what the former wrote in his *Biographia Literaria*; and he was a philosophical critic, because he was a philosopher amongst the poets. He may be said to have inaugurated a new

era by his poetic idealism, and by introducing the spirit of Plato alike into his poetry and his literary criticism. As a philosopher, however, he does not occupy the foremost place. He was too miscellaneous, too assimilative, and his intellect too meteoric and vagrant for speculative originality of the highest order. But he was one of the most suggestive of critics. Though not profoundly learned, he was very widely read; and he did more to leaven English philosophy, literature, and theology with the depth and the free spirit of Germany, than any one of his contemporaries. He vitalised whatever he discussed; and his writings will probably continue to kindle successive generations, and to fascinate them, even while they fail to convince.

Coleridge's chief works are: *Poems* (1796); *Wallenstein* (1800); *The Friend* (1809-10); *Remorse* (1813); *Christabel*, *Kubla Khan*, &c. (1816); *The Statesman's Manual* (1816); *Sibylline Leaves* (1817); *Biographia Literaria* (1817); *Aids to Reflection* (1825). Posthumously published—*Literary Remains* (4 vols. 1836-38); *Confessions of an Enquiring Spirit* (1840); *Essay on Method* (1845).

The main authorities are *Letters, Conversations, and Recollections*, by Allsop (1836); *Cottle's Early Recollections* (1837); *Gillman's Life* (1838); *Coleridge's Letters to Sir George and Lady Beaumont* (1886); *Mrs Sandford's Thomas Poole and his Friends* (1889); the *Biographia Literaria* (1817); *De Quincey's Recollections of the Lakes* (1857); *Eliza Meteyard's Group of Englishmen, 1796-1815* (1871); the *Memoirs of Wordsworth* (1851); *Southey's Life and Correspondence* (1850); *Lamb's Letters*; *Brandl's S. T. Coleridge and the English Romantic School* (1882); the short *Lives by Traill* (1884) and *Hall Caine* (1887); the *Life by Dykes Campbell*, prefixed to his admirable edition of the poetical works, and separately published (1893, 1894); the *Letters* (1895) and *The Complete Poetical Works* (2 vols. 1912), edited by Ernest Hartley Coleridge; *Lord Coleridge's Story of a Devonshire House* (1905); and *H. Fanson Fausset, Samuel Taylor Coleridge* (1926).

**Coleridge, SARA**, the gifted daughter of the great Coleridge, was born, 23d December 1802, at Greta Hall, Keswick, where she was brought up by Southey. Her 'depth of meditative eye' is noticed by Wordsworth in his (rather poor) *Triad* (1828). Sara early showed remarkable powers of mind, with all her father's leaning towards psychology and abstract thought. At twenty she published, to aid her brother Derwent's college expenses, a translation of Martin Dobrizhofer's Latin *Account of the Abipones* (1784), and three years later the 'Loyal Servitor's' memoirs of the Chevalier Bayard. In 1829 she married her cousin, Henry Nelson Coleridge, and on his death in 1843 succeeded him in the task of annotating and editing her father's writings. Her health failed early, and she died 3d May 1852. Her own works were *Pretty Lessons for Good Children* (1834), and *Phantasmion* (1837), a somewhat remarkable fairy-tale. Her *Memoirs and Letters* were edited by her daughter in 1873.—Her son, HERBERT COLERIDGE, born in 1830, was educated at Eton and Balliol College, took a double-first in 1852, and was called to the bar, but devoted himself to the study of comparative philology. He was editor of the *Philological Society's New English Dictionary* in its earlier stages. His own works were a *Glossarial Index to the Printed English Literature of the Thirteenth Century* (1859), and an essay on King Arthur, printed after his death (23d April 1861) by the Philological Society.

**Coleridge-Taylor, SAMUEL** (1875-1912), composer, born in London, the son of a West African and an Englishwoman, studied under Stanford at the Royal College of Music. His compositions include *Hiawatha* (1898-1900) and other cantatas (*The Blind Girl of Castel Cuille*, *Meg Blane*, *The Atonement*), orchestral and pianoforte works, and a violin concerto. See his *Life and Letters* by Sayers (1915).

**Coleroon**, the largest and most northerly branch from the Kaveri, flows, chiefly between Trichinopoly and Tanjore, into the Bay of Bengal.

**Coles**, COWPER PHIPPS, naval architect, born in Hampshire in 1819, early entered the navy, and became captain in 1856. In 1855 he constructed a gun-raft, which was favourably reported on; from 1856 he was engaged in experiments, and ultimately produced a form of turret-ship, the general idea of which had probably occurred to him independently, although its development owed much to Ericsson (q.v.). The *Captain*, built from his designs, turned bottom upwards in a gale, and sank off Cape Finisterre on 7th September 1870, almost all on board, including Coles, being drowned.

**Coleseed**. See RAPE.

**Coleshill**, a market-town of Warwickshire, 10 miles ENE. of Birmingham.

**Colet**, JOHN, born in London about 1467, was the eldest son of a family of twenty-two. His father, Sir Henry Colet, was twice Lord Mayor of London. Colet studied at Oxford with the view of entering the church, and about 1493 made a prolonged visit to the Continent, travelling through France into Italy. While in Italy he became acquainted with the views of Savonarola, which subsequent study and experience led him to regard with increasing approval. Having returned to England in 1496, and been ordained priest, he delivered at Oxford a series of lectures on the Epistles of St Paul, which attracted great attention, his principles of interpretation being at every point opposed to those of the scholastic theologians. In 1498 Erasmus came to Oxford, and it is one of Colet's chief claims to remembrance that he powerfully influenced that scholar's opinions on the proper methods of Scripture interpretation and on the value of the scholastic philosophy. In 1505 Colet was made Dean of St Paul's, London, and in this office still continued to deliver lectures on different books of Scripture, which gave rise to much diversity of opinion. With the large fortune he inherited on the death of his father, Colet founded St Paul's School (q.v.). At this school 153 scholars were received, whose education was conducted in a spirit far in advance of the time. On account of Colet's vigorous denunciation of the ignorance and corruption of the clergy, charges of heresy were brought against him, but Archbishop Warham refused to support them. Colet also spoke out strongly against the French wars of Henry VIII., who, nevertheless, always treated him with regard. In 1518, feeling his end approaching, Colet appointed the Mercers' Company of London as managers of his school—a step of decisive importance, as it was the first example of lay management of an educational institution. He died of dropsy, 16th September 1519.

Of late years it has been conclusively shown that Colet was one of the most striking figures of his time in England. He was not a great scholar, and he left no writings that entitle him to remembrance; but by his clear view of the urgent need of reform in the church, and by the intensity of his religious convictions, he gave an impulse to men like Sir Thomas More and Erasmus, which influenced their whole life-work. At the same time, Colet, though an ardent religious reformer, never entertained the thought of a formal rupture with Rome. His foundation of St Paul's School, and the character he gave to that institution, entitles him to an eminent place among educational reformers. See Seebohm's *Oxford Reformers* (2d ed. 1869), and the Rev. J. H. Lupton's *Life of Colet* (1887; new ed. 1909).

**Colewort**. See CABBAGE.

**Colfax**, SCHUYLER, American statesman, born at New York, 23d March 1823, removed in 1836 to

Indiana, where in 1845 he acquired a newspaper at South Bend, which he made the most influential Whig journal in the district. He was a delegate to the Whig conventions of 1848 and 1852; he was returned to congress in 1854 by the newly-formed Republican party, and re-elected until 1869, being thrice chosen Speaker; and in 1868 he was elected vice-president of the United States, in Grant's first term. Implicated, apparently unjustly, in the Crédit Mobilier charges of 1873, he spent the remainder of his life in political retirement, making public appearances only on the lecture platform, and died at Mankato, in Minnesota, 13th January 1885. See his *Life* by O. J. Hollister (New York, 1886).

**Colgate University**. See HAMILTON (N. Y.).

**Colic** (Gr. *kolon*, 'the large intestine'; see INTESTINES), a name employed by the later Greek and the Roman physicians to denote diseases attended with severe pain and flatulent distension of the abdomen, without diarrhoea or looseness of the bowels. The disease (commonly called *gripes* or *belly-ache*) is now generally believed to be spasmodic in character, and to be dependent upon irregular contractions of the muscular coat of the intestines—its supposed particular connection with the colon, or large intestine, however, is not usually to be made out from the symptoms. Painful disorders of the bowels are very frequent in persons who are not attentive to the regular evacuations, especially when they are exposed to cold so as to experience chill or coldness of the feet, which will often suffice to bring on an attack of colic. The disease is usually attended with Constipation (q.v.), and ceases when the regular action of the bowels is restored, although often in this case the operation of medicine is attended by continued pain for a time. Warm fomentations, or other warm applications such as a hot water rubber bag, to the abdomen may usefully be employed, and great relief is sometimes experienced from friction with a warm liniment, such as opodeldoc, or the soap and opium liniment. Pressure with the hand over the painful part commonly diminishes the suffering for the time in simple colic, but increases it in more serious diseases. Warmth to the feet, and the recumbent posture, are also to be recommended. In very severe or protracted cases opium may be taken internally. A good remedy in such cases is a full dose of castor-oil (one ounce or more for an adult), with 10 or 15 drops of laudanum, or of solution of morphia. (Opiates should not be given to children except under medical advice, and in very reduced doses.) When colic resists such mild and simple remedies as the above—when it is accompanied by tenderness of the belly, or by hard swelling in any part of it—when constipation is obstinate, or vomiting is present—when there is feverishness, or tendency to exhaustion—or when there is reason to believe that it may depend on any other cause than the mere accumulation of the products of digestion in the intestines, no time should be lost in seeking the best medical assistance that can be procured; for colic is closely allied as a symptom to several very severe and dangerous diseases, e.g. appendicitis. Some of the severer forms also demand special, often surgical, treatment at the earliest available opportunity—for example, colic due to obstruction of the bowels, whether caused by a twist, an old adhesion, or a hernia that has become strangulated. Colic pains are also present in peritonitis (see PERITONEUM), another most dangerous form of disease; and form one marked symptom of the slow poisoning by lead, occasionally observed as the consequence of contamination of drinking water by leaden cisterns, &c. In this form the treatment is different

from that of simple colic, and will be treated of under LEAD-POISONING.

Two other forms of colic should also be mentioned, *renal colic* and *biliary colic*. The former is due to the passage down towards the urinary bladder of a stone formed in the kidney, and the latter is caused by the presence of a gall-stone in the bile ducts (see CALCULUS).

Colic is also a disease of the lower animals, especially of high-bred horses.

**Coligny**, GASPARD DE, one of the greatest Frenchmen of the 16th century, was born at Châtillon-sur-Loing, February 16, 1519. At the age of twenty-two he began his career as a soldier, and greatly distinguished himself in the wars which Francis I. and Henry II. carried on against Spain. By Henry II. he was appointed colonel-general of the French infantry, and the severe system of discipline he introduced gave a new character to the art of war in the 16th century. In 1552 he was made admiral of France, though he never commanded on the sea. By holding the town of St Quentin (1557) with a handful of men for seventeen days against the army of Spain, he was the means of saving his country. It was during his imprisonment, after the capture of this town, that he embraced the views of the Huguenots, to the furtherance of which the rest of his life was consecrated. On the accession of Francis II. in 1559, the Guises became all-powerful, and their interest and fanaticism led them to oppose all toleration of the Huguenots. To obtain this toleration, however, was Coligny's great aim, and by his high character and his abilities as a statesman and general, he succeeded in conjunction with the heads of the Bourbon family in effecting the treaty known as the 'Pacification of Amboise' (1563), by which the Huguenots were allowed freedom of worship. This concession having been gradually withdrawn by the queen-mother, Catharine de' Medici, the second Huguenot war broke out in 1567, when, on the death of the Prince of Condé, Coligny was appointed generalissimo of the forces of Henry of Navarre, afterwards Henry IV. of France. Both parties having grown weary of the war, peace was concluded in 1570 on the basis of the treaty of Amboise, mainly through Coligny's energy. Catharine de' Medici, however, again becoming alarmed at the growing power of the Huguenots, and especially at the ascendancy of Coligny over the young king, Charles IX., determined by one desperate stroke to regain her power. In 1572, a numerous body of the Huguenot nobles having been drawn to Paris by the marriage of Henry of Navarre with Margaret, the sister of the king, the massacre of St Bartholomew took place, when Coligny (wounded by a shot two days before) was murdered in his bed, and his body thrown into the street by Henry of Guise and his followers.

In his personal character Coligny was one of the noblest Frenchmen of his time. His religious zeal was purely disinterested, and he had deeply at heart the welfare of his country. His great aim was to make the Huguenots a national party, and by their enthusiasm to defeat the schemes of Spain, who he saw was bent on supremacy in western Europe. Had he lived a few years longer the history of French Protestantism would have been different. Coligny's wide views are further seen in his unsuccessful attempts to found Protestant colonies in Brazil and North America. See his *Life* by Blackburn (2 vols. Phila. 1869), Bersier (Eng. trans. 1884), Delaborde (3 vols. Paris, 1880), Marks (Stuttg. 1892), and Whitehead (1904).

**Colima**, a Mexican state on the Pacific coast, with an area of 2300 sq. m. and a population of 80,000. The soil is very fertile, the climate warm ;

large quantities of coffee, sugar, rice, tobacco, maize, and cotton are grown. The capital, Colima, 1650 feet above the sea, about 40 miles ENE of Manzanillo, is regularly built, with narrow streets ; it has several large cotton-factories, and is the commercial centre of the state. Pop. 25,000. Beyond the state frontier, 35 miles NE. of the capital, rises the volcano of Colima (12,750 feet).

**Colin**, or VIRGINIAN QUAIL. See QUAIL.

**Coliseum**. See AMPHITHEATRE.

**Colkitto**. See MONTROSE (MARQUIS OF).

**Coll**, one of the Argyllshire Hebrides, 16 miles W. of Tobermory in Mull. It is 13 miles long, 1 to 3½ broad, and 30 sq. m. in area. It nowhere exceeds 326 feet in height ; gneiss is the predominant rock ; and more than a third of the surface is cultivated or in pasture. Pop. 400.

**Collapse**. See SHOCK.

**Collar-bone**, or CLAVICLE (q.v.), is in man, as in most mammals, the only bone directly connecting the upper extremity with the skeleton of the trunk. It is consequently very often broken, more often than any other bone except perhaps the radius. Under proper treatment, in children sometimes even without treatment, it readily reunites without any impairment of the usefulness of the limb. But it is very difficult to maintain such exact adjustment that no irregularity of the surface of the bone will remain ; and as it lies close under the skin, the resulting deformity is often visible.

**Collateral**. See CONSANGUINITY, SUCCESSION. Collateral Security is an additional and separate security for the performance of an obligation.

**Collation**. See BENEFICE.

**Coltè**, a town of Italy, on the Elsa, 24 miles SSW. of Florence. It has an old cathedral and castle. Pop. 2000.

**Collect**, a short form of prayer, peculiar to the liturgies of the Western Church. It consists of a single sentence, conveying one main petition, which is based on an attribute ascribed to God in the opening invocation, and closing with an ascription of praise or a pleading of the merits of Christ. Thus much for the structure of these prayers, which, whether in Latin or English, may be described, alike from their noble rhythmical harmony and from their pathos and devout simple earnestness, as models of liturgical petitions ; the etymology of their name is more difficult to determine, beyond the fact that it is from the Latin *colligere*, 'to collect.' According to some, the prayer was so called because, as in the English Prayer-book, it collects or condenses the teachings of the epistle and gospel for the day ; but this explanation applies only to the class of special collects. According to others, the term implies that the prayer collects and sums up all the previous petitions, or gathers and offers up in one comprehensive form all the spoken and unspoken petitions of the people. Both these derivations are open to serious objections, and neither has any historical basis ; the most probable view is that which traces the name to the *collecta*, or assembly of the people for divine service, at which certain prayers (*orationes ad collectam*) were said, distinct from the later prayers of the mass (*orationes ad missam*). Of the collects used in the liturgy of the Church of England, some, including most of those for saints' days—since the old collects were mainly prayers for the saints' intercession—were composed at the Reformation, or even later ; but most, taken from the old Roman Missal, are derived from the Sacramentaries of Popes Leo, Gelasius, and Gregory (5th and 6th centuries). The remoter source of the weekly

collects Freeman finds in the hymns of the Eastern Church, founded on the gospels, of which these collects would thus be the 'very quintessence.' In the English Prayer-book, for every Sunday there is a proper collect, with corresponding epistle and gospel; and this collect stands for every day in the following week, except in the case of festivals and their eves or vigils, which have collects of their own. Good Friday alone has three collects; and during Advent and Lent the collect for the first day of the season is repeated after the collect for the week.

**Collections at Churches.** The collections which are still made at all churches in Scotland—either at the church-doors before the service, or in the church after it—were, till a comparatively recent period, the principal fund for the support of the poor. The proceeds of these collections were originally under the control of the kirk-session, and remain so under certain restrictions. By a proclamation of the Privy-council in 1693, it was ordered that one-half of the sums so collected, and of dues received by the kirk-session, be paid over into the general fund for the support of the poor. The other half has generally been applied for the relief of sudden or temporary distress. The kirk-session may be called upon by any single heritor to account for its management of this remaining half. By the Poor-law Amendment Act, 1845, it is enacted that in all parishes in which it has been agreed that an assessment shall be levied for the relief of the poor, all moneys arising from the ordinary church collections shall in future belong to, and be at the disposal of, the kirk-session; provided, however, that they shall be applied to no purposes other than those to which they were, in whole or in part, legally applicable before the date of the act. A power is reserved to the heritors to examine the accounts of the kirk-session, and to inquire into the manner in which the collections are applied; and the session-clerk is enjoined to report annually as to the application of the moneys, to the Board of Supervision. The collections made at Dissenting meeting-houses, under which denomination Episcopal chapels are included, are entirely at the disposal of the congregations, and do not form part of the poor's funds. The making of a collection is properly the province of the minister and elders; but when they neglect the duty the heritors have been in use to perform it. See Black's *Parochial Ecclesiastical Law of Scotland* (1888), p. 145.

In England there are no regular collections at churches as in Scotland. The alms collected in chapels, as well as in parish churches, during the reading of the offertory, are declared by the rubric to be at the disposal of the incumbent and churchwardens of the parish, and not of the minister or proprietor of the chapel. If the minister and churchwardens disagree as to the distribution of the alms, they shall be disposed of as the ordinary shall appoint.

**Collectivism** is a word of recent origin, intended to express the central idea in the economic theory of socialism, that industry should be carried on with a collective capital. It means that capital should not be owned and controlled by individuals, but by groups of associated workers, that it should be the joint property of the community or other form of social organisation. Its exact meaning depends very much on the form of socialism with which the principle is connected. See **SOCIALISM**.

**College** (Lat. *collegium*, 'a collection or assemblage'). In its Roman signification, a college signified any association of persons for a specific purpose, and was in many cases practically what we call a corporation. It required also to be incorporated by some sort of public authority, springing

either from the senate or the emperor. A college could not consist of fewer than three persons, according to the well-known maxim, 'three make a college' (Dig. 50, tit. 16, l. 85). Some of these colleges were for purely mercantile purposes, but there were others which had religious objects in view, such as the colleges of pontifices and augurs, &c., and some were political, as the colleges of the tribunes of the plebs. With us, a college is an incorporation, company, or society of persons joined together generally for literary or scientific purposes, and frequently possessing peculiar or exclusive privileges. See, for instance, **PHYSICIANS (COLLEGE OF)**, **SURGEONS (COLLEGE OF)**, **HERALD**. Very often in England a college is an endowed institution connected with a university, having for its object the promotion of learning. In this relation a college is a sub-corporation—i.e. a member of the body known as the university. For a more detailed account of college in this sense, see **UNIVERSITY**, **OXFORD**, **CAMBRIDGE**. In Scotland and in America the distinction between the college as the member and the university as the body has been lost sight of; and we consequently hear of colleges granting degrees, a function which in the English and in the original European view of the matter belonged exclusively to the university. Where there is but one college in a university, as is the case in Edinburgh University, the two bodies are of course identical. Trinity College, Dublin, is practically the university. The two colleges of Aberdeen were separate universities till 1860. University College is a very usual name for recently founded institutions for the higher learning in the United Kingdom. Some of the public schools are colleges, and many secondary schools are so called. Theological schools often bear this name, which is sometimes given to a hospital. In Germany there are no colleges in the English sense. In France the name of college is sometimes given to a school, corresponding, however, more to the *Gymnasium* (q.v.) of Germany than to the grammar-school of this country. For the *Collège de France*, see separate article. The principal colleges have articles under special heads; see **KING'S COLLEGE**, **QUEEN'S COLLEGE**, **NEWHAM COLLEGE**, &c.

**Collège de France**, originally a *Collège de Trois Langues* merely, founded by Francis I. in 1530, is now a very important educational institution, giving instruction over a very wide field of literature, history, and science. It is independent of the University of Paris, is directly under the Minister of Public Instruction, and is supported by the government. As in the Sorbonne (q.v.), the lectures are gratuitous, and for the most part are designed to attract auditors older than ordinary university students. The college comprises two faculties, one literary, one scientific; and each has about thirty professors. Amongst the professors have been some of the most distinguished scholars and scientists in France, such as Renan, Laboulaye, Darmesteter, Gaston Paris, Bédier, in the literary, Brown-Séquard, Janet, in the science division. Amongst the subjects discussed are political economy, Assyrian and Egyptian archaeology, Arabic, Slavonic literature, French literature; physiology, anatomy, and embryology.

**College of Arms.** See **HERALD**.

**College of Justice.** See **COURT OF SESSION**.

**Collegiate Churches**—so called from having a college or chapter, consisting of a dean or provost and canons, attached to them—date from the 9th century, when such foundations in large towns became frequent. They are under the jurisdiction of the bishop of the diocese in which they are situated, and he exercises visitatorial powers over them. There were about ninety collegiate churches

in England and Wales at the beginning of the 16th century, but nearly all of them were suppressed or dissolved in Edward VI.'s reign under the Acts of Henry VIII. which followed upon the dissolution of the monasteries, and granted the hospitals, chantries, and colleges to the crown. Those remaining in England are Westminster, Wind-or, Wolverhampton, Haytesbury, Middleham; also Brecon in Wales, and Galway in Ireland. Ripon, Manchester, and Southwell have been constituted the cathedrals of new dioceses. Some churches called collegiate (such as Beverley) have no chapters. In the Roman Catholic Church, no new collegiate church can be founded without the sanction of the pope, acting on the favourable report of the Congregation of the Council of Trent, that the necessary conditions have all been fulfilled, such as suitable population and locality, adequate buildings, sufficient endowments, and the assent of the diocesan bishop; while a priority of rank in their class is conceded to some such churches, distinguished by the title 'eminent' (*insignis*). The *History of Banffshire* (1886) contains a very full and interesting account of the collegiate church of Castle-Semple, founded in 1304.

**Collembola**, the name first given by Lord Avebury to a tribe of wingless insects, to which the *Podura* belongs (see *SPRING-TAILS*); though he and other entomologists question their claim to be called insects.

**Colley**, SIR GEORGE, major-general, was born in 1835, and in 1852 received an ensigncy in the 2d or Queen's Foot, whose headquarters, then in the eastern frontier of Cape Colony, he joined in 1854. He was a border magistrate in 1857-58, surveyed the Trans-kei country, and served with his regiment in China in 1860. He was then for some years major of brigade at Plymouth, and a professor at the Staff College. He ably managed the transport service in the Ashanti expedition, and in 1875 accompanied Sir Garnet Wolseley to Natal, where he was for some time colonial treasurer, and prepared a valuable report and map of the Transvaal and Swaziland. From 1876 to 1880, except for a short period of service as chief of Wolseley's staff in Zululand and the Transvaal, he was private secretary to Lord Lytton, then viceroy in India. Appointed governor and commander-in-chief of Natal in April 1880, he commanded his small force against the Boers at Laing's Nek and Ingogo, and fell, shot through the forehead at Majuba Hill, February 27, 1881. See *Life* by Sir W. Butler (1899).

**Collie**. The origin of the collie is somewhat obscure, but great antiquity is claimed for it. Buffon has gone so far as to call it the oldest known breed of dogs, an opinion not now generally entertained; though it is only reasonable to suppose that the ancients, after providing a dog for the chase, next turned their attention to obtaining a guardian for their flocks. For many years collies were confined to Scotland and the northern counties of England, until their good points as graceful and intelligent companions attracting more attention, they were taken south in large numbers, and became the most popular breed of the day. Thanks to judicious breeding and a large expenditure of money, the best show collies are now all found in England. Tempted by the demand for black-and-tan dogs, a cross with the Gordon setter was resorted to, producing many collies with the flat ears and open coat of the setter, a cross to be avoided at all costs. In judging the collie the fact should never be forgotten that it is meant to do work in all weathers, requiring the best of legs and feet, a close coat, and a strong active body capable of great speed; and that a long and beautiful coat, if unaccompanied by a thick under-coat,

is a hindrance, not a protection. The chief points of the collie are—head long and sharp, with bright, keen eyes, set rather close together, and a small ear drooping slightly at the tips; back strong and muscular; legs with plenty of bone and not too much feather, bare below the hocks; feet round and cat-like. The collie should have a short dense under-coat fitted to withstand the severest wet or cold, with a long and beautiful outer-coat springing from it; round the neck this coat develops into a 'ruff' or 'frill' which sticks out in front and on each side to a great length, adding largely to the dog's beauty. Many anecdotes are told of the collie, who from his intimate association with man has acquired almost human intelligence, a good dog being able to separate the sheep under his care from those of other flocks. The collie often deteriorates in intelligence when kept merely as a companion; he is apt to get cross-tempered, a fact which the shepherd does not consider a fault, as it prevents strangers interfering with the sheep. But when not spoilt no dog makes such an agreeable companion as the collie, as his instinct is to attach himself to one person to whom he becomes devoted.

**Collier**, ARTHUR, metaphysician, the son of a clergyman, was born in 1680 at Steeple Langford, Wiltshire, studied at Oxford, and became rector of the family living at Langford in 1704, remaining there till his death in 1732. At Balliol College, Collier had devoted himself to the study of Descartes and Malebranche; and his notable book, *Charis Universalis, or a New Inquiry after Truth, being a Demonstration of the Non-Existence and Impossibility of the External World* (which, though published in 1713, was written ten years before), coincides in a remarkable way with Berkeley's *Theory of Vision* (published 1709). He was a High-Churchman, and wrote also *A Specimen of True Philosophy* (1730) and a *Logology* (1732).

**Collier**, JEREMY, nonjuror and purifier of the English stage, was born at Stow cum Quay, in Cambridgeshire, 23d September 1650. His father was a clerical schoolmaster at Ipswich, and here and at Caius College, Cambridge, he was educated, graduating B.A. in 1672. For six years he was rector of Ampton, near Bury St Edmunds, and for some years before the Revolution he was lecturer at Gray's Inn. His reply to Dr Gilbert Burnet's *Inquiry into the State of Affairs* (1688) cost him some months' imprisonment in Newgate. He next waged warfare on the crown with a succession of incisive pamphlets, carrying his refusal to recognise the authority of the government so far as hardly to be persuaded by his friends to let them bail him out of prison when arrested in 1692 on suspicion of being involved in a treasonable plot. In 1696, along with two other clergymen, he outraged public feeling by solemnly pronouncing absolution, without any public confession, on the scaffold at Tyburn upon the heads of Friend and Parkyns just before their execution for a plot to murder the king. For this gross and public offence he was obliged to go into hiding, but though he was formally outlawed, no attempt was made to punish him. In 1697 he published his famous *Short View of the Immorality and Profaneness of the English Stage*, which fell like a thunderbolt among the wits. The boldness of the onslaught can only be understood by remembering the greatness of the odds and the might of his antagonists. 'It is inspiring,' says Macaulay, 'to see how gallantly the solitary outlaw advances to attack enemies, formidable separately, and, it might have been thought, irresistible when combined, distributes his swashing blows right and left among Wycherley, Congreve, and Vanbrugh,

treads the wretched D'Urfey down in the dirt beneath his feet, and strikes with all his strength full at the towering crest of Dryden.' Collier's argument carried the country with it, and brought back the English drama to good morals and good sense. That excessive stage-profligacy which was a mere reaction against the rigidity of Puritanism, and had far outrun the parallel laxity of contemporary social morals, at once disappeared, and the theatre in England again became a mirror in which nature and truth were reflected without distortion. But it was not without a struggle that the wits consented to be worsted. Congreve and Vanbrugh, with many of the smaller fry, answered angrily but weakly, and were crushed anew by the redoubtable nonjuror, who was 'complete master of the rhetoric of honest indignation.' 'Contest,' says Dr Johnson, 'was his delight; he was not to be frightened from his purpose or his prey.' The great Dryden stood apart at first, but at length in the preface to his *Fables* (1700) acknowledged with a noble honesty that he had been justly reprov'd. 'I shall say the less of Mr Collier,' he says, 'because in many things he has taxed me justly; and I have pleaded guilty to all thoughts and expressions of mine which can be truly argued of obscenity, profaneness, or immorality, and retract them. If he be my enemy, let him triumph; if he be my friend, as I have given him no personal occasion to be otherwise, he will be glad of my repentance. It becomes me not to draw my pen in the defence of a bad cause, when I have so often drawn it for a good one.' But Dryden complained, and fairly, that his antagonist had often perverted his meaning, that he was 'too much given to horse-play in his railery, and came to battle like a dictator from the plough.' Spite, however, of all its pedantry and overstatement of the case, and its faults of taste and of relative proportion in charges made with equal indignation, the *Short View* was a noble protest against evil, and was as effective as it deserved to be.

Collier continued to preach to a congregation of Nonjurors (q.v.), and was consecrated bishop in 1713. A great controversy soon rent the nonjuring community on the lawfulness of returning to certain 'usages' allowed in the communion-office of the first prayer-book of Edward VI., which Collier's party preferred to the revision of 1552. Collier at length pronounced these usages *essential*, and not unnaturally laid himself open to a charge of holding Romish views. He masqueraded as 'Jeremias, Primus Anglo-Britanniae Episcopus' in some abortive attempts to form a union with the Eastern Church. His last years were racked by the torments of the stone, from which he found relief in death, April 26, 1726. Of his forty-two books and pamphlets, those on the stage alone are still read. The fifth edition of his famous treatise (1730) contains all the successive pamphlets which fortified the first. His largest works were the *Great Historical, Geographical, Genealogical, and Poetical Dictionary* (4 vols. folio, 1701-21), and *An Ecclesiastical History of Great Britain . . . to the end of the Reign of Charles II.* (2 vols. folio, 1708-14; new ed. by T. Lathbury, with Life, 9 vols. 1852).

**Collier, JOHN**, known under the pseudonym of 'Tim Bobbin,' was the son of the curate of Stretford, near Manchester, and from 1739 to his death in 1786 was master of a school at Milnrow, near Rochdale. He early wrote verse and painted grotesque pictures; his rhyming satire, *The Blackbird*, appeared in 1739, and his *View of the Lancashire Dialect* (in humorous dialogue), his most notable production, in 1775. It has been often reprinted. Other works are *Truth in a Mask, The Fortune-teller, The Human Passions*. See *Life* by

Fishwick, prefixed to his works (Rochdale, 1895).

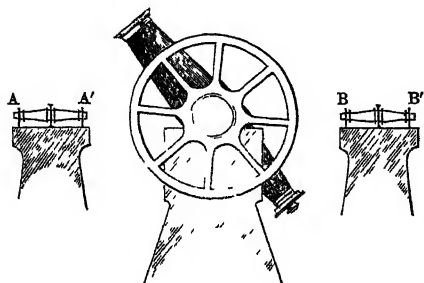
**Collier, HON. JOHN**, British painter, was born in London, 27th January 1830, the second son of the first Lord Monkswell. Educated at Eton and Heidelberg, and in art at Munich, Paris, and the Slade School, he first exhibited at the Royal Academy in 1874. As a painter of portraits, and of historical-dramatic and domestic-dramatic scenes and events, his work is excellent in composition, in colour scheme and execution, and in draughtsmanship; his historical paintings are noted for accuracy in archaeological detail. Among his best-known works are 'The Last Voyage of Henry Hudson' (1881, Chantrey Bequest), 'A Glass of Wine with Cæsar Borgia' (1893), 'Pope Urban VI.' (1896), 'The Cheat' (1905), 'Sentence of Death' (1908), 'A Fallen Idol' (1913), 'Clytemnestra' (1914). See W. H. Pollock, *The Art of the Hon. John Collier* (1914).

**Collier, JOHN PAYNE**, Shakespearian critic and commentator, was born in London, 11th January 1789, son of an unprosperous merchant who had succeeded as a reporter and journalist. His parents were friends of Lamb, Hazlitt, Coleridge, and Wordsworth. The boy passed some years at Leeds, and early began to write. Still a boy, he became parliamentary reporter for the *Times*, next for the *Morning Chronicle*, and wrote regularly for the latter down to 1847. His call to the bar was delayed till 1829, probably through the odium he incurred by a foolish volume of satirical verse. His real literary career commenced in 1820 with the publication of *The Poetical Decameron*. From 1825 to 1827 he issued a new edition of *Dodsley's Old Plays*, and in 1831 his best work, a *History of English Dramatic Poetry to the Time of Shakespeare, and Annals of the Stage to the Restoration*. This opened up to him the libraries of Lord Francis Gower, afterwards Lord Egerton and Earl of Ellesmere, and of the Duke of Devonshire, the latter appointing him his librarian. From 1835 to 1839 Collier published his *New Facts* regarding the life and works of Shakespeare, followed by an edition of Shakespeare (8 vols. 1842-44), and supplemented by *Shakespeare's Library* (2 vols. 1844), a reprint of the histories, novels, and early dramas on which Shakespeare founded his plays. He was one of the leading members of the Camden Society from its foundation in 1838, and he edited for its issues *Bale's Kynge Johan* (1838), the *Egerton Papers* (1840), and the *Trevelyan Papers* (1857 and 1863). He contributed ten publications (1840-44) to the Percy Society, and twenty-one (1841-51) to the Shakespeare Society, of which he was long director. In 1852 he announced his discovery of an extensive series of marginal annotations in a 17th-century hand on a copy of the second Shakespeare folio (1631-32) he had bought—the famous Perkins folio, so called from a name inscribed on the cover. Late in the same year he published these to the world as *Notes and Emendations to the Plays of Shakespeare*, and calmly lifted them into the text in his 1853 edition of Shakespeare, and again in his annotated six-volume Shakespeare in 1858. The emendations caused a great commotion in the literary world, and were furiously applauded or furiously assailed. The best Shakespearian students were more or less sceptical, but S. W. Singer and E. A. Brae were the first to express openly an unfavourable opinion. The latter also attacked Collier's alleged discovery of his suspiciously long-lost notes of Coleridge's lectures on Shakespeare and Milton, delivered in 1811. Collier, in the course of abortive proceedings for libel against Brae's publisher, swore to the truth of his statements respecting both the Perkins folio and his

Coleridge notes. Meantime he had been judicious enough to keep his folio from the eyes of experts, but at length in 1859, the Duke of Devonshire, to whose predecessor Collier had given it in 1853, sent it, at Sir F. Madden's request, to the British Museum for examination. The result was a conclusive proof, by Mr N. Hamilton in letters to the *Times*, and more completely in his *Inquiry* (1860), that the boasted 17th-century emendations were entirely recent fabrications. Still further forgeries were later brought to light in Mr Warner's Catalogue of MSS. at Dulwich College (1883), from which Collier had prepared three publications for the Shakespeare Society. Collier replied angrily in the *Times*, in his long *Reply* (1860), the disingenuousness of which injured his reputation as much as the facts of his antagonist. The controversy widened, but every competent writer concluded against Collier, the only question that remained uncertain being whether he himself was merely a dupe or more. Unhappily for the name of a sound scholar ruined by one fatal weakness, this too was answered by the discovery after his death of some manipulated books in his own library. In 1847 Collier was named secretary to the Royal Commission on the British Museum, and in 1850 he removed to Maidenhead, where he died 17th September 1883. He had enjoyed since October 1850 a civil list pension of £100. His later books were *A Booke of Roxburghe Ballads* (1847), *Extracts from the Registers of the Stationers' Company* (2 vols. 1848-49), *The Dramatic Works of Thomas Heywood* (1850-51), a good edition of Spenser (5 vols. 1862), a series of small reprints of rare 18th and 17th century pieces in prose and verse (1863-71), *Bibliographical and Critical Account of the Rarest Books in the English Language* (1865), and *An Old Man's Diary Forty Years Ago* (1871-72). See Dr Ingleby's *Complete View of the Shakspeare Controversy* (1861), which contains a bibliography of the books.

**Colliers and Salters.** See SLAVERY.

**Collimator**, a subsidiary telescope used to detect or correct errors in collimation (i.e. in directing the sight to a fixed object) when adjusting for transit observations. When the vertical thread in the field of view exactly coincides with the vertical axis of a telescope, the instrument is *collimated* vertically; and when the horizontal spider's thread just covers the horizontal axis, the instrument is correct in horizontal collimation. If



three solid piers stand on the meridian, so that the telescope to be tested can be laid between the collimators and have its axis coincident with both of theirs, the principle of correction becomes almost self-obvious. Removing the great telescope, the collimators (AA' and BB' in fig.) are adjusted till the cross-wires in one coincide perfectly with those of the other in all possible positions. Then replacing the 'transit circle,' it is examined and tested by reference, first to one, and then the other collimator, the verification requiring that it be

turned through 180° till the threads in the three fields of view absolutely coincide, and the collimation is pronounced perfect.

Practical astronomers set great value on the collimator (in the arrangement just described) for having entirely superseded the 'meridian mark.' By Rittenhouse's principle a telescope can become its own collimator, especially in determining the nadir point. When the axis is vertical over a vessel containing mercury, the telescope will be collimated when the cross-wires are brought to exact coincidence with their image seen in the mercury. See TELESCOPE.

**Collingwood**, a town of Ontario, on the south shore of Georgian Bay, where it connects the railways with the Huron lake steamers. It has several factories, ship-yards, and grain-elevators, and a considerable trade in lumber and grain. Population, 6000.

**Collingwood**, CUTHBERT, LORD, admiral, was born at Newcastle-upon-Tyne, 26th September 1750. Sent to sea as a volunteer at the age of eleven, his life thenceforth, with the exception of some half-dozen years, was spent wholly on board ship. From 1778 his career was closely connected with that of Nelson, whom he followed up the ladder of promotion step by step, until Nelson's death left the topmost round vacant for himself. Among the great naval victories in which Collingwood bore a prominent part, were those of Lord Howe off Brest in 1794; of Lord Jervis off Cape St Vincent in 1797; and of Trafalgar in 1805, where he held the second command. In the last-named engagement, his ship was, by Nelson's command, the first to break through the line of the combined French and Spanish fleets; and after Nelson had received his death-wound, he assumed the chief direction. A peerage was his reward for his gallant conduct in this battle. He died at sea, March 7, 1810, but was buried beside Nelson, in St Paul's. Collingwood was not the stuff great tacticians are made of, and his talents as a commander-in-chief were at best mediocre; but he was a brave and capable seaman, earnest and pious as a man, firm and mild as an officer, and admirable as a second in command. See his *Correspondence and Life*, by his son-in-law (1828), and shorter *Lives* of him by W. Davies (2d ed. 1878) and Clark Russell (1891).

**Collins**, ANTHONY, deist, was born 21st June 1676, at Heston, near Hounslow, in Middlesex, and was the son of a country gentleman. He studied at Eton and at King's College, Cambridge, and became the disciple and friend of John Locke. In 1707 he published his *Essay concerning the Use of Human Reason*; and in 1709, his *Priestcraft in Perfection*. The controversy excited by this last work induced Collins to write his *Historical and Critical Essay on the Thirty-nine Articles* (1724). He wrote a *Vindication of the Divine Attributes*, in reply to King, Archbishop of Dublin, who asserted the compatibility of Divine Predestination and Human Freedom. Collins was a philosophical Necessitarian, and afterwards advocated his opinions more fully in his *Philosophical Inquiry concerning Liberty and Necessity* (1715). In 1711 he visited Holland, where he made the friendship of Le Clerc and other eminent *littérati*. In 1713 he published his *Discourse on Free-thinking*, the best known, and the most important of all his works; to it Bentley made reply in his famous *Remarks*. In 1713 Collins made a second visit to Holland; and in 1718 he was made treasurer for the county of Essex. In 1724 appeared his *Grounds and Reasons of the Christian Religion*. The contention that no fair interpretation of the Old Testament prophecies will secure a correspondence

between them and their alleged fulfilment in the New Testament created a violent controversy, and called forth no fewer than thirty-five replies. Two years later he defended himself in his *Scheme of Literal Prophecy*, and in 1727 he published his last work, the *Scheme of Literal Prophecy Considered*. Collins died 13th December 1729.

**Collins, MICHAEL**, Sinn Féin leader, was born, the son of a farmer, at Woodfield, Clonakilty, County Cork, 16th October 1890. Educated at the local national school, he entered the Civil Service as a boy, and was for a time in the employ of the post-office in London, before becoming a bank-clerk there, and later an accountant. Leaving London in 1915 to join the Irish Republican Army, he fought in the Easter Rebellion of 1916, and was taken prisoner. After his release at the end of the year, he took part in every phase of the 'Irish War,' becoming head of the Irish Republican Army; as the most wanted man in Ireland, he made many miraculous escapes. Elected in 1918 to Dail Éireann as member for County Cork, he became later Minister of Finance, a position he held till his death. As a plenipotentiary, he did much to negotiate the Irish Free State Treaty of 1921, and subsequently in the face of powerful opposition strongly advocated its acceptance; but in the irregular warfare which followed, he was killed in an ambush between Bandon and Macroom, 23d August 1922.

**Collins, MORTIMER**, a versatile writer, was born, the son of a solicitor at Plymouth, 29th June 1827. He was educated at private schools, and held for some years a mathematical mastership in Guernsey, which he resigned in 1856 to devote himself entirely to literature. He settled at Knowl Hill in Berkshire, and kept up an incessant activity in the varied forms of articles on current politics, novels, and playful verses until his death, 28th July 1876. His physical was equal to his mental vigour; he was tall and remarkably strong, an athlete, a lover of dogs, flowers, and outdoor-life. His old-world Toryism and hatred of irreverence and irreligion, his humour, his wonderful facility in extemporising clever verse, his chess-playing, not to say his mathematics, endeared him to such friends as R. H. Horne, Frederick Locker, Edmund Yates, and R. D. Blackmore. One of his most popular books was *The Secret of Long Life* (1871), a collection of essays at first published anonymously. See his wife's account of his life (1877), and his *Select Poetical Works* (1886). His second wife, who died 17th March 1885, collaborated with him, and wrote alone *A Broken Lily* (1882).

**Collins, WILLIAM**, a distinguished English poet, was born at Chichester, 25th December 1721. His father was a hatter in that town, of which he was twice mayor. Collins received the rudiments of his education at the prebendal school of his native town. At the age of twelve he was sent to Winchester School, where he remained seven years. While there he wrote his *Oriental Eclogues*, which in his own day, and for a considerable period afterwards, were the most popular of his productions. He was himself convinced that this preference was misplaced, and the world has long since come round to his opinion. In 1741 he proceeded to Oxford, where he was distinguished by 'his genius and indolence.' Having taken the degree of Bachelor of Arts in 1743, he shortly afterwards left the university for reasons which are not accurately known. His private means being but slender, he obtained the title to a curacy, but was dissuaded from entering the church. As his only other alternative, he took up his residence in London, and sought to make a living by literature, a profession for which he was utterly unfitted by his desultory

ways and uncertain health. He now fell into what are vaguely described as 'irregular habits,' and was at times reduced to the greatest straits. On one occasion Dr Johnson rescued him from the hands of bailiffs by obtaining an advance from a bookseller on the promise of Collins to translate the *Poetics* of Aristotle. It was during this period, however, that he wrote his Odes, upon which his fame as a poet now rests. They attracted no notice at the time of their publication, and they were little valued even by such contemporaries as Gray and Dr Johnson. By the death of an uncle in 1749, Collins inherited the sum of £2000, which enabled him to retire to Chichester, and apparently to pursue a regular course of study. It was about this time that he met Home, the author of *Douglas*, to whom he addressed his *Ode on the Popular Superstitions of the Highlands of Scotland*, a poem in which, according to Russell Lowell, 'the whole Romantic School is foreshadowed.' The ode was first published in the *Transactions of the Royal Society of Edinburgh* (1788). Before 1753, Collins felt the approaches of the mental disease to which he finally succumbed, and sought relief in a visit to France. On his return he gradually became worse, and in 1753 his reason completely gave way. He lived for six years longer in this state, though with lucid intervals. He died on 12th June 1759, so unknown to fame that no newspaper or magazine of the day has any notice of his death.

Collins, like Gray, holds a middle position between the school of Pope and the school of Wordsworth. In his maturer work he is almost completely free from the so-called 'poetic diction' of the 18th century. He has not the passionate feeling for nature of later poets, but his feeling is at least real and not conventional. In respect of natural poetic gifts, Coleridge, Swinburne, and many of the best critics place him high above his contemporary, Gray. His choice of subjects, however, and his subtler modes of treatment, debar him from the popularity of the author of the *Elegy*. His most highly finished ode is that *To Evening*: the allegorical element in those on *The Passions*, *To Liberty*, *To Mercy*, and *To Pity*, serves not a little to remove them from direct human sympathy. But Collins shows both simplicity and pathos in his poem on the death of Thomson and in his lines beginning 'How sleep the brave.'

Editions of his poems have appeared in 1765, 1771, 1781, 1797 (Mrs Barbauld's), 1827 (Dyce's), 1858 (Aldine edition, with memoir by Mox Thomas), 1898 (with memoir by Bronson), 1917 (ed. Stone and Poole).

**Collins, WILLIAM, R.A.**, landscape and figure painter, was born in London, September 18, 1788, of a Wicklow family. In 1807 he entered the Royal Academy as a student, and in the same year he exhibited two small landscapes. In 1812 his 'Sale of the Pet Lamb' was sold for 140 guineas, and from this time his pictures became popular. He exhibited 169 works, of which the best known are the 'Blackberry Gatherers' and 'The Birdcatchers' (1814), which gained his associateship; 'Scene on the Coast of Norfolk' (1815), now at Windsor; 'The Fisherman's Departure' (1826), 'As Happy as a King' (1836), and 'Early Morning' (1846). Collins was elected R.A. in 1820. He studied and sketched in Italy in 1836-38, and in 1839 sent to the Academy several Italian subjects. Two pictures on sacred subjects (1840-41) were not particularly successful, and he wisely fell back on his green fields, his sea-beaches, his rustics, and his children at their games. A visit to the Shetland Islands in 1842 supplied materials for the illustrations of Scott's *Pirate*. Collins died in London, 17th February 1847. See his Life (1848) by his elder son, William Wilkie Collins (q.v.).—His second son, CHARLES ALLSTON COLLINS (1828-73), in early life painted

a number of pictures which are highly valued by collectors. In 1860 he married the younger daughter of Charles Dickens, and having already turned his attention to literature, produced *The Eye-witness* essays (1860), two novels, and other works, all exhibiting high promise.

**Collins, WILLIAM WILKIE**, novelist, elder son of William Collins, R.A., was born in London, 8th January 1824. He was educated partly at High-bury, but during 1836-39 was with his parents in Italy. After his return he spent four years in business, and then entered Lincoln's Inn; but gradually took to literature, the *Life of his father* (1848) being his earliest production. To it succeeded *Antonina, or the Fall of Rome* (1850); *Basil* (1852); *Hide and Seek* (1854); *The Dead Secret* (1857); *The Woman in White* (1860); *No Name* (1862); *Armada* (1866); *The Moonstone* (1868); *The New Magdalen* (1873), &c.—in all, fully a score of novels and collections of novelettes. Several of them originally appeared in *Household Words*, *All the Year Round*, the *Cornhill*, and other periodicals. The best is *The Woman in White*, whose 'Count Fosco' is really a creation, and in which the author's almost invariable method of unfolding an intricate plot by narratives of the chief *dramatis persone* had not grown hackneyed. *The Moonstone* also is a strong story. He died 23d September 1889. See Swinburne's *Studies in Prose and Poetry* (1894).

**Collinson, PETER**, botanist, was born at Hugal Hall, near Windemere, 14th January 1694, and became a manufacturer of hosiery. He was early distinguished as a naturalist, studied entomology and botany, and in 1745 communicated to Franklin his first intimation of the recent advance of electrical science in Europe. But it was as a botanist he was most distinguished. He introduced the culture of numerous European plants into the United States, and introduced American trees into England. He died 11th August 1768. A genus of labiate plants was named *Collinsonia* after him.

**Collisions.** See RAILWAYS, WRECK, RULE OF THE ROAD.

**Collodion** (Gr. *kollaō*, 'I stick') is a solution of Gun-cotton (q.v.) or pyroxylin. Cotton itself is not soluble in alcohol or ether, but when treated, either in the form of cotton-wool, rags, or paper, with a mixture of five parts of strong nitric acid, and six of sulphuric acid, it is found that it can now be dissolved in ether, or in a mixture of ether and alcohol. To this modification the name pyroxylin is applied. There are many varieties of collodion divisible into surgical or medicated collodions, and photographic collodions. When one part of pyroxylin is dissolved in thirty-six parts of ether and twelve parts of alcohol, a thickish liquid is obtained, which evaporates rapidly, leaving a thin film of pyroxylin. As an application to wounds, where it is desired to keep the edges close together, this form of collodion is of use, owing to the contractility of the pyroxylin film which it leaves, but for general purposes a flexible or flexible collodion, as it is called, is desirable. This is produced by the addition of a little Canada balsam and castor-oil to the ordinary variety. Flexible collodion is largely used as a covering for abraded surfaces, as a remedy for burns, for sore nipples, &c., and it is also the basis for many medicated collodions, such as styptic collodion, cantharidal or blistering collodion, &c. Salicylated collodion is well known as a popular corn cure, and it is certainly most effectual in removing hard or soft corns with but slight inconvenience. It contains, in addition to salicylic acid, the active principle, a little extract of Indian hemp, which prevents the slight pain, which might otherwise prove

troublesome. Collodion plays a very important part in Photography (q.v.).

**Colloid** is a name applied by Graham to any soluble substance which, when exposed to dialysis (see OSMOSE), does not pass through the porous membrane. Starch, gum, albumen, and gelatin are examples; and the name is used in contradistinction to *crystalloids*. See PHYSICAL CHEMISTRY.

**Collet d'Herbois, JEAN MARIE**, a French revolutionist of infamous notoriety, was born in Paris in 1751. Originally a provincial actor, he was attracted by the Revolution to Paris, where his impudence, his loud voice, and his *Almanach du Pere Gérard*, secured him the public ear and his election for Paris to the National Convention. In 1793 he became president of the Convention and a member of the murderous Committee of Public Safety. Sent by Robespierre to Lyons in November of the same year, he took bloody revenge by guillotine and grapeshot on the inhabitants for having once hissed him off the stage in the theatre. His popularity at length exciting the envy of Robespierre, Collet d'Herbois for his own safety joined in the successful plot for the overthrow of Robespierre, 1794; but the reaction that followed proved fatal to himself. He was expelled from the Convention, and banished to Cayenne, where he died, January 8, 1796.

**Collotype**, one of the modifications of the gelatine process in Illustration of Books (q.v.).

**Collusion**, a deceitful agreement between two or more persons to defraud or prejudice a third person, or for some improper purpose. The most common cases of collusion occur in arrangements between bankrupts and their creditors, such as payment by anticipation to a favoured creditor on the approach of bankruptcy, arrangements for granting preferences by circuitous transactions or otherwise. Transactions in which there is evidence of collusion are reducible at common law, and many of the same nature are struck at by the bankruptcy statutes. Collusion in judicial proceedings is an agreement between two persons that one should institute a suit against the other in order to obtain a judicial decision for some sinister purpose. The judgment so obtained is null. Collusion between petitioner and respondent in a suit for dissolution of marriage bars the suit.

**Collyrium** is a term for various kinds of eye-salve or eye-wash.

**Colman, GEORGE**, commonly called 'the Elder,' a dramatic author and theatrical manager, was born at Florence in 1732. In 1760 his first dramatic piece, entitled *Polly Honeycomb*, was produced at Drury Lane with great success. Next year he gave to the world his comedy of *The Jealous Wife*, and in conjunction with Garrick, he wrote *The Clandestine Marriage*, which was played at Drury Lane, 20th February 1766. In 1767 he became one of the purchasers of Covent Garden Theatre, and held the office of acting manager for seven years, after which period he sold his share. In 1777 he purchased the patent of the theatre in the Haymarket from Mr Foote. In 1785 he was attacked by paralysis, which caused a gradual decay of his mental powers, and he died in confinement on 14th August 1794. Colman was an industrious author; besides poetry and translations, he wrote and adapted upwards of thirty dramatic pieces.

**Colman, GEORGE**, 'the Younger,' son of the preceding, was born October 21, 1762. His bent lay in the same direction as his father's, during whose illness he acted as manager of the Haymarket Theatre; and on the death of the elder Colman, George III. transferred the patent to his

son. Colman held, till the time of his death, the office of Examiner of Plays, to which he was appointed on 19th January 1824, and in which he behaved with great arrogance. In industry he rivalled his father, and he received large sums for his dramatic writings, some of which continue in possession of the stage. He was twice married, and died on the 17th October 1836. In 1830 he published a very imperfect autobiography, which he named *Records of My Life*; but his most notorious work is the preface to his play of *The Iron Chest*, in which he furiously attacked John Kemble.

**Colman**, SAMUEL, American painter, born in Portland, Maine, in 1832, studied in Europe in 1860-62, was elected a member of the National Academy in 1862, and first president (1866-71) of the American Society of Painters in Water-colours. He has travelled extensively, and his pictures include scenes from Algeria, Germany, France, Italy, and Holland.

**Colmar**, or KOLMAR, the capital of the district of Upper Alsace, stands on a plain near the Vosges, 42 miles SSW. of Strasburg by rail. Among the principal public buildings of Colmar are the church of St Martin (1263), the Dominican convent of Unterlinden, now a museum, the college, court-house, and town-hall. Colmar is one of the chief seats of the cotton manufacture in Alsace. Other manufactures are paper, leather, ribbons, and hosiery. Colmar is an old place, having been raised to the rank of a free imperial city in 1226. It rapidly became one of the most prosperous towns in Upper Alsace. Fortified in 1552, its fortifications were razed in 1673 by Louis XIV. Pleasant boulevards now occupy their place. Colmar was formally ceded to France in 1697, recovered by Germany in 1871, ceded again 1919, and included in Haut Rhin. Pop. (1875) 23,778; (1921) 42,255.

**Colne**, a town in the east of Lancashire, on a high ridge near the source of the Calder, a western branch of the Ribble, 26 miles N. of Manchester by rail. It has manufactures of cotton calicoes and mousselines-de-laine; and it was formerly a seat of the woollen industry. Slate and lime abound in the vicinity. Many Roman coins have been found at Colne. With Nelson it is a parliamentary borough (1918). Pop. of municipal borough, 25,000.

**Colney Hatch**, a Middlesex village, 6½ miles N. of London, with a great lunatic asylum (1851).

**Colocasia**. See Cocco.

**Colocynth** (Gr. *kolokynthis*), a well-known medicine, much used as a purgative, is the dried and powdered pulp of the *Colocynth Gourd*, *Coloquintida*, *Bitter Apple*, or *Bitter Cucumber*, a globose fruit about the size of an orange, of a uniform yellow colour, with a smooth, thin, solid rind. The plant which produces it, *Citrullus* (or *Cucumis*) *Colocynthis*, is of the same genus as the water-melon. It is found very widely distributed over the Old World, growing in immense quantities on the sand hillocks of Egypt and Nubia. It is also common in India, Portugal, Spain, and Japan. It has long been known for its purgative properties, and as early as the 11th century was in use in Britain. The main supplies of the drug are from Smyrna, Mogador, Spain, and Syria. The fruit is gathered when it begins to turn yellow, peeled, and dried quickly either in a stove or in the sun. It is chiefly in the form of a dried extract that it is used in medicine. It owes its properties to a bitter amorphous glucoside, *Colocynthine*, which is more or less abundantly present in the fruits of many of the gourd family. It is a curious fact, but one to which there are many analogies, that the seeds of the colocynth plant, produced in the midst of its medicinal pulp, are perfectly bland, and they even form an important article of food in the north

of Africa.—The name False Colocynth is sometimes given to the Orange Gourd (*Cucurbita aurantia*), sometimes cultivated as an ornamental plant in our gardens, on account of its globose, deep-orange fruit. The pulp of the fruit possesses the properties of colocynth, but in a milder degree.

Colocynth is administered in the form of pills, in which the extract is associated with aloes, scammony, and in some cases with calomel or with extract of hyoscyamus. In small doses, the colocynth acts as a safe and useful purgative; and when accompanied by hyoscyamus, the latter prevents much of the pain and griping which are attendant on the use of colocynth by itself. In large doses, colocynth is a poison. Colocynth enters into the composition of some moth powders, and renders them very efficacious.

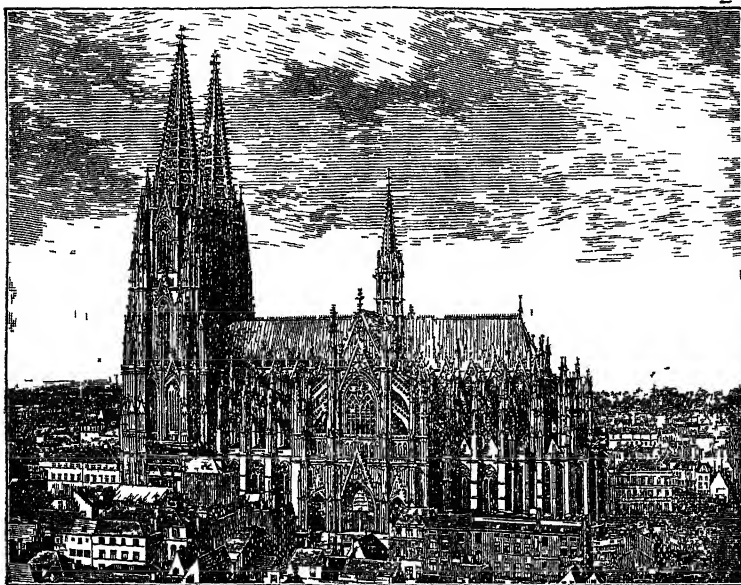
**Cologne** (Ger. *Köln*, *Coln*), a city and port on the left bank of the Rhine, 362 miles by rail WSW. of Berlin, 175 SE. of Rotterdam, 149 E. of Brussels, and 302 NE. of Paris. Formerly an independent city of the Empire, it is now the chief town of Rheinland, and third city of Germany. It was a fortress of the first rank, forming a semicircle, with the town of Deutz on the opposite bank as tête-de-pont. It is connected with this suburb by a bridge of boats, and an iron bridge 1362 feet in length, for railway and carriage traffic. Pop. (1871) 129,233; (1891) 282,537; (1900) 372,229; (1910) 516,527; (1919) 633,904. The old streets are narrow and crooked, and quaintly named; but the area freed by the removal of the ancient fortifications, which dated originally from the 13th century, is laid out on a more spacious plan. This area, which doubled the town, was purchased in 1882 by the corporation; its most prominent feature is the handsome 'Ringstrasse' or boulevard, 4 miles in circuit, nowhere less than 60 feet wide, which encircles the entire old town. The newer fortifications, which consisted of a number of detached forts planted round Cologne and Deutz, within a radius of about 4 miles from the cathedral, were demolished in accordance with the treaty of Versailles.

The ancient buildings in Cologne, both secular and ecclesiastical, are of great architectural interest; the Romanesque and Transition styles are specially well represented in the numerous churches of the 11th, 12th, and 13th centuries. The church of St Maria im Capitol, consecrated in 1049, is the earliest example in Cologne of a church with a trefoil-shaped ground-plan for transepts and choir. In the church of St Ursula are preserved the bones of the 11,000 virgins, companions of St Ursula (q.v.). The church of St Gereon boasts of the possession of the bones of St Gereon, and of the 308 martyrs of the Theban legion, slain during Diocletian's persecution. The church of St Peter contains the altar-piece of the crucifixion of St Peter by Rubens, and that of the Minorites the tomb of the famous scholastic, Duns Scotus.

The chief object of interest in the city, however, as well as its greatest ornament, is the cathedral, one of the noblest specimens of Gothic architecture in Europe. This cathedral is said to have had its origin in an erection by Archbishop Hildebold, during the reign of Charlemagne in 814. Frederic Barbarossa bestowed upon it, in 1162, the bones of the three Magi (q.v.), which he took from Milan, and this gift greatly increased its importance. The bones are retained as precious relics to this day; but the old structure was burned in 1248. According to some accounts, the present cathedral was begun in the same year, but others fix the date of its commencement in 1270-75. To whom the design of this noble building is to be ascribed is uncertain. The choir, the first part completed, was consecrated in 1322. The work was carried on,

sometimes more actively, sometimes more slowly, till 1509, when it was suspended; and during the subsequent centuries what had been already executed was not properly kept in repair. Since

but a colony being planted here in 50 A.D. by Agrippina, the wife of the Emperor Claudius, it received the name of *Colonia Agrippina*. At the partition of the Frank monarchy in 511, it was



Cologne Cathedral.

the beginning of the 19th century, however, the necessary funds to repair and complete it according to the original design, have been supplied by subscriptions from all parts of Germany. The work of renovation began in 1823, and in 1842 the foundation-stone of the new part was laid. The naves, aisles, and transepts were opened in 1848; the magnificent south portal was completed in 1859; in 1860 the iron central *fleche* was added; and with the exception of the western spires, the church was completed in 1863. The spires, the crown of the edifice, were finished in 1880. The body of the church measures 440 feet in length, and 240 feet in breadth; the spires rise 515 feet above the pavement of the nave. For the 'Kaiserglocke,' see BELL. Among the chief secular buildings of Cologne are the town-house, begun in the 14th century upon Roman foundations; the Gurzenich (1441-52), the finest secular Gothic erection in Cologne, a public banqueting-hall, now containing the exchange; the modern law-courts; and the Wallraf-Richartz Museum, containing a good collection of paintings.

The educational and benevolent institutions of Cologne are numerous and well equipped. The university (1389) was in abeyance from 1798 to 1919. The town has acquired a high reputation for music. The situation of Cologne is extremely favourable for commerce. It has extensive and important railway connections. The dismantling of the fortress removed an obstacle to its growth; and the Rhine-Meuse-Scheldt and Rhine-Main-Danube canals, and a new port, are expected to lead to great development. Various branches of manufacture are carried on, of which the chief are the making of beet-sugar, chocolate, tobacco, glue, carpets, soap, leather, furniture, pianos, chemicals, and spirits of wine, besides the characteristic manufacture of Eau-de-Cologne (q.v.).—The city was founded by the Ubii about 37 B.C., and was at first called *Ubiarum oppidum*;

included in Austrasia; and by a treaty in 870, it was united to the German empire. It entered the league of the Hanse towns in 1201, and contended with Lubeck for the first rank. The merchants of Cologne carried on commerce far and wide, and had warehouses in London, near the Guildhall. Cologne was at a very early period the seat of a bishopric, which was elevated, at the end of the 8th century, into an archbishopric.—The archbishops acquired considerable territories, some of them distinguishing themselves as politicians and warriors. They took their place amongst the princes and electors of the empire, but were involved in a protracted contest with the citizens of Cologne, who asserted against them the independence of the city; and the archiepiscopal resi-

dence was therefore removed to Bonn. The archbishopric was secularised in 1801, when the city also lost its independence, and the congress of Vienna did not attempt to restore to it its former character, but assigned the whole territories to Prussia. The archbishop has now no political power.

**Colombia**, a republic occupying the north-west corner of the South American continent from the frontiers of Ecuador, Peru, Brazil, and Venezuela to those of Panamá (till 1903 part of Colombia), with 500 miles of coast on the Caribbean Sea and 600 on the Pacific. Its area is estimated at 440,000 sq. miles. The population amounts to about 5,500,000, including some 30,000 uncivilised Indians who inhabit the remote forests. The situation of Colombia, washed by two oceans, possessing commodious bays and lagoons all along the Atlantic shore and several fair harbours even on the less-favoured Pacific coast, presents great commercial possibilities—though it has lost by the secession of Panamá. The surface of the country is extremely varied, with lofty mountains in the west, and vast plains in the east scarcely above the level of the sea. For the mountains, see ANDES. This system spreads out in three great ranges, like the rays of a fan, from the extensive plateau of Pasto in the south-west, thus forming valleys running from north to south parallel to the three chains, except where disproportionate activity of the volcanic forces has caused an upheaval of the country near them. The fundamental formations of the country are igneous and metamorphic, and everywhere are traces of the disturbances (still not infrequent in the form of earthquakes) that have upheaved plateaus. Of the sections outside the main Cordilleras, the principal are the Sierra Nevada de Santa Marta, in the north, and the low Baudo range, along the north-west coast, extending into Panamá. From the Central Cordillera descend the two principal rivers of Colombia, the Magdalena and its

tributary the Cauca, which flow north into the Caribbean Sea, besides several affluents of the Amazon in the east, and the Patia, which forces its way to the Pacific, through a gorge between cliffs 10,000 to 12,000 feet high, and forms the only notable break in the long wall of the Western Cordillera from Darien to Patagonia. The Eastern Cordillera, by far the largest chain, consists of a series of extensive tablelands, cool and healthy, where the white race flourishes as vigorously as in Europe. This temperate region is the most thickly populated portion of the republic; and on one of its plateaus, at an elevation of 8694 feet, stands the capital, Bogotá (q.v.). Eastward from this Cordillera stretch vast *llanos* or plains, through which flow the Meta, the Guaviare, and other tributaries of the Orinoco. Besides these, the chief rivers are the San Juan, on the Pacific coast; the Atrato (q.v.) and Zulia, flowing north; the Arauca, which feeds the Orinoco; and the Caquetá and the Putumayo, tributaries of the Amazon. The lakes are unimportant.

*Climate and Productions.*—In the course of one day's journey the traveller may experience in this country all the climates of the world; perpetual snows cover the summits of the Cordilleras, while the valleys are smothered in the rich vegetation of the tropics. The mean temperature ranges from 32° to 82° F. according to the elevation. The rainy season falls from November to April, except among the low-lying forests of the south-east, where the rainfall is distributed throughout the year, and in the Chocó coast district of the west, where, shut in from the north-east winds, the heavy atmosphere hangs motionless, and mists and torrents of rain alternate. Colombia naturally yields a variety of productions corresponding to its great diversity of climate and of elevation. The hot region, extending to an elevation of about 3200 feet, produces in abundance rice, cacao, sugar-cane, bananas, yams, tobacco, indigo, cotton, rubber, vegetable ivory, and many medicinal plants; and the forests, with their tagua and other stately palms, their rare balsamic resins and valuable dyewoods, are ablaze with flowers and creepers, and steeped in the perfume of the delicate vanilla orchid. In the temperate zone, from 3200 to 8500 feet above the sea, many of these are equally common, but the coconut palm gives place to the oak, the encenillo, groups of laurels, and arborescent ferns, and here flourish the coffee plant, the odorous Cherimoya (q.v.) and curibano, the fig, and the cinchona-tree. The Wax-palm (q.v.) extends beyond this region, and is found at a height of nearly 11,000 feet, and large crops of potatoes, grain, and leguminous plants are raised in the cold region; but from 10,000 feet rises the bleak *paramo*, with its scanty vegetation, ending in lichens at the snow-line. The fauna of Colombia is very extensive. Both coasts abound with turtles and pearl-oysters; the rivers swarm with fish and alligators, and on their marshy banks the capybara is found; the forests are the haunt of the tapir, armadillo, cavy, opossum, and deer, and during the day are alive with monkeys (of which no less than seventeen species are common), squirrels, paroquets, and numerous bright-plumaged birds, whose notes give place at night to the plaintive cry of the sloth. Beasts of prey are the jaguar, puma, ocelot, margay, and bear. The boa and numerous other snakes are common, but venomous serpents cease at an elevation of 6000 feet. Centipedes and chigoes are not met, beyond 9850 feet, while the plague of mosquitoes and ants, and of other dangerous insects, is mainly confined to the lowlands. In the north, and in the immense *llanos* of the east, great herds of cattle, descended from those

imported by the Spaniards, are reared; in the central districts, shorthorns and other English, Dutch, and Norman cattle and horses have been introduced, and are largely raised throughout the temperate zone. Fish life ceases in the lakes at 13,000 feet; and in the solitudes above, the condor dwells alone.

In minerals the country is exceedingly rich, although its scanty population, their poverty, and the absence of roads have combined to limit the exploitation of the precious metals. The principal mines (chiefly gold and silver) are in Antioquia, Caldas, Nariño, Cauca, Bolívar, Tolima, and Magdalena. The salt-mines at Zipaquirá, near Bogotá, are a monopoly of government, and yield a considerable revenue. There are extensive deposits of iron, coal, and petroleum. Copper, lead, sulphur, zinc, antimony, arsenic, manganese, mercury, fireclay, cinnabar, crystal, granite, marble, lime, gypsum, jet, amethysts, rubies, porphyry, and jasper are also found; while much of the world's platinum is obtained from the upper San Juan, and the principal source of the finest emeralds is at Muzo in Boyacá, although there are other mines near Nemocón, in Cundinamarca.

*Commerce, &c.*—The only industries common to all the departments of Colombia are agriculture and the rearing of cattle. Straw-hats, known abroad by the name of Panama, are almost the only manufactured article exported. But the exports are few, considering the vast size of the country, only a small part of which is under cultivation, and they suffer from want of transport and communication. There is trade in coffee (the staple crop), gold, silver, and other ores, rubber, bananas, ivory-nuts, divi-divi, tobacco, cacao, cotton, cinchona, cattle, balsams, timber and dyewoods, hides and wool. Most of the inland traffic is by the rivers, the Magdalena being navigable for about 900 miles. The roads are only tracks, but they are being improved. There are a few short railways. Others are projected.

*Population.*—The chief aborigines of the country, the *Chibchas* or *Muyscas*, who inhabited the plateau of Bogotá, ranked among the nations of the New World second to the Aztecs and Peruvians alone. They worshipped the sun, had a calendar, and a government closely resembling that of Japan, lived in communes, were industrious farmers, and dressed in garments of cotton. Their rich, beautiful language has been forgotten by their descendants, but is preserved in a grammar published at Madrid by the Dominican missionary, Bernardo de Lugo, in 1619. The rest of the country was occupied by a great number of tribes, with as many dialects as divisions, sinking from the grade of the Chibchas to the naked savages of the plains. Some of the intermediate races, while understanding Spanish, have preserved their primitive speech; the uncivilised Indians are now mostly confined to the eastern plains, the northern portion of Magdalena, and the district of the Atrato. The pure whites form about a fifth of the entire population, and the Indian half-breeds more than half; there are now scarcely any pure negroes left in the country, but the mulattoes and *zambos*, resulting respectively from the union of negroes with whites and Indians, exceed a sixth of the whole. Slavery was finally abolished in 1852, and in 1870 a system of compulsory education was adopted which has on the whole proved successful. Parochial, secondary, normal, and technical schools are now within general reach, and there are several state and departmental universities of more or less efficiency. Journalism is largely represented in most of the large towns; and at the capital a considerable number of books are published every

year The state church is the Roman Catholic, which in the management of its own affairs is independent of the civil authority; religious orders were suppressed in 1863, and toleration in matters of religion is guaranteed; but, by the terms of a concordat entered into with the holy see in 1888, in the universities and all educational establishments public instruction is directed in conformity with the dogmas of the Roman Catholic Church, religion is one of the obligatory subjects of study, and diocesans are empowered to suspend teachers or professors who neglect or disobey this order.

*History.*—The northern coasts of Colombia were visited by Ojeda and Amerigo Vespucci in 1499, and afterwards by Bastidas; in 1502 Columbus explored part of the country, and endeavoured to found on the Isthmus of Panamá the first Spanish colony on the American mainland. In 1513 Balboa (q.v.) discovered the Pacific, and Pizarro and Almagro sailed along the western coast of Colombia on their way to Peru in 1526. Ten years later Jiménez de Quesada broke the power of the Muyscan empire, and the *Nuevo Reino de Granada* was formed. As the country was opened up, the Indians sank, in spite of legislation designed for their protection, to the condition of serfs, and the policy of the crown, aided by the Inquisition, which was introduced in 1571, put an end to the democratic institutions of the early settlers. The region was administered by the Council of the Indies; nearly all posts were sold to Spanish speculators, who recouped themselves at the expense of the colonists; and even the commerce of the new possessions was granted as a monopoly to the merchants of Seville. The country formed a presidency (except during the years 1718–24) from 1564 to 1739, a period memorable for the disastrous descents of Drake, Morgan, Dampier, and others on the coast towns; it was then raised to a viceroyalty, which lasted until the war of independence.

On the 20th July 1810 the colony shook off the yoke of the mother-country, and entered upon the long struggle which ended in the election of Bolívar (q.v.) to the presidency of the *Republic of Colombia*, a term which, like the viceroyalty, embraced all that now belongs to Venezuela, Colombia, and Ecuador. Independently of the singular difficulties of communication, and of the resulting absence of anything like natural unity, this unwieldy state contained from the beginning the germs of its own dissolution in the national character of its inhabitants. So long as union was necessary to meet external dangers, it maintained an imposing attitude in the eyes of the world; but gradually sectional interests and political jealousies did their work, and in 1831 the ill-assorted elements of the confederation were separated for ever. What is now Colombia was then formed under the title of the *Republic of New Granada*; but in 1861 a fresh civil war led to the establishment of the *United States of Colombia*. In 1863 a constitution was adopted, based on that of the United States of America, with a president elected for two years; but this proved altogether unsuited to the Colombians, and, after twenty years' trial, brought about the revolution of 1884–85. In 1886 a fresh constitution was adopted for the new *Republic of Colombia*, placing the central authority in the strengthened hands of the federal government, and reducing the nine former self-governing states of Antioquia, Bolívar, Boyacá, Cauca, Cundinamarca, Magdalena, Panamá, Santander, and Tolima to departments, further reduced to eight by the independence of Panamá (q.v.) in 1903. The country has since been divided anew. The boundary with Ecuador was fixed in 1917, with Venezuela in 1922; those with

Peru and Brazil remaining indefinite. Colombia had in the first sixty years of its statehood no less than twenty-seven civil wars, in one of which alone (1879) it lost 80,000 of its citizens. Again in 1899–1901 it lost 50,000.

See García Calderón's *Latin America, its Rise and Progress* (1913); Sir Clements Markham's *True History of the Conquest of New Granada* (1913); books by Scruggs (1910), Mozans (1910–11), Eder (1913), Lévine (1914), F. Lorraine Petre (1906).

**Colombo**, the capital of Ceylon, is situated on the western side of the island. By the completion of the great breakwaters and graving-dock, diedging, &c. (1874–1914; see **BREAKWATER**), the harbour was greatly improved and commerce largely increased; Colombo having superseded Galle as a coaling station for large steamers. It contains the government offices, is the seat of an Anglican bishop, and is an important centre of missionary enterprise. It has a university college and other educational institutions. Among the chief buildings are the government house, court house, town-hall, asylum, and colleges. The fortifications of Colombo were constructed by the Dutch. Colpetty, a beautiful suburb, shaded by groves of the coconut palm, is a favourite retreat. The humble, mud-constructed dwellings of the Dutch, Portuguese, Eurasians, Singhalese, Tamils, Moors, and Malays are outside the city walls. The *pettah* or Black Town, the only ancient quarter, extends to the river Kalany-ganga. Pop. (1871) 100,238; (1921) 244,100. Colombo is connected with the two ends of the island, with Adam's Bridge, and Kandy by railway. The early name of Colombo, *Kalan-totta*, the 'Kalany Ferry', the Moors corrupted into Kalambu, and by this designation it was described by Ibn Batuta about 1340 A.D. as the finest city of Serendib. The Portuguese, who fortified it 1517 A.D., wrote the name Colombo, in honour of Christopher Columbus. The Dutch succeeded to the Portuguese, and Colombo was taken by the British, 16th February 1796. See **CEYLON**.

**Colón.** See **ASFINWALL**.

**Colon**, that portion of the large intestine which extends from the Cæcum (q.v.) to the rectum, which is the terminal portion of the intestinal canal. See **DIGESTION**.

**Colonel** (from Ital. *colonello*, the 'leader of a column') is the grade of officer next below that of colonel-commandant (till 1920 brigadier-general). The chief officer of an English regiment at one time bore the title of captain, but since 1588 that of colonel has been substituted. In the British army, the infantry 'regiment' not being either a tactical or an administrative unit, the colonel of a regiment has practically a sinecure, bestowed upon a retired officer as a recognition of good service. The commander of a cavalry regiment, or a brigade of artillery, or a battalion of infantry is a lieutenant-colonel. In the artillery and engineers the colonel is an active officer. 'Officers are only promoted to the rank of substantive colonel to fill a vacancy in the establishment which was fixed, by army order 45 of 1908, at 350 for the British service, and 110 for the Indian army;' and 'lieutenant-colonels may be promoted to the rank of colonel by brevet on appointment as aide-de-camp to the sovereign; for distinguished service in the field, or for meritorious or distinguished service of an exceptional nature other than in the field.' See **COMMISSIONS, ARMY**; and for colonel-commandant, see **BRIGADIER**.

In the great foreign armies, the infantry 'regiment' is a tactical and administrative unit, containing three battalions. Consequently the colonel is an important active officer. The battalions are under lieutenant-colonels, as in Britain, and six of

them—that is, two regiments—form a brigade of infantry (see BRIGADE).

**Colonia**, a department of Uruguay, on the Plata, below the Uruguay River. The uplands are barren, but in the fertile valleys and plains are numerous European colonies, engaged in agriculture and stock-raising. Area, 2200 sq. m.; population, 100,000. The capital, Colonia del Sacramento, a small town on the Plata, about 100 miles above Monte Video, has a good harbour, a dock for vessels of 1000 tons, and ruined fortifications.

**Colonial Animals**, organisms which cannot be fairly regarded as unities, but consist of numerous more or less similar individuals united in a common life. Among the usually single-celled simplest animals or Protozoa, loose colonies not unfrequently occur, and are of not a little importance as suggestions of the bridge between the single-celled and many-celled animals. Such colonies arise when the original cell, instead of reproducing discontinuously, retains its daughter-cells in union with itself or with one another, just like the egg-cell of a higher animal. By sacrifice of individuality at the epoch of reproduction, a higher unity is formed. In the same way a simple cup-shaped sponge, by continuous budding, forms a colony of similar forms, which may possess more or less distinct individuality. The common fresh-water *Hydra*, to mount a step higher, buds off daughter *Hydræ*, which remain for a while connected with the parent organism, and make it temporarily colonial. This becomes constant in the myriad colonies of hydra-like forms which are known as Zoophytes, or Hydrozoa (q.v.). The same formation of colonies is well illustrated in the higher polyps of the sea-anemone type, where in dead-men's fingers and in most corals, compound or colonial organisms are beautifully illustrated. Some jellyfish-like or medusoid types also become compound, and lead on to the order Siphonophora, where, as in the Portuguese man-of-war (*Physalia*) or in *Velella*, the occurrence of compound forms is a constant character. But in this last case a further step has been made, for the individuals not only share a common nutritive life, but are bound together in a more intimate way into a true unity of a higher order. Among simple worm-like forms, chains of individuals are occasionally formed, as in *Catenula*, and these point to the probable origin of the higher or segmented worms which consist of a series of similar 'joints.' Even among the higher worms, temporary compound forms occasionally occur, as in the fresh-water *Nais* or the marine *Syllis*. The Polyzoa afford good illustration of colonial life as an almost constant character of a class. Finally, passing beyond the limit of invertebrate animals, we find the last examples of true colonial organisms in the Ascidians (q.v.) or Tunicata. The occasional development of double or multiple forms from a single ovum is among higher animals the only suggestion of compound organisms.

From the above illustrations a few general conclusions may be drawn. The process of asexual budding, which leads to the formation of compound organisms, is commonest in relatively passive vegetative animals, like sponges, hydroids, corals, polyzoa, and ascidians, and is an expression of their general physiological constitution. When the colonial organism is free-living, as in Siphonophora and some Tunicata, the individual members are more closely knit together, and the colony is more perfectly integrated. As above suggested, some colonial forms are of importance as illustrating in loose union an order of individuality, which in higher types becomes more firmly unified. We first find loose 'aggregates,' at a higher level these become 'integrated.' The loose colonies

of some medusoid types are thus succeeded by more perfectly integrated forms in the Siphonophora. Finally, colonial organisms are of the highest physiological interest in illustrating division of labour. In a compound organism the internal and external conditions of life are not uniform for all the members; certain 'persons,' as the individuals are technically called, exhibit the predominance of one function, and others of another; the differences in function thus started bring about more or less marked difference of structure as its consequence; and thus division of labour and 'polymorphism' or difference in form are established.

**Colonial Conference.** See CONFERENCE.

**Colonial Corps** was a name for regiments of British regulars, paid from home, but permanently stationed in the colony. The system was unsatisfactory, and was abandoned. At present there are two classes of colonial forces. (Note that India is not a 'colony' in this connection.) 1st Class—those raised in a colony by order of his Majesty, paid from home, and subject to the Army Act (see ARMY DISCIPLINE). 2d Class—those raised and maintained by a colony, only subject to the Army Act when with his Majesty's forces. The 1st Class comprises several regiments in the West Indies and Africa, and Artillery (q.v.). The 2d Class contains a large, and yearly increasing, body of troops, details of which are in the official *Handbook of the Land Forces of the British Colonies*. During the Boer war (1899-1902) the 2d Class contributed 83,000 men, from Canada, Australia, New Zealand, and South Africa, and in the Great War about half a million.

**Colonial Institute**, THE ROYAL, was founded in 1868 (incorporated by Royal Charter in 1882) to provide a London place of meeting, of a strictly non-party character, for persons connected with the colonies and British India, and to fulfil kindred purposes. It has an excellent library.

**Colonial Office.** See SECRETARY OF STATE.

**Colonial System**, also called COMMERCIAL SYSTEM, a name for the theory long acted on by European nations, that their settlements abroad were to be treated as proprietary domains, exploited for the benefit of the mother-country, which did everything it could to import their produce as cheaply as possible, and encourage them to a large consumption of home manufactures. The system was carried to its furthest extent by Spain. See COLONY, FREE TRADE, MERCANTILE SYSTEM, MONOPOLY, NAVIGATION LAWS, UNITED STATES.

**Colonisation Society.** See LIBERIA.

**Colonna**, CAPE (Lat. *Sunium Promontorium*), a headland of Greece, forming the southmost point of Attica, and crowned by the ruins of a temple of Athena, thirteen of whose white marble columns, from which the cape derives its modern name, are still standing.

**Colonna**, a celebrated Roman family, which took its name from a village among the Alban Hills, 12 miles ESE. of Rome, and which, from its numerous castles, vast estates, and crowds of clients, enjoyed a powerful influence from the 11th to the 16th century. From it have sprung a pope (Martin V., q.v.), several cardinals, generals, statesmen, and noted scholars, and VITTORIA COLONNA, the most celebrated poetess of Italy. She was the daughter of Fabrizio Colonna, Constable of Naples, at whose estate of Marino she was born in 1490. When four years old, she was betrothed to a boy of the same age, Ferrante d'Avalos, son of the Marchese de Pescara; at seventeen they were married. After her husband's death in the battle of Pavia (1525), Vittoria Colonna

found her chief consolation in solitude and the cultivation of her poetical genius. During seven years of her widowhood she resided alternately at Naples and Ischia, and then removed to the convent of Orvieto, afterwards to that of Viterbo. In her later years she left the convent, and resided in Rome, where she died in February 1547. She was the loved friend of Michelangelo, admired by Ariosto (see canto xxxvii. of the *Orlando*), and the intimate associate of the reforming party at the papal court. Her poems belong chiefly to the period following her husband's death, and are remarkable for truth of sentiment and enlightened piety. They were first published at Parma in 1538. See Mrs H. Roscoe's *Vittoria Colonna, her Life and Poems* (Lond. 1868), and studies by the Hon. Alethea Lawley (1888) and Maud F. Jerrold (1906).

The family is still distinguished in Italy, three of its four lines being princely. The Colonna palace, situated at the base of the Quirinal (Rome), is celebrated for its splendid gallery and treasures of art.

**Colonna**, GIOVANNI PAOLO, composer, born about 1640, either at Brescia or Bologna, became principal of the musical academy at Bologna. Of some 44 works, nearly all were for the church; his opera, *Amilcare*, was first performed in 1693. He died 28th November 1695.

**Colonsay and Oronsay**, two of the Argyllshire Hebrides, 16 miles NNW. of Port Askaig in Islay, separated from each other by a sound, 100 yards wide, and dry at low-water. Colonsay, which rises to a height of 493 feet, is 16 sq. m. in area; Oronsay, only 3. On the latter are a sculptured cross and a 14th-century Austin priory, with some curious effigies; whilst in the former are standing stones, a bone cave, Colonsay House (1722), and an obelisk to the memory of the lawyer Duncan McNeill, Lord Colonsay (1794-1874). Pop. (1851) 933; (1921) 284, nearly all in Colonsay.

**Colony**, the English form of the Latin *colonia* (from *colere*, to cultivate), denotes in British law any part of the British dominions other than the British Islands and British India. In popular usage, and especially as regards foreign countries, the term bears the more general sense of any overseas dependency, irrespective of its technical legal designation. The word, however, suggests, as contrasted with dependency, territory occupied by agricultural settlers from the mother-country, but this implication is not necessary. Ceylon is as much a British colony as Australia itself, and of late the name has ceased to be used officially as a description of the great self-governing British territories, which are now styled 'Dominions,' the ground for the change being that 'colony' implies subordination. By a wider, and historically older, use the word designates a body of persons of one nationality who have taken up residence in some foreign place, especially, but not solely, where the home government retains some legal power over the settlers, as in the case of British residents in Egypt or Shanghai.

*Ancient and Mediæval Colonies.*—The idea of the maintenance of systematic control by a mother-country over distant possessions is one of slow evolution. In the main the colonies (*apoikiai*) of the Greek and Phœnician cities were hivings off of superabundant citizens, who founded new cities, which recognised with pride their derivation from the metropolis as the mother-city, but accepted no political tie; such were the relations of Syracuse to Corinth, of Tarentum to Sparta, of Miletus to Athens, and of Carthage to Tyre. Athens, however, in the 5th century B.C., when seeking to secure her imperial position in Greece, developed the practice of sending out settlers to establish themselves in dependent territories, as in Eubœa,

and act as strongholds of Athenian influence, a policy which finally was destroyed with the ruin of the Athenian efforts at empire. The Roman republic developed, with greater success, the same policy; in conquered lands there were planted settlements of landholders, who were at once to cultivate the territory and act as military garrisons, and, with modifications, the policy persisted under the empire. At the same time the term *colonia* came to acquire a wider sense; the settlers as Roman citizens had a distinctive status, and it was possible to confer this status on a city, although only a fraction of its population was made up of Roman settlers, as in the case of Philippi in Macedonia. The Roman colonies were widely scattered, as the names of Lincoln and Cologne remind us. Carthage, the great rival of republican Rome, also aimed at colonisation, and established both settlements on the African coast in the territory of dependent tribes, and trading posts in Spain and Sicily. The doctrine of colonial dependencies was thus firmly implanted in the communities of the Mediterranean area; and in the middle ages, as civilisation recovered from the shock of the barbaric invasions, the Italian cities, especially Genoa and Venice, appear with dependencies of commercial importance, Venice having strong positions in Crete. These cities also laid the foundation for the extra-territorial rights enjoyed until 1923 by foreign communities in the Turkish dominions, securing from the sultans of Turkey special places of residence in Constantinople, and the right of jurisdiction over their own subjects resident there.

*Modern Colonisation.*—It was, however, the re-discovery of America, and the revelation of the route to the east *via* the Cape of Good Hope, that inaugurated the era of modern colonising activity. The lure of wealth and dominion, rendered less sordid by the spirit of high adventure, and tempered by missionary zeal—unhappily often distorted to evil ends—brought into fierce competition Spain, Portugal, France, Holland, and Britain. Spain by conquest attained vast areas in Central and South America; but the revolt of the New England colonies against Britain and the French Revolution had their inevitable sequel in the determination of these territories to acquire independence, while the war with the United States of 1898-99 deprived her of her last important territory, Cuba, together with the Philippines and Porto Rico, leaving to her only an unprofitable protectorate over a part of Morocco, the islands of Fernando Po and Annabon, and strips of the Saharan and Guinea coasts. Though the Spanish colonies were acquired by conquest, no small number of adventurers made their homes there, and, as usual with the peoples of the south of Europe, they mingled freely with the native races, giving rise to the semi-Spanish inhabitants of Central and South America.

Portugal, with much inferior natural resources, rivalled Spain in colonising power, largely because of her taste for combining trade with conquest. At the height of her power she had establishments in Africa, India, the East Indian Archipelago, the Malay Peninsula, and China. Too great diffusion of effort, coupled with the misfortune by which the mother-country fell for a time under Spanish dominion, led to serious defeats and losses, especially at the hands of the Dutch, who beat the Portuguese even as traders. The sympathy of Britain, among other factors, has latterly enabled Portugal to retain an unexpectedly large area of her colonial dominions, including in Africa the Cape Verde Islands, Principe and St Thomas, Portuguese Guinea, Angola, and Mozambique, with Goa and other small places in India, Macao in China, and the eastern portion of the island of Timor. Their great rivals, the Dutch, fought

also a long struggle with the British, with whom they vied in the West Indies and the East Indies, adopting exploitation by companies similar to the British East India Company. As settlers, they occupied what is now New York and the Cape of Good Hope, but these were lost in the 17th and 19th centuries, and their possessions are now essentially tropical dependencies: in the west, Dutch Guiana or Surinam, with Curaçoa and a few minor islands; in the east, the populous and valuable territories of Java, Sumatra, Celebes, the Moluccas, and the greater part of Borneo, as well as part of New Guinea. To Portugal and Holland alike these tropical possessions have appeared in the light of legitimate sources of revenue for their owners, and though the policy of exploitation has now been modified in the interests of the natives, the territories are strictly controlled as regards administration and legislation from the metropolis.

Of still greater importance have been the efforts of France to attain colonial possessions, which at one time seemed to promise her dominion on a great scale in North America and in India. Her failure ultimately to hold her own against Britain, and the sale of Louisiana by Napoleon, have left her in America only the tiny islands of St Pierre and Miquelon, and French Guiana or Cayenne, with the West Indian islands of Martinique and Guadeloupe. In India, Pondicherry and Chandernagore are faint relics of the great struggle of Duplex. On the other hand, France has acquired important areas in Indo-China, including Annam, Cambodia, Cochin-China, Laos, and Tongking; and, in successful rivalry with Britain, has established a colossal empire in North Africa, including Algeria, Tunis, a protectorate over the greater part of Morocco, the Senegal, Upper Senegal and Niger, Mauritania, French Guinea, the Ivory Coast, Dahomey, French Equatorial Africa, and French Somaliland. But for the frustration in 1898 of Marchand's mission to Fashoda, practically all North Africa, save Egypt, would have been under French control. France has also, in the Indian Ocean, Réunion, Madagascar, and the Comore Islands; in the Pacific, New Caledonia, Tahiti, and other islands; and in China, Kwangchow. The vast area and diversified conditions of this empire demand different methods of administration. Algeria is treated as an integral part of France; certain colonies have the right to representation in the French parliament by elected representatives; while large areas in Africa are governed on the basis of a protectorate. The measure of local autonomy allowed varies greatly, and is subject to the fact that France controls entirely the foreign relations of all parts of the empire, and maintains strict watch over finance, tariffs, and defence.

No other foreign powers have any colonial possessions of great importance. Belgium holds the Congo as a legacy from King Leopold, its original sovereign, but subject to the terms of the Berlin Act of 1885, as remodelled in 1919, so as to secure equal conditions for the trade of foreign countries and preservation of native interests. Italy has acquired Tripoli and the Cyrenaica in North Africa, Eritrea on the Red Sea, and a portion of Somaliland. Denmark, having parted with her West Indian and West African holdings and granted complete autonomy to Iceland, retains as a dependency only Greenland. The United States holds Hawaii, part of the Samoan islands, the Philippines, and Porto Rico. Her control of her possessions differs from that of the other minor colonial powers by the encouragement of autonomy among the governed, which has been carried to a very marked extent in the Philippines, probably as a preliminary to the ultimate concession of

independence similar to that enjoyed by Cuba since her liberation from Spain.

*The Acquisition of the British Colonies.*—The 17th century saw the inception and establishment of a large number of true colonial settlements effected on partially occupied territories in America. Newfoundland had been annexed by Sir Humphrey Gilbert in 1583, but the earliest real settlement was that effected in 1607 in Virginia by the Virginia Company; in 1620 the *Mayflower* bore the Pilgrim Fathers to New England; the Quaker, William Penn, and the Catholic, Lord Baltimore, established Pennsylvania and Maryland; and by the close of the century, of the thirteen colonies which by their revolt established the United States of America only Georgia remained to be founded. Newfoundland was colonised from Bristol, and settlers established themselves in Bahamas, Barbados, Bermuda, Antigua, St Kitts, Nevis, Montserrat and the Virgin Islands, while Jamaica was added by conquest under Cromwell from Spain. In India the East India Company, whose charter was granted by Elizabeth on 31st December 1600, established themselves, primarily as traders, at Madras, Bombay, which was ceded by Portugal to Charles II. as part of his queen's dowry, and Calcutta, while other chartered companies operated on the Gambia and the Gold Coast. The Hudson Bay Company, incorporated in 1670, began operations important in the future for securing that bay to Britain. So far, colonisation had been on the whole pacific; in the following century acquisitions were in the main the outcome of war; Gibraltar was taken in 1704 from Spain; France in 1713 had to cede Acadia, which became Nova Scotia, her claims over Newfoundland and Hudson Bay, and her share of St Kitts, while the outcome of the Seven Years' War brought Britain Canada, St Vincent, Grenada, and Dominica, as well as the triumphs of Clive in India, which led almost immediately to the virtual possession of Bengal and paramount power in the peninsula. But the removal of the danger from France left the American colonies free to resent British control; George III.'s struggle to reassert the royal power in England had its counterpart in the attempt to dominate the colonies—largely autonomous—in New England, with the result of the declaration of independence in 1776, and the final surrender by Britain in 1783. The loss of the most important of British settlements was in some degree compensated for by a revival of energy which seized upon Australia, though at first mainly as a penal settlement. The Napoleonic wars renewed the acquisitions of 1763; by the treaty of Amiens in 1802 Ceylon was acquired from the Dutch, by that of Paris in 1814 the Cape of Good Hope and part of Guiana followed suit, while France surrendered St Lucia, Tobago, Malta, Mauritius, and Seychelles, and Spain Trinidad. Contemporaneously the wars of Wellesley in India placed the predominance of Britain beyond question and added largely to the territory under British rule; Penang and Province Wellesley were acquired; British Honduras established its independence as against Spanish claims, and a more or less successful effort was made by philanthropists to establish a colony of freed slaves in Sierra Leone. The attainment of peace in Europe after Waterloo slackened the pace of acquisition, but before 1837 there were added Arakan, Tenasserim, and Assam as the result of the first Burmese war; Malacca, ceded by Holland in return for British possessions in Sumatra; Singapore, and the Falkland Islands. Under Queen Victoria, commercial needs and humanitarian ideals co-operated with the aspirations of an abundant population and large capital resources

in adding, in the main peacefully, large areas to the empire. British Columbia was settled, Canada was given in 1867 a federal constitution, and in 1870 the vast territories of the Hudson Bay Company were entrusted to the Dominion government. The colonies of Australia threw off all connection with penal settlements, and achieved in 1900 federation in a powerful Commonwealth. New Zealand was occupied and prospered in remarkable measure, while the chiefs of Fiji ceded their islands to the crown, a large part of New Guinea was annexed, and the Solomon and other islands brought under a protectorate. The more important of the Malay States were accorded protection, and finally induced to federate, while the territories of the Raja of Sarawak and the Sultan of Bunei, and those held by the British North Borneo Company, were accorded the status of protectorates. Hong-kong, destined to become a great entrepôt of trade, and Labuan with minor islands were annexed. In India the temperate zeal of one viceroy added Scind to the British dominions; the Punjab was annexed to save it from anarchy and British territory from invasion; and the insensate pretensions of the Burmese kings caused first the annexation of Lower, then the taking possession of Upper Burma also, while the security of the route to India dictated the occupation of Aden and Perim. The mutiny of a large part of the Indian army resulted in 1858 in the decision to terminate the rule of the East India Company, the authority of Britain being transferred directly to the crown, which later assumed the title of Empress of India. In Africa grave difficulties arose from the reluctance of the home government to annex territory, the resentment of the Dutch of South Africa at the emancipation of the slaves and British native policy, the rise of a war-like Zulu kingdom, and after 1880 the vehement competition of European powers, in part instigated by Germany, to attain dominion, which was complicated by the rivalry of France and Britain as regards Egypt. The situation in Europe from 1880 on seriously hampered British action, but a timely revival of the system of chartered companies, on the model of those of the 17th century, but under more effective control, secured the creation of the Royal Niger Company, the Imperial British East Africa Company, and the British South Africa Company. Thanks to the co-operation of these bodies substantial gains were recorded despite the competition of the powers. While the Gambia was encircled, and Sierra Leone left with a very modest hinterland, the northern territories of the Gold Coast and Ashanti became British, together with the vast area of Nigeria. In the east Uganda, British East Africa, and Zanzibar, and to the north Somaliland became protectorates, a status also granted to Nyasaland and Northern Rhodesia in the centre. In the south, while the Orange Free State and the South African Republic were granted independence, large areas, including British Bechuanaland and Griqualand West, were added to the Cape; the colony of Natal was created; Zululand, Amatongaland, and Basutoland annexed; and protectorates established over Bechuanaland and Southern Rhodesia, whose name records the invaluable work of Cecil Rhodes. Britain's services to Turkey in 1877-78 were recognised by the grant of Cyprus as a protectorate, while Egypt fell definitely under British control, and the Sudan, reconquered by Lord Kitchener, was declared under the joint rule of Britain and Egypt. Wei-hai-wei was acquired on lease (terminated in 1923) from China as an offset to the seizure by Russia of Port Arthur. The close of the Queen's reign was marked by the practically inevitable conflict be-

tween Great Britain and the Dutch republics in South Africa, both of which were finally incorporated in the empire in 1902, and in 1906 long friction with France was ended by arranging a joint protectorate over the New Hebrides, while under the Anglo-French agreement of 1904, in return for British support in Moroccan matters, France acquiesced in British predominance in Egypt. In 1909 a union was arranged of the four South African colonies, and by agreement with Siam protection was accorded to several Malay states.

The war of 1914 was immediately followed by the annexation of Cyprus and the declaration of a protectorate over Egypt, extinguishing the claims of the Sultan of Turkey to suzerainty over these territories. But in the peace settlement the colonial possessions acquired by Germany after 1884 (Togoland, the Cameroons, German Southwest and German East Africa, German New Guinea, Samoa, and other Pacific islands) were disposed of by the Allies under the system of mandates, in lieu of annexation.

*The Administration of the British Colonies.*—Legal theory draws a distinction between colonies acquired by cession or conquest, in which case the crown is held to have full power over the territory, and settled colonies, to which the colonists are held to carry the law of England, so that the crown has no power to legislate for such colonies, except with the aid of the British parliament or a local legislature of the same elective type. The New England colonies were essentially of the latter class; they soon developed legislatures which were often in conflict with the executive, representing the crown, and which finally denied the right even of the British parliament to legislate for them. The successful revolt of these colonies led to a reversal of British policy; parliament was induced to legislate to deny Canada in 1774 the normal right to a legislature independent of the executive, which was only conceded in 1791, and representative government was refused to Australia on various grounds until 1842. By that time, however, experience in Canada had shown that an elective legislature and an irresponsible executive were incompatible; revolts in both Upper and Lower Canada led to Lord Durham's despatch there, and evoked the suggestion of responsible government for the colonies, a system which, despite logical difficulties pointed out by Lord John Russell, was in substance conceded by the British government and made effective by Lord Elgin in Canada in 1848. The doctrine was thus, in effect, established that British subjects overseas should be accorded as much autonomy as was compatible with their own interests and the safety of the empire as a whole, and the whole history of the British colonies is the working out in its application to the different types of community of this doctrine. Hence the constitutional position of these territories is singularly complex, and is subject to a continuous, if gradual, process of development in the sense of the emancipation of overseas territories from control from Britain.

*I. The Dominions.*—The process of emancipation is most complete in the case of the self-governing Dominions, so styled since the Colonial Conference of 1907, viz. the Dominion of Canada, the Commonwealth of Australia, the Dominion of New Zealand, the Union of South Africa, and the Dominion of Newfoundland. In the strict legal aspect all these are colonies; their legislation may be disallowed by the crown, their laws may be overridden by imperial acts, the head of the executive government is appointed by the king on the advice of the British government, and appeals lie from their courts to the Judicial Committee of the Privy-council. In practice they are almost autonomous;

the governors-general are appointed in accordance with the wishes of the dominion; disallowance of their acts is obsolete or nearly so; the British parliament has ceased to legislate for them save with their consent; and, if they desired, the right of appeal to the Privy-council would doubtless be cancelled. Save Canada, they have a wide power of constitutional alteration, though they cannot sever their connection with the British crown. The chief sign of their condition of quasi-dependence is the fact that under international law they are not, for many purposes, treated as independent states; the governors-general and ministers cannot declare war or make peace or enter into treaties, except under the authority of the king, on the advice of the British government. But these restrictions are of less importance in practice than in theory, for in all important political treaties since the Peace Conference of 1919, the Dominions (other than Newfoundland) have separate representation, and their consent is obtained before ratification, while no commercial treaty since 1880 has been made binding on them without their consent, and special treaties are negotiated for them by their own representatives, acting with the authority of the British government. Further, the Dominions (except Newfoundland) are distinct members of the League of Nations, side by side with the British empire as a whole, and as such members act independently of, and sometimes in opposition to, the British empire representatives. The Dominions have not the power to declare themselves neutral in any war into which Britain enters, but they may refuse any active aid, and they obviously can claim that they should participate in framing British foreign policy, so as to obviate their being involved in war without consultation and full knowledge. Effective arrangements exist under which, in matters immediately and directly affecting them, the British government does not act without Dominion concurrence, but the problem of consultation on general foreign policy is not yet solved. It is complicated by the fact that the Dominions, while able to maintain internal order, are not yet prepared to undertake proportionately the same burden of defence expenditure as is borne by the United Kingdom.

The status of the Free State in Ireland is essentially that of a Dominion on the model of Canada, but that status is possessed under the terms of a formal treaty of 1921 between Great Britain and Ireland, and the terms of that treaty provide certain powers which Great Britain can exercise in respect of defence matters, and definitely limit the right of the Irish Free State to maintain naval and military forces, matters left indefinite in the case of the Dominions.

II. *India*.—British India, together with the Indian or native states, is destined to hold the position of a Dominion, and is an independent member of the League of Nations. But at present, under the Act of 1919 bestowing the existing constitution, India is not governed by ministers responsible to elective parliaments in all internal matters, as is the case in the Dominions. Only in certain spheres of provincial action is this the case, while in other matters the executive government is carried on under the direct control of the British government through the Secretary of State for India in Council, and the whole of the central government of India is thus controlled. The Indian legislatures, central and provincial, are now predominantly elective, but powers are given to the governor-general and the governors to secure essential legislation and expenditure in all matters not definitely assigned to ministers.

III. *Colonies possessing Responsible Government*.

—This rank has been conceded to Malta, also to Southern Rhodesia in 1923 in substitution for a

curious form of government under the British South Africa Company with an elective legislature. In these cases self-government is strictly confined to domestic issues; all foreign relations remain in the hands of the British government, which in the case of Rhodesia also asserts control in certain matters affecting lands, native rights, taxation, &c.

IV. *Colonies possessing Representative Government*.—In such colonies there survives the British form of government prior to the reign of George I. The executive is independent of the legislature, but can obtain legislation only by its consent, save in the rare event of intervention by the British parliament. Bahamas, Barbados, and Bermuda hold this rank, which was formerly held by Jamaica and other West Indian islands, but was surrendered on various grounds.

V. *Crown Colonies*.—In the vast bulk of the remaining British possessions the executive is able to control the legislature, because that consists of a body in which there is either a majority of officials or a majority of official and nominee members, even when some members are elective, while in some cases, such as Gibraltar, the governor constitutes the legislature. This form of constitution is appropriate and necessary where it would be impossible to create an elective legislature which would effectively represent the people as a whole and conserve their interests, for example, in colonies with large native populations still unfitted for political activity. In cases where political education is evolving higher capacity the elective element in these legislatures is being increased; thus in Ceylon it is in a majority; but, to prevent deadlocks, the governor is empowered in cases affecting vital interests to carry legislation by the votes of the official members; a somewhat similar condition of affairs exists in Jamaica. Throughout the empire the increase in the number and effective powers of the elective members in the legislatures is now being aimed at. The final control of administration and legislation in all these cases still rests with the British government through the Secretary of State for the Colonies.

VI. *Protectorates*.—Very closely allied in constitution to crown colonies are the protectorates, such as the Nigeria Protectorate, those attached to the Gold Coast, the Gambia and Sierra Leone, Somaliland, or the Solomon Islands. The inhabitants of protectorates are not British subjects, and the territory is not part of the possessions of the crown or the British dominions; but these distinctions are not of much practical importance, and as a territory advances in development it may be annexed, as of late years the East Africa Protectorate has given place to the Kenya Colony, and the Gilbert and Ellice Islands Protectorate to the colony of that name. Historically the declaration of a protectorate was often easier and more convenient than annexation; a native ruler would readily accept protection when he could not consider cession, and during international rivalries it was desirable to be able to vary territorial claims without the difficulties attending cession of territory.

VII. *Protected States* differ from protectorates of the colonial type in that, while in the latter the administration is carried on for the British crown by its servants, in the former the foreign state preserves its legal identity unimpaired. Great distinctions of character exist among such states; thus under the declaration of 1888 Sarawak's foreign relations are under British control, but the state in its internal government is independent. The Federated Malay States, on the other hand, are largely run on the model of a crown colony, but the British officers act in the name of the sovereigns of the states; the unfederated states

represent a stage intermediate between that of Saaawak and the Federated States. Under the British declaration of 1922 Egypt has ceased to be under British protection, but her independence is qualified by certain special rights claimed in the interests of Britain.

VIII. *Mandated Territories.*—Britain holds East Africa, under the style of the Tanganyika Territory, and portions of what were formerly German Togoland and the Cameroons under mandate, conferred by the principal allied and associated powers, under the treaty of Versailles of 1919, subject to the supervision of the League of Nations. Similar mandates were issued to Australia for German New Guinea and the Pacific islands south of the equator, save Samoa, which was assigned to New Zealand, while the islands north of that line were allotted to Japan; to the British empire for the island of Nauru; to the Union of South Africa for German South-west Africa; and to France for parts of Togoland and the Cameroons and Syria. Britain received also mandates for Mesopotamia and Palestine. The mandates vary in terms, conceding virtual annexation in the case of the Pacific islands and South-west Africa, according a more independent status in the other African mandates, and contemplating considerable autonomy in those for Turkish territories, subject in the case of Palestine to the onerous obligation of securing the establishment of a Jewish home. In Mesopotamia the king has received the concession of an alliance preparatory to independence. In all cases annual reports must be rendered to the League of Nations, which has the right to criticise, though not to give instructions to the mandatory power, and the holder of the mandate must study the interests of the natives and further their advancement; save in mandates which practically allow annexation, equal opportunities in matters of trade must be conceded to all nationals of states, members of the League.

To complete the complexity of the empire, it may be added that Canada, the Commonwealth, the Union of South Africa, and India have both central and local governments, true federations in the first two cases, quasi-federations in the latter, and that in addition to their mandated territories Australia controls Papua and Norfolk Island, and New Zealand the Cook Islands, while the government of British India exercises control over a large number of Indian states enjoying British protection.

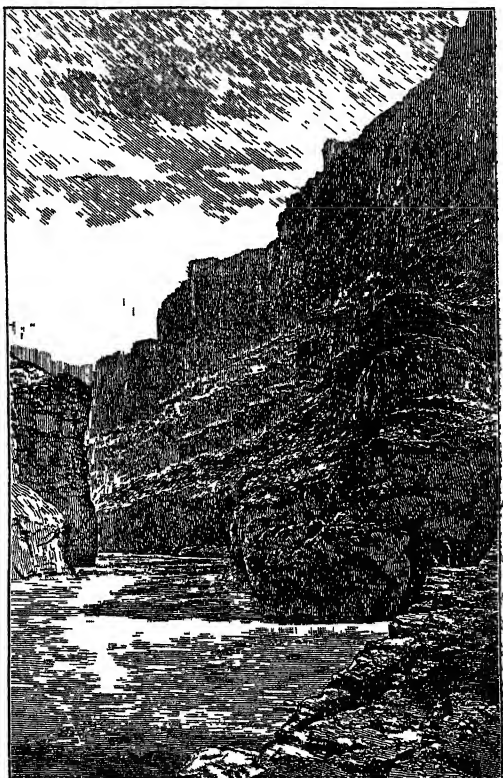
The older standard treatises on colonies include Heeren's *Manual of the Political System of Europe and its Colonies* (1841); Sir G. Cornwall Lewis's *Essay on the Government of Dependencies* (new ed. 1891); H. Merivale's *Lectures on Colonies and Colonisation* (new ed. 1861); A. Ireland's *Tropical Colonisation* (1899) and *The Far Eastern Tropics* (1905). Sir H. Johnston's *A History of the Colonisation of Africa by Alien Races* (1913), Sir F. Lugard's *The Dual Mandate in British Tropical Africa* (1922), and Sir C. Lucas's *The Partition and Colonisation of Africa* (1922) present more recent views. On the British empire, beside the important older works of Seeley (*The Expansion of England*, 1883) and Sir C. Dilke (*Problems of Greater Britain*, 1890), may be consulted Sir C. Lucas's *Historical Geography* (8 vols. 1905-20); W. Tilby's *The English People Overseas* (6 vols. 1908-14); H. E. Egerton's *Short History of British Colonial Policy* (1908) and *British Colonial Policy in the Twentieth Century* (1922); H. Robinson's *The Development of the British Empire* (1923); A. B. Keith's *Responsible Government in the Dominions* (1912), *Imperial Unity* (1916), and *War Government of the Dominions* (1921). A complete *Survey of the British Empire* was issued at Oxford in 1914; a similar survey will be issued in London contemporaneously with the British Empire Exhibition of 1924. The annual issues of the *Colonial Office List* and *The Statesman's Year Book* give the latest details.

**Colophon**, an Ionian city of Asia, about 15 miles N. of Ephesus, and not far from the coast. It

was the native city of Mimnermus, the elegist, and claimed to be the birthplace of Homer. The Greek proverb, 'to put the colophon on it,' meaning to terminate an affair, Strabo referred to the belief that the cavalry of Colophon was so excellent that its charge always decided a battle. Hence, in old printed books, any device, or printer's name, or the place and year of printing, printed at the end, was called a *colophon* (see BOOK).

**Coloquin'tida.** See COLOCYNTH.

**Colorado** (Span. for 'red' or 'reddish'), a remarkable river of North America, formed in 38° 17' N. lat., 109° 50' W. long., by the union of the Grand and Green rivers, and flowing through the great plateau region. The Green River rises in Wyoming, and drains the south-west portion



Grand Cañon of the Colorado, looking up.  
(From a Photograph by E. Baer, of Prescott, Arizona.)

of that territory; it also receives affluents from Utah and the north-west angle of the state of Colorado. The Grand River rises in Colorado, where its more common name is the Gunnison. Its main tributaries in that state are the Bunkara, or Blue, and the Dolores. Below the junction of the Green and Grand rivers the main affluent in Utah is the San Juan, which drains an interesting region in the south-west of Colorado and the north-west of New Mexico. In Arizona the main affluents are the Colorado Chiquito or Flax River, the Bill Williams, and the Rio Gila, all from the left. The only important affluent the Colorado receives from the right is the Rio Virgen. From the junction of the Grand and Green, the general course of the stream is to the south-west, through the southern part of Utah and the north-west of Arizona; and it afterwards separates Arizona from Nevada and

California. The lower part of its course is in Mexican territory, where it flows into the north extremity of the Gulf of California. The most striking features of the Colorado basin are its dryness, and the deeply channelled surface of the greater part of the country. Almost every stream and water-course, and most of all the Colorado itself, has cut its way through stratum after stratum of rock, until now it flows, in a great part of its course, at the bottom of a deep trench or cañon. The main stream for nearly 400 miles below the mouth of the Colorado Chiquito thus makes its way through a great plateau, forming the Grand Cañon of the Colorado (a national park, 1919), the most extensive and marvellous example of the kind anywhere known. The cañon-walls throughout the upper part of the great cañon are from 4000 to 7000 feet in height, and are often nearly perpendicular. At some points the walls on either side rise sheer from the water; at others there is a talus of fallen rock, or occasionally a strip of fertile soil, on one or both banks. This over-drained river basin has an area of 240,000 sq. m. Its former adaptedness to the support of human life on a considerably greater scale than at present seems to be evidenced by the presence of great numbers of abandoned and prehistoric dwellings, sometimes perched upon cliffs within some cañon, or on a high ridge or *mesa*, as if for protection from hostile attack. The Moqui towns in Arizona are still inhabited by interesting tribes of semi-civilised aborigines, no doubt relics of a race once very much more widely spread. The whole course of the river below the junction is about 900 miles; to its remotest sources it is 2000 miles. Navigation is possible for light-draught steamers for over 600 miles. At extreme high water, steamboats sometimes go up to the mouth of the Rio Virgen to load rock-salt. The lower portion of the river is visited at certain seasons by *boces*, or high tidal waves, a phenomenon to be seen in only a very few North American rivers. The non-tidal portion of the river is subject to vast and frequent changes of volume, and except where confined by cañon-walls, the river channel shifts to and fro in its sandy alluvial bed to a very remarkable degree. Its waters are largely employed in southern Arizona for irrigation purposes, and with valuable results.

**Colorado**, a river of Texas, rises by many head-streams in the south part of the Llano Estacado, of north-west Texas. Its two main head-streams are the Concho or Salt Fork, and the Red or North Fork. The river takes a devious south-eastward course of about 900 miles, and discharges its waters by two main outlets into Matagorda Bay. Its drainage area is put at 24,700 sq. m. Sand-bars at its mouth impede navigation. Steamboats have ascended the river as far as Austin, the capital of the state; but the stream is not much navigated. The basin of the river is in part very level, but in some parts of its course the banks are bold and bluff. The valley of the Colorado is fairly supplied with timber, and the soil is generally fertile; but the rains are much less abundant than in the river basins lying farther to the eastward. It is stated that this river was named Brazos by the Spanish colonists, and that the Colorado of the same settlers was what is now called the Brazos, the names having been misapplied or transposed in later times by mistake. The Colorado is the largest river wholly within the state of Texas, except only the Brazos.

**Colorado** (popularly known as the 'Centennial State'), a state of the American Union, in 37°-41° N. lat., and 102°-109° W. long., traversed from north to south by ranges of the Rocky Mountains. It takes its name from the river Colorado, to

the basin of which all the western slope of the state belongs—as the eastern to the Mississippi valley—while part of the south is drained by the Rio Grande and its head-streams. The area is 103,925 sq. m.; so that Colorado ranks as seventh in area, being surpassed by Texas, California, Montana, New Mexico, Arizona, and Nevada. The vast ranges which traverse this region have mostly an approximate north and south direction, with many deviations. The high plains and over-drained *mesas* to the west are not clearly marked off from the mountain region; and much of the western slope is actually mountainous. The eastern slope, which embraces about two-fifths of the whole state, is, apart from the foot-hills skirting the flank of the mountain-region, an open and comparatively treeless plain, with a surface singularly monotonous, and for the most part devoted to the pasturage of cattle and sheep, an interest which is of high importance in nearly all parts of Colorado. This level region averages 5000 feet in altitude, and its lowest point is 3000 feet above sea-level. The mountain-region contains many peaks exceeding 14,000 feet in height, the loftiest being Blanca Peak (14,464 feet); while the summits exceeding 13,000 feet are stated to be more than one hundred in number. The mountains, notwithstanding their general parallelism, are greatly broken into short and variously named chains, there being no one ridge that can distinctly claim to rank everywhere as the main range of the system. Six passes cross mountain-ranges at points over 12,000 feet high; the Argentine Pass is 13,000 feet in altitude. Railways are led across many of the passes, and their construction through the valleys and cañons has called for many brilliant displays of engineering skill and boldness. A marked feature of the mountain-region is presented in the *parks*, or rich mountain-valleys, often very spacious, and generally bearing evidence of being the basins of lakes once extensive, but now nearly or quite dried up. The central mountain-region, with its parks, cañons, and hot springs, and its rich mineral deposits, has attracted most attention. The western part of the state is far less accessible and less developed, although its mineral wealth and the construction of railways have led to the settlement of some parts of the region.

The rainfall of Colorado is small; yet the great altitude causes a considerable local fall of rain and snow, and several important streams take their rise in the state, including several tributaries of the Colorado; the Arkansas and South-Platte, flowing to the Mississippi; and the Rio Grande, the only stream which reaches the sea under its own name. Extensive and important irrigation-works are fed by some of these streams. Colorado has a great reputation as a health-resort, especially for persons with pulmonary disease. The dryness of the air is the great factor in the recovery of consumptive patients in this region; but some invalids only after a considerable period become so habituated to the rarefaction of the atmosphere as not to be seriously annoyed by it. The medicinal and thermal springs of the state are numerous, and are visited by large numbers. A peculiar disease called 'mountain fever' is endemic in some places, attacking principally strangers from lower levels of country.

Wheat, maize, barley, oats, hay, potatoes, fruits, and garden and dairy products are the staples of agriculture, which is remunerative in all sections where irrigation can be effected. Thousands of miles of irrigating canals and ditches have been made. A mountain-cut tunnel has turned the waters of a river, the Gunnison, into a large desert area. Visitations of insect-plagues, including the well-known Colorado potato-beetle, have hitherto

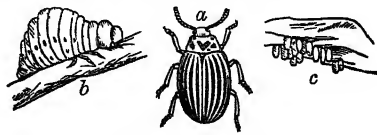
proved very destructive in this state; but the Rocky Mountain locust (see LOCUST), formerly a terrible enemy to the farmers, has of late years been comparatively harmless. Cattle and sheep are important and increasing industries, and dairying is becoming a prominent industry. Lumber-cutting also employs a number of hands.

The discovery of gold (1858) in the neighbourhood of Pike's Peak led to the first important settlements of English-speaking people in this region. The earliest discoveries were of placer-deposits; but quartz-mining soon followed, and although many of the quartz-lodes yield a highly sulphuretted material, the introduction of improved methods of treatment has finally rendered these ores, so refractory under the old processes, highly important as a source of gold. In more recent years a considerable proportion of gold has been afforded by the richly argentiferous lead-carbonate ores, for which the state is famous. From 1873 on the silver production exceeded that of gold in importance; and the state ranked as the first in the United States in outturn of silver, second or third in its gold, and first or second in the production of the precious metals in general. In the working of the best silver ores much lead is obtained, and Colorado still takes rank as one of the first states in lead production as it does in gold, though hardly now in silver. Vast sums of money have been invested in the construction of works for hoisting and reducing the ores; and railways have been built along the mountain-cañons, generally at a very high cost, so as to make the mines accessible. Mining and smelting operations have been much facilitated by the discovery of large beds of coal, usually of good quality, though classed as a lignite. Iron and Bessemer steel rails are among the manufactures of the state; zinc, copper, tungsten, radium, cement, fireclay, and manganese are wrought to a greater or less extent; and there are many petroleum wells near Florence. There is a good yield of coal. Two senators and four representatives are sent to Congress.

**History.**—Not quite one-half of this region was acquired by the United States from France in the Louisiana purchase of 1804; the remainder was ceded by Mexico under the treaty of 1848, together with California and New Mexico, of which last it formed a portion. The southern part of Colorado has for many years had a small Spanish-speaking population, partially of Indian descent. Colorado was organised as a territory in 1861, and was admitted as a state in 1876. The population is of mixed origin, but is largely derived from the older states of the Union. The distinctly American traits of enterprise and progress, shown alike in business methods and in measures for the spread of popular education, are nowhere more conspicuous than here. The principal towns are Denver, the capital, and Pueblo. There are also a number of minor towns, most of them mining centres; but the fall in the value of silver, and the closing of many of the mines (after 1893), unfavourably affected not a few of them. Pop. of Colorado (1860) 34,277; (1870) 39,864; (1880) 194,327; (1900) 639,700; (1910) 799,624; (1920) 939,629.

**Colorado Beetle** (*Chrysomela* or *Doryphora decemlineata*), a North American beetle which commits fearful ravages among potatoes. First discovered near the upper Missouri in 1824 by Thomas Say, it belongs to the sub-order of Coleoptera known as Tetramera or Cryptopentamera, and is a good type of the family Chrysomelidae. It is an oval insect, from 9 to 11 millimetres in length, of an orange colour, with black spots and lines as seen in the figure. The antennæ are club-shaped. The larvæ and adults live on the potato-plant, and have sometimes (as in 1859) quite

destroyed the crop in certain parts of America. They pass the winter underground, and emerge from their hiding-places in the beginning of May. The female lays many hundreds of eggs in groups of twelve to twenty on the under side of potato-leaves. The larvæ, which emerge in about a week, are reddish and afterwards orange. They grow up quickly, and produce a second generation, which



Colorado Beetle :

a, beetle, natural size; b, caterpillar, c, eggs.  
(From Miss Ormerod's *Injurious Insects*.)

may again produce a third in the same summer. Their rate of multiplication is therefore very rapid.

The home of the Colorado beetle is in the western states; 'from Nebraska and Iowa it travelled eastward, until, in 1873-76, it reached the eastern shores of America. In 1877 it was found at Liverpool in a cattle-boat from Texas.' Owing in great measure to the stringent regulations of an order in council, which provides that 'it shall not be lawful for any person to sell, keep, or distribute living specimens of the Colorado beetle in any stage,' this pest has fortunately not succeeded in establishing itself in Britain. The surest remedy in case of attack is said to be a preparation of arsenic known as 'Paris Green' or 'Scheele's Green.'

The genus *Chrysomela* ('golden beetle'), to which the Colorado beetle belongs, is represented by many hundred often beautifully metallic species in temperate and tropical countries. *C. cerealis*, sometimes injurious to grasses and cereals, *C. staphylea*, *C. or Lina populi*, found on poplars, are common species.

**Colorado Springs**, a popular summer-resort of Colorado, situated in the midst of beautiful scenery on the Fontaine qui Bouille Creek, 75 miles S. of Denver by rail, and about 10 miles E. of Pike's Peak; pop. 30,000.

**Coloration, PROTECTIVE and WARNING.** See MIMICRY.

**Colossæ.** Colossæ was a town of Asia Minor, in the southern part of the province of Phrygia, situated on the river Lycus, a tributary of the Mæander, 12 miles east of Laodicea. It is mentioned by Xenophon as 'a populous city, prosperous and great,' but in the time of Strabo had become 'a small town.' It was ruined by an earthquake in 61 A.D. (Tac., *Ann.* xiv. 27); but it was again rebuilt, and in the middle ages was named Chonæ. See COLOSSIANS.

**Colosseum.** See AMPHITHEATRE.

**Colossians, THE EPISTLE TO THE,** a letter written by the Apostle Paul during his imprisonment at Rome to the church at Colossæ—a town in the Lycus valley near to the more famous cities of Laodicea and Hierapolis. The church at Colossæ was founded by Epaphras, and, as far as we know, was never visited by Paul himself. Colossians is a twin epistle with Ephesians, and the relation between these two letters constitutes a very interesting problem in criticism. The object of the letter is to repel a serious attack which had been made upon some of the foundation principles of the Christian faith. A dangerous heresy had arisen, which is nameless and has never been absolutely identified. Lightfoot thinks that it originated with the Essenes, but there is no clear trace of Essenism outside the borders of Palestine; other scholars regard it as a form of incipient Gnosticism. The

creed of these heretics seems to have consisted of three main articles: (a) Knowledge is far more important than faith, and should be the goal of the religious quest. (b) Ritual and rigid asceticism are absolutely necessary to the religious life. (c) God and the world are separated by an impassable gulf, but this gulf has been bridged over by a hierarchy of mediatorial angels. Angel-worship, therefore, is of the very essence of religion. These heretics appear to have been willing to regard Christ as one of the lowest in this series of angelic mediators. That is a position which the Apostle Paul vigorously denounces. He declares with the utmost emphasis that Christ is not to be ranked among the lowest angels, for 'in him dwelleth the fullness of the Godhead bodily.' The chief characteristic of Colossians, therefore, is its exalted Christology. He is the 'image of God,' the source of the universe, the principle that holds it together, and the goal towards which it moves. A full discussion of the critical problems will be found in Moffatt's *Introduction to the Literature of the New Testament*. The best commentaries in English are those of Lightfoot, Abbott (*International Critical Commentary*). The best monograph on the critical problems is Holtzmann, *Kritik der Epheser und Colosser-briefe*.

**Colossus**, a Greek word of unknown origin, used to denote a statue of gigantic size. The colossus was a common feature of all ancient art, and in particular of Egyptian and Assyrian architecture and sculpture. The image set up by Nebuchadnezzar (*Daniel*, iii. 1) was of enormous proportions. Even Greek art, through Aristotle, laid down the principle that only the large can be noble, and carried it out in its statues of gods and heroes. Of the many colossi of which accounts have come down to us, the most famous was the bronze colossus of Rhodes, representing Helios (the Sun), the national deity of the Rhodians, which was reckoned among the seven wonders of the world, though it was by no means a masterpiece of Greek sculpture. It is said to have been the work of Chares of Lindus, a distinguished pupil of Lysippus, who gave twelve years to the casting, and completed his work in 280 B.C. Its height is variously given at from 90 to 120 feet. It stood near the harbour; but the legend that placed it astride the entrance is certainly apocryphal, and probably arose from a misunderstanding of the statement that it was so high that a ship might sail between its legs. Fifty-six years after its erection it was thrown down by an earthquake, and there its ruins lay, the marvel of the place, till in 653 A.D. an Arab general sold them to a Jew from Edessa for old metal. Other famous colossi of antiquity were the Chryselephantine (q.v.) statues of Athena on the Acropolis, 37 feet, and of Zeus at Olympia, 40 feet, both by Phidias; the Zeus at Tarentum, by Lysippus, 107 feet; a bronze Apollo, 66 feet, brought from Apollonia to Rome by Lucullus; and a marble statue of Nero, 131 feet, set up by the emperor before the palace, but removed by Vespasian to the Via Sacra, where Commodus afterwards superseded the head by one of himself. Colossi came in again with the Renaissance, and in later times the most noteworthy have been the S. Charles Borromeo (1697), on the bank of the Lago Maggiore, 72 feet; the 'Bavaria' national statue at Munich, 67 feet; the Arminius (q.v.), 90 feet; the Virgin of Puy, 51 feet; the Germania (see BINGEN), 112 feet; and Bartholdi's 'Liberty' (1886), in New York harbour, of which the figure is 151½ feet high and the pedestal 155 feet. The Dai-butsu ('Great Buddha') of Kamakura, which dates from 749 A.D., and is the most famous but not the most artistic of Japanese colossal statues, is 50 feet high.

See BAMIAN, EASTER ISLAND; Lesbazeilles, *Les Colosses Anciens et Modernes* (1876); Torr, *Rhodes* (1885-87).

**Colostrum**. See BREASTINGS.

**Colour** is not a material existence; it is a sensation. The colour of an object varies slightly with the brilliancy of the light emanating from it to the eye; and where the eye is abnormal, as in the 'colour-blind,' the apparent colours of objects may differ widely from their colours as perceived by normal eyes. Light is due to waves—or other periodic disturbances whose recurrence resembles that of waves—in the ether of space; and just as air-waves of a certain definite frequency of recurrence will induce in the ear the sensation of a sound of a particular *pitch*, so will the impact of 'ether-waves' of a certain particular frequency induce in the eye a sensation of light of a particular *colour*. But the eye is blind to all except a comparatively narrow range of ether-waves—viz. those of frequencies from 392 billion to 757 billion per second (see LIGHT). Within that comparatively small range, however, we have a large choice of fractional and integral numbers; and each number, each *frequency*, has its own colour. When we look at the spectrum or rainbow we have marshalled before us a series of colours, of which the extreme visible red is produced by about 392 billion, the extreme visible violet by about 757 billion, vibrations per second. Between these the eye may rest upon certain distinctive colours, such as yellow, blue, and so on; and the frequencies corresponding to these respective colours are, taking the centre of each distinctive colour as displayed in the spectrum—red, 492·4; orange-red, 484·1; orange, 503·3; orange-yellow, 511·2; yellow, 517·5; green, 570; blue-green, 591·4; cyan-blue, 606; blue, 635·2; violet-blue, 685·8; puce-violet, 740·5—all in billions (1,000,000,000,000)—per second. Light due to wave-motion of one simple frequency would be 'homogeneous' or 'monochromatic' light; it would produce the simplest colour-sensation; but no such thing is experimentally attainable. The light from burning sodium is a compound of two yellow lights, very near one another in the spectrum, and corresponding to the respective wave-frequencies of 508·9 and 510·6 billions per second; and this is the nearest attainable approximation to monochromatic light.

The eye takes up, singularly enough, any congeries of several monochromatic lights impinging simultaneously upon the same spot in the retina, and the resulting sensation is always that of a single colour, not necessarily resembling any of the components. Nearly every example of what we call coloured light is in reality an admixture of several monochromatic lights; e.g. the light passing through a piece of green glass is composed—as will be found on trying to make a spectrum of it by means of a prism—not only of green light, but also of blue and yellow, and, often enough, of red and violet; but the resultant sensation is that of green, a simple colour.

White light is in general due to a simultaneous impact of wave-motions of all visible frequencies. But the sensation of whiteness may also be produced by the simultaneous impact on the retina of two suitable spectral colours, such as yellow and ultramarine-blue, and such a pair of colours are said to be *complementary* to one another; other examples are red and greenish-blue, greenish-yellow and violet, orange and cyan-blue (a rather greenish blue). It will be observed that it is said that yellow and ultramarine blue lights make white light, while it is well known that yellow and blue pigments make a *green* pigment. The explanation of this is that the light from the yellow pigment is not pure; it contains green

light; similarly that from the blue pigment contains green light; when the pigments are mixed, the eye receives a simultaneous impression of blue, yellow, and green; but the blue and the yellow destroy one another, being, to the eye, complementary colours; jointly they produce white light; and thus the green alone remains, diluted with white. Complementary coloured lights may both or either be of any degree of complexity; if an aggregate impression of yellow be superimposed on the same part of the retina, whatever be the mode of their production, the result may be the same—an impression of white light.

Colours vary in hue, in purity, and in luminosity. The hue determines the name of the colour—e.g. vermilion, scarlet; the purity or absence of admixture with white light determines its richness—vermilion reflects 80 per cent. of red light mixed with 20 of white; the luminosity or brightness determines the shade or tone of colour. Interfere with any of these and the impression produced upon the eye is modified. Take, for example, a definite red light, saturated or unadulterated with white light, such a red as may be found in the spectrum; progressively lower its purity by mixing it with white light—it becomes brighter, but passes through light red and pink to pinkish-white tints; lower its luminosity—it passes through terra-cotta tones to brown, which is a dull red; interfere with both purity and luminosity by mixing with various grays—it goes through russets and maroons, the so-called tertiary colours. Any colour in nature can be matched either by a spectral colour or by a purple, treated in this way; and for each such modification of the original colour there will be a different complementary, which when mixed with it forms not a white but a gray.

The colour of transparent objects is due to Selective Absorption. A red object seen through greenish-blue glass appears black; greenish-blue glass is opaque to the light from the red object. Hold the same piece of glass up to the sky, and the red lights, which are components of the white light of day, are cut off; what passes through produces a sensation of greenish-blue. The red, which is cut off by absorption, and the greenish-blue, which passes through, are complementary to one another—both being really complex, not monochromatic. The colour of a transparent body will also apparently depend upon the thickness of the layer examined: a thin layer of iodine-vapour absorbs all the constituents of visible white light except blue and red; it therefore appears in daylight to be purple; a thicker layer effects the complete absorption of the red but not that of the blue, and a thicker layer of iodine-vapour therefore appears blue. If looked at in red light, a thin layer of iodine-vapour appears red, while a thick layer will present the blackness of opacity.

Before a non-luminous object can be seen otherwise than by transmitted light it must reflect light; if it reflect none it will appear black; a dustless pool in a mountain-hollow, a liquid in a deep black vessel, may reflect no light to the eye of the observer, and will appear black. (Black is the negation of colour, because it implies that there is no sensation of light; gray, produced by mixing white and black, is white deficient in luminosity). Let the pool become turbid, and there will be some light reflected towards the observer. A coloured liquid in a deep black vessel will have its colour revealed by sprinkling a white powder into it. White light (daylight) enters the liquid; it is reflected in all directions by the white powder; but it is in part absorbed by the liquid, which accordingly appears coloured. Of precisely the same kind is the reflection of light by a solid object. Bodies allow light to traverse them to a

very small depth, and then the light is, by internal reflection, turned back in all directions; absorption, meanwhile, comes into play, and the result is that the object appears to have a definite colour, the purity of which is marred by surface-reflection. The white light reflected from the surface of a metal masks its true colour, which is brought out by repeated reflection. Gold is deep orange; copper, scarlet; silver, yellowish-bronze; brass, a rich golden red.

If the light supplied to an object do not contain those kinds of light which it can reflect, the object will appear black or colourless; a bunch of flowers looked at by the yellow light of burning sodium, or of a spirit-lamp with common salt in the wick, will all appear black or colourless except those which are yellow. Surface-reflection modifies the result.

There is one class of cases in which colour is not due to absorption. A haze is blue if its particles be fine enough: if it be composed of coarse particles it at once reflects white light in all directions; but fine particles cause repeated reflection, and at each reflection the reflected light becomes bluer; because those rays which would have been most refracted (the blue and violet) are in fact most largely reflected. The colour of the sky is that of a haze, reflecting light downwards; if there were no dust-haze or water-haze above us, the sky would be black. The light which is not reflected from such a haze is either transmitted through it, yellower or redder in colour, or else it is entirely absorbed. The sun thus appears yellower than it would do if our atmosphere did not intervene.

See also COLOUR-BLINDNESS, COLOUR-PERCEPTION, DICHROISM, DYEING, EYE, INTERFERENCE, IRIDESCENCE, LIGHT, OPTICS, PHOSPHORESCENCE, PLEOCHROISM, POLARISATION, RAINBOW, SPECTRUM, VISION, and the articles on the several colours. For Heraldic Colours, see HERALDRY; for the Ecclesiastical Colours, VESTMENTS; and for Colour in Animals, MIMICRY, PIGMENT.

**Colour-blindness**, a term introduced by Sir David Brewster to denominate a defect of vision owing to which some persons are unable to distinguish certain colours correctly. It is also called *Achromatopsia* (Gr.) and *Daltonism*, from Dalton the chemist, who suffered from the defect, and who gave the first detailed description of it (1794).

Experience proves that this defect is generally hereditary, and is quite incurable. The eyes may be, and usually are, perfect in every other respect; no difference has been detected in their structure, either during life or after death; so the cause of their defective perception remains absolutely unknown. Numerous careful and extensive researches both in various countries of Europe and in the United States have found this defect to be present in about 4 per cent. of the males (or one in twenty-five) and less than 0.5 per cent. of the females in those countries. Further research may prove it to be commoner than this. Mendelian investigators assert that all the sons of a congenitally colour-blind woman are colour-blind. Her daughters by a normal father may transmit colour-blindness to their sons or through their daughters, but are themselves normal. A colour-blind man and a normal woman have normal children, but the daughters, as in the other case, may transmit colour-blindness, while the sons apparently cannot.

Colour-blindness more or less complete may also result from disease of the eyes (particularly atrophy of the optic nerve), and from excessive use of tobacco. See EYE, and AMAUROSIS. In the former, the distance from the direct line of sight at which colours can be recognised is diminished; in the

latter, the colour of a small disc is not recognised when it is in the direct line of sight, though it may still be perceived at a little distance to one side; and large objects give no difficulty. The presence of the latter form in engine-drivers, &c., may cause even greater risk than the congenital form of colour-blindness.

Degrees of colour-blindness are classified as follows by Holmgren of Uppsala: (1) *Total colour-blindness*, where there is no perception of colours as such, but only of gradations of light and shade; (2) *Complete partial colour-blindness*, where some bright colours, different in different cases, are confused with each other, though other colours are correctly perceived; (3) *Incomplete partial colour-blindness*, where bright colours are recognised, but more delicate shades are confused. The first form is rare, and generally, perhaps always, associated with other defects in the eyes; the third is probably common, though not of great importance; indeed everybody is more or less colour-blind in a dim light.

Dr Edridge-Green classifies the forms of colour-blindness thus: (1) defective hue-discrimination; (2) defective light-perception; (3) defective perception of colour through the foveal or central region of the retina not being normal or normally supplied. To this last class belongs the peculiar form due to tobacco described above. Under the second head come cases of defective sensibility for certain wave-lengths. A portion may be cut off entirely from one end of the visible spectrum. For persons defective in this way extreme red light (or violet, as the case may be) is darkness; mixtures in which it is included appear as if it were not there; and objects reflecting it appear black unless they reflect some other rays as well, which determine the colour they assume. In like manner the visible spectrum for some extends beyond its normal limits. Defects in hue-discrimination are very varied.

Light from different parts of the spectrum can be brought together instrumentally for comparison. By passing progressively along the spectrum until a point is found at which the eye can detect a difference in hue from the light of the starting-point, the whole can be divided up into sections, each of which appears monochromatic. For normal vision there are about eighteen of these sections. In extreme cases as many as twenty-nine may be discriminated. Dichromics (see COLOUR-PERCEPTION) are found to be defective here, trichromics less so, and so on; but each class varies much. Dichromics may even succeed as artists. A dichromic is liable to confuse red, yellow, and green, all of which appear a single colour. Owing to the gap in his spectrum green may be confused with gray and purple. A trichromic has distinct sensations of red, green, and violet. Yellow appears to him either red or green; blue he confuses with green or violet. The tetrachromic also confuses blue with green or violet, but has a distinct yellow sensation. The pentachromic is not in the ordinary sense colour-blind. He distinguishes blue, but considers orange to be yellowish-red.

For practical purposes confusion of red with green is most serious. Some confuse a bright red with a green that appears to a normal eye a much lighter colour; some with a green that appears darker. But if suitable tests be applied it will be found that they do not distinguish red and green *as such*. Experience, however, and observation of the different apparent brightness of ordinary reds and greens, enable them to distinguish between them in most cases with wonderful accuracy, so that they may remain unconscious of their defect till some striking mistake, or the application of a systematic test, reveals it. Now red and green are the very colours

which are most largely used for the purpose of signalling both at sea and on railways; and it must be obvious that most disastrous results may follow if the person whose duty it is to distinguish them from each other is unable to do so. There are difficulties in the way of substituting any other colours than red and green for signals. Blue and yellow are the only others sufficiently definite and contrasted for the purpose. But blue is much more quickly lost in passing through the air than other colours; and yellow is just the colour to which haze or distance reduces white. It is then an important practical question how the defect may best be recognised. Authorities on the subject are agreed that any test which requires the *naming* of colours is unsatisfactory, and that for two reasons. First, a person may perceive colours correctly, but may make mistakes through imperfect knowledge of their names; second, a person may be colour-blind, and yet, by his perceptions of different brightness in the tests, may name the colours correctly. Holmgren of Uppsala used a number of skeins of wool of different shades. One of these was placed before the person to be tested, generally in the first instance a pale green, and he was asked to select from the remainder those which most resembled it. If colour-blind, he might pick out some of the 'confusion colours,' pale-grays, buffs, &c., to match the green; and further similar tests could then be applied to determine more precisely his defect. This test is said to have allowed over 50 per cent. of dangerously colour-blind persons to pass, besides rejecting many normal persons; and it is now generally abandoned. Many other tests have been devised. A spectrometer may be used to investigate the candidate's vision for various parts of the spectrum; or he may be set to copy pictures. Beads may be used, or a lantern with coloured glasses. Dr Edridge-Green devised a set of cards coloured in spots. The spots of one colour form a letter which in some case or other the colour-blind candidate will fail to pick out.

For further information, see the Brit. Assoc. Report (1886); Roy. Soc. Report (1892); and works on colour-blindness and colour-vision by Jay Jeffries (Boston, U.S.), Edridge-Green (1891-1920), and Abney (1895-1913); and the writings of Sir David Brewster, George Wilson, Clerk-Maxwell, Peddie (1923), Mary Collins (1925)

**Colour-music**, a nascent art in which it is sought to make colour play the part that pitch does in music. Initial difficulties occur from the fact that the parallel on the physical side does not hold on the physiological and psychical. When a number of colours are thrown simultaneously on a screen, we do not see anything answering to a chord, but simply another colour. Again, the visible spectrum has a range of not quite one octave. It is impossible, therefore, to translate music into colour. Some have sought to get over these disadvantages in one way or other. Thus the scale can be extended through many octaves by taking saturation into account as well as hue. Various keyboard instruments ('colour-organs') have been devised and made for the performance of colour-music. Among those who have been interested were Sir Hubert von Herkomer and Scriabin. The latter wrote a colour accompaniment to his *Prometheus* and his unfinished *Mystery*.

**Colour-perception** has commonly been explained by the trichromatic theory of Thomas Young (q.v.), developed by Helmholtz, or by some modification thereof. The retina is composed of numerous ultimate nerve-elements, each of which, according to this theory, is capable of perceiving one of three physiologically primary colours. These colours are red, green, and violet (Young and Helm-

holtz); vermilion, emerald-green, and ultramarine-blue (Clerk-Maxwell); or red, green, and blue (Pick). Simultaneous affection of the elements sensitive to red and of those sensitive to green produces, according to the ratio between the respective irritations, any colour of the spectrum from red through orange and yellow up to green; similarly, green and violet lights blended in different proportions produce all the intermediate blues; and when all three sets of nerve-elements are irritated, the sensation is still that of a simple colour, or, it may be by due adjustment, of white light. The eye does not distinguish between a simple homogeneous light—say, yellow—and a mixture of quite different lights—red and green. Coloured lights may be mixed so as to show this, either by causing coloured lights from different sources to coincide in the eye or on a screen, or else, as in the colour-top, by causing ocular impressions of different colours to succeed one another in the eye with such rapidity that the eye or the brain blends them.

While the trichromatic theory is in harmony with these facts, it yet introduces difficulties of many kinds. To meet these Dr Edridge-Green proposed another theory. The impact of a ray of light on the retina liberates the visual purple from the rods (see EYE); and the decomposition of the visual purple by the light may be likened to the behaviour of a photographic plate exposed in a camera. The cones are stimulated thereby and transmit impulses to the brain, differing according to the wave-length of the light. Thus there is no need to assume a difference invisible to the anatomist and physiologist between one cone and another. The visual purple diffuses from the rods into the surrounding liquid, so that the absence of rods from the fovea centralis is no objection to the theory.

Certain colour sensations seem to the observer to be fundamentally distinct, while others are felt to be mixtures or modifications, though both definite colours and modifications may be obtained alike either by mixing of lights or by isolating a small region of the spectrum. Thus blue-green is felt to be composed of blue and green; but green is not felt as yellowish-blue or bluish-yellow. To the normal sighted red, yellow, green, and blue are fundamental sensations, and perhaps orange and violet, though some would call orange a reddish-yellow. A few would add a seventh colour between blue and violet. To this colour Newton, whose vision seems to have been of this 'heptachromatic' class, gave the name of indigo. Others prefer to call it ultramarine. On the other hand, below the 'hexachromatic' there are persons who may be classed as pentachromatic, tetrachromatic, trichromatic, dichromatic, and achromatic. To the trichromatic yellow is greenish-red, blue is greenish-violet. The dichromatic see the spectrum coloured at the ends only (red and violet), with a neutral gap. The achromatic see merely variations in brightness. See COLOUR-BLINDNESS.

**Colour-printing.** See ILLUSTRATION, LITHOGRAPHY, PHOTOGRAPHY, PRINTING.

**Colours, MILITARY,** are the flags carried by certain regiments of the British army. Those of the infantry were originally called ensigns, a name still used in the navy. In former times there was one for each company, but now there is, in each Battalion (q.v.), a 'pair of colours,' one (the 'Union Jack,' on a blue ground) called the royal or king's colour is the more important, and of the same pattern for all regiments; the other, or regimental colour, matches the facings of the regiment, and has in one corner the blue union, in the centre a wreath of roses, shamrocks, and thistles, with the name, crest, and motto of the regiment, and the campaigns in which it has taken part.

The facings of all regiments having the title 'Royal' are blue, otherwise they are white for English, yellow for Scottish, and green for Irish. The East Kent Regiment, formerly famous as the 'Buffs,' retains the buff facings, and is the only exception. English regiments have the St George's cross in red on their white colours. All colours are made of silk, 3 feet 9 inches by 3 feet, fringed with gold, and have crimson and gold cords and tassels, on a staff 8 feet 7 inches long. They are carried on parade by the two junior second lieutenants (formerly ensigns), and guarded by two sergeants and two men, forming what is called the 'colour party.' Since the Franco-German war of 1870-71 it is recognised that they make too conspicuous a mark; and since the defeat at Laing's Nek (28th January 1881), when they were nearly captured, British colours have not been taken into action. At Isandula (1879) an officer trying to save them was drowned in the Tugela, and the colours were found wrapped round his body. Regiments of guard cavalry have oblong 'standards,' 30 inches by 27, and dragoon regiments have 'guidons,' 41 inches by 27, slit in the fly, with the upper and lower corners rounded off at 1 foot from the end. These flags are all of crimson silk, with gold fringe, cord, and tassels, and bear the crest and campaigns of the regiment. The Royal Artillery, Royal Engineers, Lancers, Hussars, Rifle regiments, and temporary regiments have no colours. When a regiment obtains new colours, they are usually solemnly presented by a royal personage or some lady of distinction, with much military pomp, after a special religious service. The old colours are hung up in the cathedral or parish church at the territorial headquarters. A member of the Herald's College is 'inspector of regimental colours.' *Camp* colours are small flags matching the facings of the regiment, to designate the part of the camp it occupies.

**Colour-sergeant** (so called as being a sergeant who, in addition to other duties, guarded the colours), now called company sergeant-major, is the chief non-commissioned officer in a Company (q.v.) of British infantry. On his efficiency its good order mainly depends, as he is the channel of communication between the Captain (q.v.) and the men in almost everything. The distinctive badge consists of crossed colours worn on the sleeve above the Chevrons (q.v.). The pay is 10s. a day. The corresponding rank in the cavalry is squadron sergeant-major (corporal of horse in the Life and Horse Guards). In the United States army each battalion has a colour-guard, composed of a colour-sergeant and seven corporals. The colour-sergeant carries the national colours.

**Colquhoun, JOHN**, second son of Sir James Colquhoun of Luss, was born in Edinburgh, 6th March 1805, studied at Edinburgh University, served in the army 1829-34, and became a supreme authority on sport in Scotland. The famous record of his experiences, *The Moor and Loch*, published in 1840, was much extended and improved in the 4th (1878) and 5th (1884) editions. *Rocks and Rivers* appeared in 1849; *Salmon Casts and Stray Shots*, 1858; and *Sporting Days*, 1866. He died at Edinburgh, 27th May 1885.

**Colquhoun, PATRICK**, born at Dumbarton, 14th March 1745, became provost of Glasgow in 1782, went to London in 1789, and in 1792 became a police-magistrate there. He was indefatigable in forwarding administrative legislation, educational and commercial reforms, wrote innumerable pamphlets, and published two important works—*Police of the Metropolis* (1795); and *Population, Wealth, Power, and Resources of the British Empire* (1814). He died 25th April 1820.

**Colston**, EDWARD (1636–1721), a Bristol merchant, Tory and high-churchman, bestowed over £70,000 in establishing or endowing almshouses, schools, and other public benefactions. From 1689 he lived chiefly at Mortlake. His 'day' falls on 13th November, and is celebrated yearly at Bristol in dinners held by Conservative, Liberal, and non-political societies founded in honour of his memory. See the *Life* (with an account of the work of the societies) by Dr H. J. Wilkins (1920).

**Colt**, SAMUEL, inventor, born in Hartford, Connecticut, in 1814, ran away to sea in 1827, and about 1832 travelled over a large part of America, delivering lectures on chemistry by which he obtained the funds required to prosecute his invention. In 1835 he took out his first patent for a revolving pistol, which after the Mexican war was adopted as a regular weapon for the United States army, and since then has been adopted universally. Colt expended over \$2,500,000 on an immense armoury in Hartford, where he died 10th January 1862, and where his widow erected a handsome Episcopal church to his memory. See **REVOLVER**.

**Colt's-foot**. See **TUSSILAGO**.

**Coluber**, a genus of non-venomous snakes, of almost world-wide distribution. It forms a type of the family Colubridæ, in which the common Ringed English Snake (*Tropidonotus natrix*) is also included. The Æsculapian Snake (*Coluber æsculapii*), so familiar from ancient times as a symbol of medicine, is the best-known species. It is very common in Italy, is the species of the Schlangenbad, and is widely distributed in Europe. It is of a predominantly brown colour, attains a length of 4 or 5 feet, and is readily tamed. All the members of the family are very typical snakes. See **SNAKE**.

**Colugo**, GALEOPTHECUS, or FLYING LEMUR. See **FLYING ANIMALS**, with figures; **INSECTIVORA**.

**Colum**, PADRAIC, born at Longford in 1881, wrote a number of plays for the Abbey Theatre, of which the best known are *The Land* (1905), *The Fiddler's House* (1907; in an earlier form called *Broken Soil*), and *Thomas Muskerry* (1910). *Wild Earth* (1907) is a book of poems. He edited *Broad Sheet Ballads* (1913) and *Poems of the Irish Revolutionary Brotherhood* (1916).

**Columba**, Sr—called also Colum-cille ('Columba of the Churches') and Colm—was born (it is believed at Gartan, County Donegal) in the north of Ireland, on 7th December 521. His father Fedhlimidh, of the tribe of the Cinel Conaill, was a kinsman of several of the princes then reigning in Ireland and in the west of Scotland; and his mother, Eithne, was also of royal blood. After studying under St Finnian at Moville on Strangford Lough, and under another St Finnian at Clonard (where he had as companions St Comgall, St Ciaran, and St Caineach), he spent some time near Dublin; but in 546, when no more than twenty-five, he returned to the north and founded Derry, and, six or seven years afterwards, Durrow, the greatest of all his Irish monasteries. The belief that he had caused the bloody battle of Culdremhne in 561 led to his excommunication by an Irish ecclesiastical synod, and practically to exile from his native land.

Setting out in 563, when in his forty-second year, and accompanied by twelve disciples, he found a resting-place in the little island of Hy or Iona, now better known as Iona (q.v.), or I Colum-cille, and having planted a monastery there, he set himself to the great work of his life, the conversion of the Pictish tribes beyond the Grampians. His missionary efforts were highly successful, but unfortu-

nately very little is known of the way in which he effected his purpose. Bede speaks simply of his 'preaching and example.' Adamnan, extolling his gift of miracles, tells how the gates of the Pictish king's fort near Inverness burst open at his approach, and how, as he chanted the 45th Psalm, his voice was preternaturally strengthened so as to be heard like a thunder-peal above the din and clamour by which the Pictish magicians tried to silence his evening prayer under the walls of the Pictish palace. We get another glimpse of his missionary footsteps from the *Book of Deer* (q.v.), which records how 'Colum-cille and Drostan, the son of Cosreg, his disciple, came from Hy, as God had shown them, to Aberdour,' in Buchan; how 'Bede, a Pict, was then high-steward of Buchan, and gave them that town in freedom for evermore;' how 'they came after that to another town, and it was pleasing to Colum-cille, for that it was full of God's grace; and he asked of the high-steward Bede that he would give it to him, but he gave it not; and, behold, a son of his took an illness, and he was all but dead, and the high-steward went to entreat the clerics that they would make prayer for his son that health might come to him; and he gave in offering to them from Cloch-in-Tiprat to Cloch-Pette-mic-Garnait; and they made the prayer, and health came to him.' In some such way as this St Columba and his disciples seem to have traversed the Pictish mainland, the Western Islands, and the Orkneys, establishing humble monasteries whose inmates ministered to the religious wants of the people. The parent house of Iona exercised supremacy not only over all those monasteries, but over all the monasteries that St Columba had built in Ireland, and over those that were founded by his disciples in the northern provinces of England. Thirty-four years appear to have been spent by St Columba in raising up and perfecting his ecclesiastical system in Scotland. But the labour did not so wholly engross him but that he found time for repeated voyages to Ireland, and for a visit to Glasgow, where St Kentigern or Mungo was restoring Christianity among the Welsh or British tribes of Cumbria and Strathclyde. The health of St Columba seems to have begun to fail in 593, but his life was prolonged till he reached his 76th year, when he breathed his last as he knelt before the altar of his church in Iona a little after midnight, between the 8th and 9th June 597. He was buried within the precinct of his monastery, and his bones—which were afterwards enshrined—the stone pillow on which he slept, his books, his pastoral staff, and other things which he had loved or used, were long held in great veneration.

Whether any original composition of St Columba's still survives is doubtful, though an *Altus* published by Dr Todd in the *Liber Hymnorum*, and republished by the Marquis of Bute in 1882, has been ascribed to him by unbroken tradition. Be this as it may, he was certainly eminent as a transcriber. Adamnan tells us that on the night before his death he was engaged on a transcript of the Psalter, and in the *Annals of Clonmacnois* it is stated that 'he (Columba) wrote three hundred books with his own hand . . . which books have a strange property, which is that if they or any of them had sunk to the bottom of the deepest waters they would not lose one letter, or sign, or character of them, which I have seen tried, partly by myself on that book of them which is at Dorowe.' The two existing specimens of St Columba's work, both preserved at Dublin, are the Book of Durrow just mentioned, and the Psalter known as the Cathac or Batlier. This name it has received from the custom of bearing the relics of the ancient Celtic saints into battle as sacred

victory-bringing ensigns. St Columba's crossier was also used in this way.

St Columba's character was very complex, but marked in all things by enthusiasm and earnestness. Warlike and aggressive by temper and descent, as well as from the spirit of the times, he was naturally more inclined to action than to melancholy, and yet he had a tendency to expatiate amid visions; and though his disposition was prevailingly austere, he had frequent gleams of tenderness and kindness. 'Angelic in appearance,' says Adamnan, 'graceful in speech, holy in work, with talents of the highest order and consummate prudence, he lived during thirty-four years an island soldier. He never could spend the space even of one hour without study, or prayer, or writing, or some other holy occupation. So incessantly was he engaged night and day in the unwearied exercises of fasting and watching, that the burden of each of these austerities would seem beyond the power of all human endurance. And still in all these he was beloved by all; for a holy joy ever beaming on his face revealed the joy and gladness with which the Holy Spirit filled his inmost soul.'

In the ecclesiastical system of St Columba as in that of Ireland, the church was essentially monastic with 'neither a territorial episcopacy nor anything like presbyterian parity, but the same anomalous position of the episcopal order. The bishops were under the monastic rule, and as such were in respect of jurisdiction subject to the abbot, even though a presbyter, as the head of the monastery;' but while the power usually reserved to the episcopate was thus transferred to the abbatial office, 'the episcopal orders were fully recognised as constituting a grade superior to that of the presbyters,' and as carrying with them the functions of ordination and celebration of the eucharist according to the episcopal rite. St Columba himself, as well as his followers generally till the year 716, kept Easter on a different day, and shaved their heads after another fashion than obtained in other parts of Western Christendom. But with these exceptions, their creed and rites appear to have been substantially the same.

The chief authority for the life of St Columba is the account written by St Adamnan (q.v.), who was abbot of Iona from 679 to 704, and who incorporated in his work an earlier life by Cuimine (abbot, 657-669). Of this Dr Reeves published an edition in 1837 for the Bannatyne Club, re-issued in the 'Scottish Historians' series (1874); and there are others by J. T. Fowler (1894; 1920). See also Smith's *Life of St Columba* (Edin. 1798); Lanigan's *Ecclesiastical History of Ireland* (1822); Father Innes's *History of Scotland* (Spalding Club, 1853); Montalembert's *Monks of the West*, vol. iii.; Forbes's *Kalendar of Scottish Saints* (Edin. 1872); and Skene's *Celtic Scotland*, vol. ii. (Edin. 1877).

**Columban**, or COLUMBANUS, ST, one of the most learned, eloquent, and devoted of the many missionaries whom Ireland sent forth to the Continent during the Dark Ages, was born in Leinster in the year 543. Having studied under St Comgall, in the great monastery of Bangor, on the coast of Down, he passed over to France, in his fortieth year, accompanied by twelve companions, and founded successively the monasteries of Anegray, Luxeuil, and Fontaine, in the Vosges country. His adherence to the Irish rule for calculating Easter involved him in controversy with the French bishops in 602; and a few years later, the courage with which he rebuked the vices of the Burgundian court, led to his expulsion, largely at the instigation of the notorious Brunhilda, the king's grandmother. After various travels and adventures, and having for a year or two settled at Bregenz,

near the Lake of Constance, he passed into Lombardy, and in 612 founded the famous monastery of Bobbio, in the Apennines, where he died on the 21st November 615. His life, written within a century after his death, by Jonas, one of his successors in the abbacy of Bobbio, has been repeatedly printed. The writings of St Columban, which are wholly in Latin, consist of a rule for the government of his monastery, six poems on the vanity of life, several letters on ecclesiastical affairs, seventeen short sermons, and a commentary on the Psalms (first published at Rome in 1878). The most complete edition of his works is in Patrick Fleming's *Collectanea Sacra* (Augsburg, 1621; Louvain, 1667), followed by the *Bibliotheca Patrum*, and Migne's *Patrologiae Cursus* (1844). The town of San Colombano, in the province of Milan, takes its name from the Irish monk, as St Gall (q.v.), in Switzerland, perpetuates the name of the most favoured of his disciples. See the *Vita* by his successor Jonas of Bobbio (tr. by D. C. Munro, 1896), Montalembert's *Monks of the West*, and Wright's *Biographia Literaria*.

**Columbarium** (Lat.), a dovecot or pigeon-house, which probably differed little in form from those in modern use, but was sometimes built on a much larger scale, as we read in Varro of as many as five thousand birds being kept in the same house. The same name was applied to the niches or pigeon-holes in a particular kind of sepulchral chamber in which the urns (*ollæ*) containing the ashes of dead bodies burned were deposited. Each niche usually contained two urns, and the four walls of the sepulchre sometimes contained as many as one hundred niches or more. The names of the persons were inscribed underneath. Tombs of this description were chiefly used by great families for depositing the ashes of their slaves and dependants.

**Columbia**, the name of over fifty places in the United States, of which the most important are: (1) The capital of South Carolina, at the head of navigation on the Congaree River, 125 miles NNW. of Charleston. The town is regularly built, with several handsome streets, and contains a fine granite state-house and other official buildings. It is the seat of a Presbyterian theological seminary, and of the university of South Carolina (1806), and other colleges. Pop. (1920) 37,524.—(2) A borough of Lancaster county, Pennsylvania, on the Susquehanna, which is here crossed by a railway bridge, 80 miles W. of Philadelphia, with several iron-furnaces and rolling-mills, and manufactures of machinery, flour, &c. Population, 11,000.—(3) The capital of Maury county, Tennessee, on the Duck River, 38 miles SSW. of Nashville, with manufactures of ploughs, furniture, and flour. Population, 5500.—(4) The capital of Boone county, Missouri, 24 miles E. of Boonville, with manufactures of flour, wooden goods, and shoes. It is the seat of the state university (1840), not to be confused with Columbia University, New York. Pop. 10,000. See also DISTRICT OF COLUMBIA.

**Columbia**, or OREGON, after the Yukon the largest river on the west side of America, rises in a small lake (Lake Columbia), in British Columbia, on the west slope of the Rocky Mountains, about 50° N. lat., doubles round the north end of the Selkirk Range, passes through the Upper and Lower Arrow Lakes, follows a very irregular course, generally south-west, through Washington, forms the northern boundary of Oregon for about 350 miles, and enters the Pacific by an estuary 35 miles long and from 3 to 7 wide. Its estimated length is 1400 miles. The area drained by this stream and its affluents, of which the largest

are Clarke's Fork and the Snake River (with very remarkable cañons), has been computed at 298,000 sq. m. The river is broken by falls and rapids into many separate portions, and the ingress and egress are embarrassed by a surf-beaten bar. Still, it is open to steamboat navigation from its mouth to the Cascades (160 miles), and goods are carried past the obstruction, for 6 miles, by canal or railway; the next reach, of 50 miles, extends to Dalles. For 14 miles there are falls and reefs; two upper reaches are navigable for small steamers. The extraordinarily abundant salmon-fisheries have been largely developed; the canneries are mostly near the mouth of the river.

**Columbia, BRITISH,** Canada's maritime province on the Pacific, has an area of 355,855 sq. m.—an irregular quadrangle about 700 miles from north to south, with an average width of 400 miles, between latitudes 49° and 60° north. It is bounded S. by the United States, W. by the Pacific Ocean and Alaska, N. by the Yukon and North-west Territories, and E. by Alberta. The long-debated boundary between it and Alaska was definitively settled by a joint British and American commission in 1903 (see ALASKA). This country, then known as New Caledonia, formed part of the Hudson Bay Company's concession, but in 1858 it was constituted a crown colony, owing to the large immigration consequent on the discovery of gold. In 1866 the colonies of British Columbia and Vancouver Island were united, and in 1871 British Columbia entered the Canadian Confederation; it is now represented by six members in the Senate and fourteen (since 1924) in the House of Commons of Canada. The population in 1901 was 178,657; in 1911, 392,480, including 29,000 Indians, 17,000 Chinese, 16,000 Japanese, and 5000 Hindus; in 1921, 524,582. Some of the principal cities and towns are Victoria, the capital (pop. 39,000); Vancouver (117,000); New Westminster (14,500); Nanaimo (9000); North Vancouver (8000); Prince Rupert (6000); Nelson (5000).

The vast tract comprised within the limits of the province, extending as it does through nearly twelve degrees of latitude, naturally affords a great diversity of climate. The coast region has been described as 'having a climate wonderfully like that of England, only the summers are much drier.' The warm tropical waters of the Pacific Gulf Stream (Japan Current) give to Vancouver Island and the coast generally a mild and agreeable climate; there is little frost or snow, and there is a difference of at least ten degrees of latitude in favour of places on the coast as compared with corresponding positions on the Atlantic seaboard. The interior is subject to greater extremes both of heat and of cold, especially east of the Rocky Mountains.

The provincial government is administered by a lieutenant-governor and Legislative Assembly of forty-seven members. The members are elected for four years, every male or female adult (being a British subject) having resided six months in the province being entitled to vote.

The provincial University of British Columbia, at Vancouver, was founded in 1907, and opened for teaching in 1915. The number of schools in operation is about 900, under 2000 teachers, with an enrolment of 70,000 pupils. The schools are free and non-sectarian; no religious dogma or creed is permitted to be taught. School districts are formed wherever there are twenty children between the ages of six and sixteen years.

The provincial revenue increased from \$1,736,445 in 1903 to upwards of \$12,600,000 in 1919-20. The trade of the province is developing rapidly; in 1918-19 the imports amounted to \$63,700,000, and the exports to \$77,000,000. Exports consist of minerals (chiefly gold, silver, copper, and coal), sea products (chiefly salmon, halibut, herring, whale products

and oil), lumber, fruit, furs, skins, &c. A large portion of the salmon, canned and pickled, goes to Great Britain, Germany, eastern Canada, the United States (including Hawaii), Australia, and Japan; the United States consumes a large share of the exported coal; and immense quantities of lumber are shipped to Great Britain, South Africa, Japan, China, India, Australia, Mexico, and South America. The fruit industry assumed large proportions in the early years of the 20th century, and promises to become the leading industry of the province; apples, pears, strawberries, plums, cherries, grapes, tomatoes, prunes, and peaches being the most extensively produced, but nectarines, apricots, figs, almonds, and several other kinds of fruits and nuts have been grown with success in southern British Columbia. The valuable furs—seal, sea otter, and other peltries—are sent to Great Britain and the United States (see SEAL, OTTER). China also buys a considerable amount of lumber, timber, and furs. Valuable shipments of oil, principally obtained from whales and dog-fish, are consigned to Great Britain and the United States. A large interprovincial trade with Alberta, Saskatchewan, Manitoba, and the eastern provinces is rapidly developing, the fruit grown in British Columbia being largely sent to the prairie provinces, where it finds a good market. Whaling is a recent industry, and its produce makes an important item in the export trade.

The principal minerals are gold, silver, lead, copper, zinc, and coal. Molybdenum, platinum, arsenic, asbestos, graphite, and gypsum are also got; and there are immense deposits of magnetite and hematite iron of the finest quality which still remain undeveloped. British Columbia's coal-measures are sufficient to supply the world for many centuries. It possesses the greatest compact area of merchantable timber in North America; the importance of the fisheries, apart from salmon-fishing, is only beginning to be realised; about one-tenth of the available land is settled upon, not to say cultivated; the province has millions of acres of pulpwood as yet unexploited; most of the territory is unexplored and its potential value unknown. There is estimated to be about 5,000,000 horse-power in water-powers undeveloped in the province. A great advance has been made in metal-mining; the oldest districts have increased their production, while new fields have been opened up. There has been a corresponding increase in the population; some of the new mining districts, of late inhabited by only a few hardy prospectors, are now dotted with active and prosperous mining-towns.

The Canadian Pacific is the principal railway. It has three main lines through the province, the Transcontinental, Crow's Nest Pass, and Kettle Valley lines, and several branches, connecting with United States railway systems; also steamboat connections on the land lakes, besides a large fleet of ocean-going and coasting steamers. Of the Canadian National lines, the Grand Trunk Pacific main line was built eastward from Prince Rupert, and completed the second Canadian transcontinental route in 1914; and the Canadian Northern Pacific has lines from Tête Jaune Cache to Vancouver City, and in Vancouver Island. The railway mileage of the province is over 4000 miles.

Until the completion of the Canadian Pacific Railway in 1885, British Columbia was isolated from the rest of the Dominion. It occupies a favourable position for trading with the west of South America, and for becoming more and more the entrepôt of the through trade between Canada, China, and Australia. Lines of steamers now connect Vancouver, Hong-kong, and Australasian ports; and the Panamá Canal greatly promotes its

commerce by sea. The section of the 'All British' telegraph cable from Vancouver to Australia was completed in 1902.

See A. Begg, *History of British Columbia* (1896); F. Maenab, *British Columbia for Settlers* (1898); W. A. Bailhe-Grohmann, *Sport and Life in British Columbia* (1899); J. T. Bealby, *Fruit-Ranching in British Columbia* (1909); and the provincial year-books.

**Columbia University**, in New York city, was founded in 1754 as King's College, and reincorporated as Columbia College in 1784. The first class, of eight, met in the vestry of old Trinity Church in 1754; in 1760 the college settled in a building near the city-hall, removed to a new site in 1867, and in 1895 was once more transferred to a new site and new buildings. Under President Barnard (1864-89) the college was greatly extended; and under the Hon. Seth Low (1890-1902) the several flourishing schools were consolidated. In 1896 the name Columbia University was adopted for the whole institution, 'Columbia College' being restricted to the undergraduate department. In the university there are, besides Columbia College, Barnard College for women, schools of law, medicine, pharmacy, journalism, business, dentistry, philosophy and pure science, applied science, courses in fine arts, teachers' college, summer school, and university extension courses, with some 30,000 students in all. See the history of the university by G. H. Moore (1890), and Brander Matthews, *American Universities* (1895).

**Columbine** (Ital. *colombina*, 'little dove'), the female character in Italian Pantomime (q.v.).

**Columbine** (*Aquilegia*), a genus of Ranunculaceæ, with five coloured sepals, which soon fall



Common Columbine (*Aquilegia vulgaris*).

off, and five petals each terminating below in a horn-shaped nectary. The name (from Lat. *columba*, 'a dove') is derived from the resemblance of the flower to a cluster of doves, of which the convergent nectaries suggest the heads and necks, and the divergent sepals the fluttering wings. They are natives of the temperate and colder regions of the northern hemisphere. One, the Common Columbine (*A. vulgaris*), is found in woods in some parts of Britain, and has long been familiar as an inmate of flower-gardens. It is a perennial, generally 2 to 3 feet high, with flowers of considerable beauty. Columbine was formerly much esteemed for medi-

cinal virtues, which are now seldom heard of.—Some of the other species are very ornamental, and are pretty common in flower-borders.

**Columbium**. See NIOBIUM, TANTALUM.

**Columbus**, the capital of the state of Ohio, stands on the Scioto River, 120 miles NE. of Cincinnati. Its site is level, its streets are broad, and in the centre of the city is a public square of 10 acres, in which stands the state capitol, a fine stone structure. Among other noted edifices are the city-hall, containing a public library and city offices; a court-house; United States government and Board of Trade buildings; a large state penitentiary; a hospital for the insane, with a farm of 300 acres, and capacity for over 1000 patients; and institutions for the blind, the deaf and dumb, &c. Here also are located the Ohio State University, with its grounds of 320 acres, and the Capital University (Lutheran), both liberally endowed; and there are other important educational institutions. Fourteen lines of railway radiate from the Union Depot in this city in all directions, which, added to the natural advantage of its proximity to the great coal and iron fields of the state, tend to a rapid development of its industry and commerce. There is a large trade in grain, wool, live-stock, iron, and coal, and important manufactures of iron and steel, agricultural implements, shoes, automobiles, &c. In a terrible flood of March 1913 many lives and much property were lost. Columbus was founded in 1812. Pop. (1870) 31,274; (1910) 181,511; (1920) 237,031.

Columbus is also the name of some twenty other places in the United States, the most important being: (1) Capital of Muscogee county, Georgia, situated on the Chattahoochee River at the junction of several lines of railroad, 100 miles SSW. of Atlanta. It has a large trade in cotton, and extensive manufactures of cotton and iron goods. Pop. 31,100.—(2) Capital of Bartholomew county, Indiana, 41 miles S. by E. of Indianapolis, with which it is connected by railway; there are tanneries, lumber-mills, &c.; pop. 9000.—(3) Capital of Lowndes county, Mississippi, on the Tombigbee River, and on a branch railroad about 150 miles NE. of Jackson; much cotton and lumber is shipped; pop. 10,500.—(4) Capital of Colorado county, Texas, on the Colorado River, 95 miles SSE. of Austin; cotton, cane, rice, dairy produce, hides, corn, and hay are extensively shipped; pop. 2000.

**Columbus**, CHRISTOPHER (a Latinised form of the Italian *Cristoforo Colombo*; the Spanish form, *Cristóbal Colón*), corresponds to another Latinisation into *Colonus*), the discoverer of the New World, was born at Genoa, though some would make him a Spaniard. The date was probably 1446, though variations range from 1436 to 1457. His father, Domenico Colombo, seems to have been a cloth-weaver or wool-comber, ultimately very prosperous, and it would appear that in early youth his son Christopher worked at the same trade; but he spent some time, probably not much, at the university of Pavia. When fourteen years old he went to sea. The mariners of those days were fighting men, and we find notices of the young Columbus in an expedition against Naples while in the service of the good King René, Count of Provence, who, on one occasion, sent the young man to Tunis, to cut out a captured galley. It is not a little remarkable that on this occasion his men, like so many of his later crews, refused to obey his orders; and he was obliged, as more than once in later years, to deceive them as to his real course. The accounts of his early voyages are obscure and of doubtful accuracy. About 1470 he was wrecked in a sea-fight off Cape St Vincent, and reached the shores of Portugal on a plank. In

Lisbon he married Filipa Moniz, a lady who had been connected with the convent of All Souls there; she was related to one Perestrello, an Italian navigator, who had governed Porto Santo, off Madeira, for the Portuguese king.

As early as 1474 he had conceived the design of reaching India by sailing westward; and in this intention he was encouraged by Toscanelli, a Florentine astronomer. In 1477, he tells us, he 'sailed 100 leagues beyond Thule,' probably to or beyond Iceland (where he may have got some hint of the old Norse adventures in Vinland, q.v.); he seems also to have visited the Cape Verd Islands and Sierra Leone. Columbus soon after this began to seek a patron for his intended expedition. He applied once or more to King John II. of Portugal; later by letters to Henry VII. of England; then to the rich and powerful dukes of Medina Sidonia and Medina Celi, in Spain, of whom the last named at length referred him to Isabella the Catholic, queen of Castile. His application to the queen was submitted to a body of jurors, most of them ecclesiastics, who reported adversely to the project of the Genoese mariner. Finally, through the intervention of Juan Perez de Marchena, a monk who had been the queen's confessor, he was brought in contact with their Catholic majesties, Ferdinand and Isabella. His plans and demands were once more rejected, but afterwards reconsidered; and finally, after seven years of alternate encouragement and repulse, his proposals were accepted by the monarchs, in the camp of Santa Fe, April 17, 1492. On Friday, August 3, 1492, Columbus, now an admiral, set sail from the bar of Saltes, an island near Palos, in command of the small ship *Santa Maria*, with 50 men, and attended by two little caravels, the *Pinta* and the *Niña*, the whole squadron comprising only 120 adventurers. He first made the Canary Islands, whence, on the 6th of September, he set sail westward. On the 13th a variation of the magnetic needle was observed, a circumstance which struck terror into the hearts of his followers. From this and various other causes he found it hard to keep up the courage and patience of his crews. On Friday, October 12, land was descried. There is no doubt that this first landfall, named San Salvador by Columbus, was one of the Bahama Islands; and the more general recent opinion would appear to be that it was what is now called Watling's Island; but this is not by any means certain. He then visited Cuba and Hayti, which he named Hispaniola or Little Spain, and where he planted a small colony of Spaniards. He set sail on his return with his two caravels (for his flagship had been wrecked), and after an exceedingly tempestuous voyage, the *Niña* alone cast anchor in the Tagus. He re-entered the port of Palos, March 15, 1493. On the very same day the *Pinta* also, which had parted company from him more than a month before, entered the same port, having been driven out of her course to Bayonne. The voyagers brought back with them some gold, various plants, birds, and land animals, and six natives of the West Indies. Columbus was received with the highest honours by the court, then at Barcelona, and was hailed as admiral of the sea and a grandee of Spain.

He sailed on his second voyage on the 24th of September, with three carracks and seventeen small caravels, and on the 3d of November sighted the island of Dominica in the West Indies. His remaining career presents one long series of failures, vexations, and miseries. After a succession of wretched quarrels with his associates, and a long and desperate illness in Hispaniola, he returned to Spain much dejected in 1496. His third voyage, begun in 1498, resulted in the discovery of the South American mainland. In 1500 Columbus and

his brother were sent home in irons by a newly-appointed royal governor; but the king and queen repudiated this action, and restored Columbus to favour. His last great voyage (1502-4), along the south side of the Gulf of Mexico, was accomplished in the midst of great hardships and in many distresses of body and mind. Spanish jealousy of the foreigner and of his well-earned honours worked against him on sea no less than at court. Columbus died at Valladolid, May 20, 1506. He was buried there; but in 1513 his remains were translated to Seville, thence in 1536, with those of his son Diego, to Santo Domingo, in Hispaniola. In 1796 they (or perhaps Diego's only) were transferred to the cathedral at Havana. After the Cuban war, the bones were brought from Havana to Spain (1899), kept for a time at Granada, and finally deposited in 1902 in a special mausoleum built at Seville for their reception.

A man of ardent impulses and strongly poetical imagination, Columbus was hardly the stuff that leaders are made of; consequently he failed to control the turbulent and adventurous spirits among his followers. Although an honestly and earnestly religious and truly conscientious man, he was not seldom guilty of acts which subsequently brought him many compunctions of conscience. Irritable and impetuous, he was, nevertheless, magnanimous and benevolent. His conduct in the capture and sale of slaves, though justified by the jurists and divines of the time, was indignantly condemned by the queen, and can only be explained by the desire of Columbus and the crown to obtain some revenue from his new discoveries, and by the hope that while detained in slavery the natives might become christianised.

His brother BARTHOLOMEW, who died in Cuba in 1514, was a man of high character and excellent abilities, and assisted Columbus effectively in his labours.—Another brother, GIACOMO (called in Spain DIEGO), who also assisted him in his West Indian government, was a man of gentle and pacific disposition, but was no match for the turbulent adventurers he attempted to control.—Christopher's eldest son, Diego (about 1480-1526), was the heir to his honours, merits, and misfortunes. The great discoverer left also a natural son, Don Fernando (1488-1539), who wrote an important Life of his father, preserved only in an Italian translation (published at Venice, 1571; Milan, 1614; and London, 1867). In 1578 the last legitimate descendant of Columbus in the male line died.

It is doubtful if any of the portraits of Columbus are authentic. Las Casas says: 'He had a figure that was above medium height, a countenance long and imposing, an aquiline nose, clear blue eyes, a light complexion tinged with red, beard and hair blonde in youth, but early turned to white.'

The best Lives in English are those of Irving (1881), St John (1850), Crompton (1859), Helps (1868), Winsor (1890), Elton (1892), Sir Clements Markham (1892). See also *The Narrative and Critical History of America*, edited by Winsor, vol. ii.; Harriette, *Colomb* (Paris, 1884); Varaldo, *Cristoforo Colombo* (1887); *The Select Letters of Columbus*, edited by Major (2d ed. London, 1870); the *Journal* of his first voyage, ed. in English by Markham (Hakluyt Soc. 1893); Stevens's *Columbus's Book of Privileges* (1894); the monumental Spanish work by Asensio (1891), and Filson Young, *Christopher Columbus* (1906). Thacher's *Life* (1903-6) is not flawless. Samuel Kettell translated the *Journal* of the first voyage as *Personal Narratives* (Boston, 1827); it was reprinted as *Christopher Columbus: the Journal of his First Voyage to America* (1925).

**Columella**, L. JUNIUS MODERATUS, the most learned of Roman writers on practical agriculture, was born at Gades, in Spain, and flourished in the earlier part of the first century of the Christian

era. For some time he resided in Syria, but lived chiefly at Rome, and died most probably at Tarentum. His great work, *De Re Rustica*, in 12 books—the tenth upon gardening, written in dactylic hexameters

—is addressed to one Publius Silvinus, and treats of arable and pasture lands, culture of vines, olives, &c., care of domestic animals, &c., respective duties of masters and servants, &c. A supplementary treatise relates to trees. This ancient 'Book of the Farm' is written in good Latin, and the information is copious, though not precise, and in some points of questionable accuracy. Editions are by Schneider in *Script. Rei Rust.* (1797), and Postgate in *Corpus Poeticum Latinum* (1904).

**Column**, a round pillar, usually provided with a base and capital, employed in architecture for the support of an Entablature (q.v.) or other superstructure. Fig. 1 shows in detail the names of the different parts of a column. Columns are doubtless derived from the primitive use of stems of trees in a similar position. Thus the early Egyptian columns are evident imitations of bundles of reeds bound together, or of the stems of palm-trees (figs. 2 and 3). A flat stone laid beneath to prevent the column from sinking, and another on the top to receive the lintel, would naturally suggest the base and capital. In the Classic 'orders' the column played an important part, the proportions of all the different members being regulated by the diameter of the column. In Greek Doric the height of the column varied from 5 to 8 diameters, and the other orders from 8 to 10 diameters. Columns invariably taper from base to cap, with a slight swelling

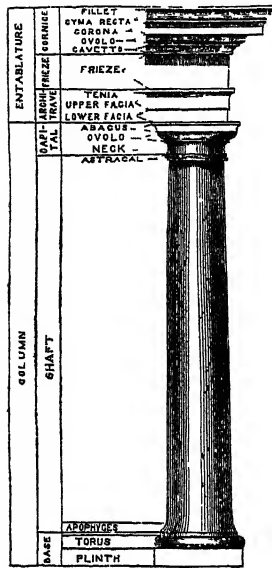


Fig. 1.—Tuscan Column.

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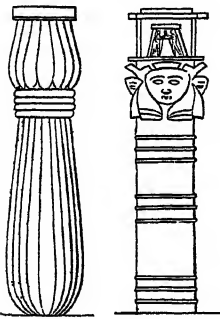


Fig. 2.

Fig. 3.

in the centre called the entasis, and they were frequently carved with flutings or channels (see FLUTING). The most conspicuous distinction was the capital. The characteristics of the three Grecian orders, with the plain Doric capital, the Ionic volutes, the Corinthian leafage, will be seen from the accompanying cuts (figs. 4, 5, 6), and will be further dealt with in GREEK ARCHITECTURE; the Tuscan column is also shown in fig. 1. The composite column retained the general proportions of the Ionic, with the Corinthian capital. For a Byzantine capital, see BYZANTINE ARCHITECTURE. In Gothic, columns are also much used, but their variety is infinite, and not regulated by any fixed proportions like the Classic columns. The articles on the various styles of architecture show many

forms of columns. A single column was sometimes erected to commemorate some remarkable

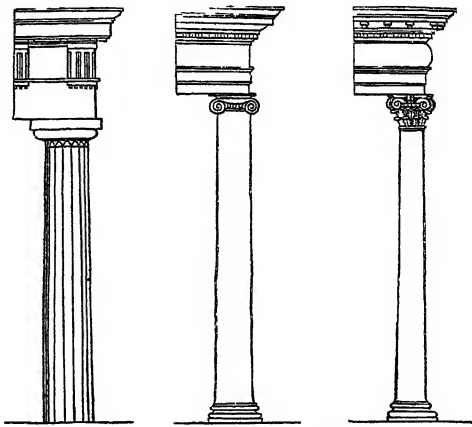


Fig. 4.—Doric.

Fig. 5.—Ionic.

Fig. 6.—Corinthian.

event or great personage, such as Trajan's Column in Rome.

**Column** is a military formation adopted for convenience of movement. Any body of troops in line, forming itself into a narrower front, is said to form column. Thus a company, which has four platoons, can form a column with a front of one platoon, the other three following in rear. A battalion, of four companies, can form a column with a front of one company, the other three following in rear. This would be called 'battalion in column,' or 'battalion in quarter column,' according as the distance between companies was equal to the front of a company, or was only six paces. A brigade (four battalions) can form a column with a front of one battalion, the others following at full distance or quarter distance; or with a front of half a battalion, when there would be eight units in the column; and so on.

A cavalry squadron (see CAVALRY) can form a column with a front of one troop, the other three following; a cavalry regiment, with a front of one squadron, the other two following, or with a front of one troop, when there would be twelve units in the column. A battery of horse or field artillery (see BATTERY) can form a column with a front of two guns (a 'section'), with the other two sections following.

The usual march column, 'column of route,' is, for infantry, a column having a front of 'fours'—that is, four men abreast; for cavalry, column of sections—that is, four abreast; for artillery, a front of one piece, followed by its ammunition wagon or wagons, these followed by the next gun and its wagons. Artillery also march, on a broad road or in the open, in 'column of sub-sections,' when a gun and wagon abreast form each unit.

In the collision with the enemy, column is in modern days impossible, owing to the destructive power of modern weapons on compact bodies. But column remains the formation for the march, or for manoeuvre out of the enemy's range or sight.

British infantry always fought in line, while the European powers adhered to the attack in column until after the Crimean war (1854), and some even later. But the growing value of fire, and the comparative lack of fire from a column, added to the column's vulnerability, gradually banished the column from the field of fire.

The word column is also used to name many of the trains that follow an army. Thus, brigades of artillery (see BRIGADE) are followed by an

ammunition column, divisions by a transport and supply column (see COMMISSARIAT).

**Colure.** See ARMILLARY SPHERE.

**Colvin,** SIR SIDNEY, was born at Norwood, 18th June 1845. He was educated at Trinity College, Cambridge, where in 1865 he gained the chancellor's medal for English verse, and graduating in 1867 as third classic, became a fellow of his college in 1869. He was elected Slade professor of Fine Art in the university of Cambridge in 1873, and director of the Fitzwilliam Museum in 1876, and was keeper of the Department of Prints and Drawings in the British Museum (1884-1912). His numerous contributions to periodicals, marked by accurate scholarship and poetic feeling, include 'Albert Dürer, his Teachers, his Rivals, and his Scholars' (*Portfolio*, 1877); and his separate works are *Notes on the Exhibitions of the Royal Academy and Old Water-Colour Society* (1869); *A Word for Germany by an English Republican* (1870); *Children in Italian and English Design* (1872); *Drawings by Flaxman* (1876); *Landor* (1881); two books on Keats (1886 and 1917); *A Florentine Picture-Chronicle* (1898); *Early Engraving and Engravers in England* (1906); and *Memories and Notes* (1921). He edited *Selections from Landor* (1884), Keats (1915). As R. L. Stevenson's literary executor, he superintended the Edinburgh edition of his works (1894 *et seq.*), and edited his *Samoan Letters* (1895) and *Letters* (1899 and 1911).

**Colza.** See RAPE.

**Coma,** a state of more or less profound insensibility allied to sleep. In coma the patient lies on his back, and is either simply insensible to external impressions, or has a confused and dull perception of them, with restlessness and low Delirium (q.v.). The former kind of coma occurs in apoplexy and epilepsy, and also in many other organic diseases of the brain and its membranes, of which, indeed, it may be said to be the natural termination. It is also seen in narcotic poisoning, and most characteristically in poisoning by Opium (q.v.). In the most fatal forms, the breathing is very slow and noisy (snoring or stertorous), accompanied with puffing of the cheeks; the pulse is at first strong and regular, afterwards feeble; there is often lividity; and the pupils are either contracted or excessively dilated, but in either case immovable, and totally insensible to light. In the second variety of coma, there is perpetual restless delirium, without enough of sensibility to lead to spontaneous and regular voluntary movements; the patient mutters slightly, and grasps feebly and without purpose at any object in his way; the pupils are commonly contracted, and the tongue is apt to be dry and brown. This kind of coma is mainly seen in many fevers, and forms one of the modes of their fatal termination. The treatment of coma is that of the disease or accident leading to it. Where there is a reasonable chance of recovery, the patient must be roused to consciousness as much as possible, either by frequent movements or strong impressions on the skin, so as to maintain the respiration (see OPIUM). Blistering of the head is also sometimes resorted to with good effect.

**Comac'chio,** a walled town of Italy, 30 miles ESE. of Ferrara, on an island in the east of the Valli di Comacchio, a shallow lagoon, about 90 miles in circumference, shut out from the Adriatic by a belt of land, 3 miles wide. It is a bishop's see, and has several fine churches. There are large salt-works and extensive fisheries, the fry of the eel and mullet being admitted to the lagoon in spring by canals opening to the sea, and exit after the fish are grown being prevented by nets and other contrivances, which are referred to both by

Tasso and Ariosto. The trade is in pickled eels and sardines, fruits, and wine. Pop. 10,000.

**Comanches,** a tribe of American Indians, belonging to the Shoshone family, and roaming for the most part over the prairie-lands of Texas and Mexico. Splendid horsemen, warlike, and fond of plunder, they have until very recently been troublesome neighbours; but they are now among the most tractable and progressive of the Indians called 'blanket Indians.' Honesty, truthfulness, self-respect, and regard for chastity are marked characters of this tribe. They are to some extent addicted to intoxication, which they procure by means of a species of cactus which has narcotic qualities. Their numbers were estimated at 12,000 in 1847; now they are about 1000.

**Comat'ula.** See CRINOIDEA.

**Comaya'gua,** a city of Honduras, Central America, is situated in a fertile valley, 1935 feet above the sea, on the Rio Humuya, 190 miles E. of Guatemala. Founded in 1540, it has a handsome cathedral and a law school, and before 1880 was capital of the state. Pop. about 10,000.

**Comb** (O.E. *comb*). This well-known toothed implement has been used in every age and by all peoples for dressing and keeping clean the hair. Combs are also used for fastening the hair when dressed, and as head ornaments. In early times the bodkin (*acus*), equivalent to the modern hair-pin, was employed for the latter purpose, but in medieval times elaborately ornamented combs, sometimes of precious metal, were used for ornamental hair fastening. An allusion to this practice we have in the ancient Scottish ballad of *Sir Patrick Spens*:

O lang, lang may their ladyes sit,  
Wi' their gowd kames in their hair.

Fig. 1 represents an ancient Irish long rack comb in the museum of the Royal Irish Academy.

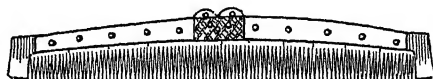


Fig. 1.

Fig. 2 is an example of an ancient Scottish double-edged comb of bone from the Broch of

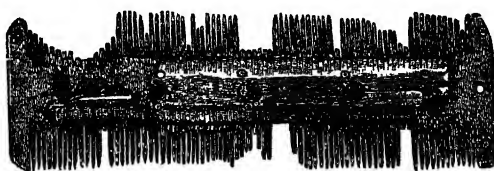


Fig. 2.

Burrian, Orkney, drawn to half the size of the original.

Combs of ivory or of boxwood have been frequently found in early Christian tombs, it being a common practice of antiquity to inclose in the sepulchre objects, especially those of the toilet, that had been used by the deceased. For a late instance, see the article on ST CUTHBERT. Combs also figure commonly in inventories of articles belonging to the medieval churches, and, being made use of by the priests prior to service, that they might approach the altar with the more decency, these instruments became in some sort sanctified by their employment.

Combs are made of horn, tortoiseshell, ivory, wood, bone, metal, india-rubber, and of a com-

position called xylonite (see CELLULOID). In dealing with horn, which is the principal comb-making material, the horns are cut into rectangular pieces in a manner which involves the least possible loss. These segments are damped and heated till they become soft, when they are opened out and pressed quite flat. The plates are next squared, smoothed, and trimmed preparatory to the tooth-cutting, which formerly was done with a *stadda*, or double saw, having two blades of steel set parallel to each other, with a space between them equal to the thickness of the intended tooth. Tooth-cutting is now done by small circular saws to which the plates are automatically applied, the horn moving the space of a tooth after each cut. In this way 70 or 80 teeth may be cut in an inch of ivory for fine-toothed combs. The teeth are then thinned, smoothed, and finished by means of thin wedge-shaped files. Saw-cutting is the only process available for bone, ivory, and wooden combs, and it is used for the finer kinds of horn combs also.

A great economy of material and time, however, is effected by making horn and tortoiseshell combs by the method of 'twinning' or parting. By saw-cutting, the material corresponding to the spaces between the teeth is of course wasted; by the process of parting, this is made available to form

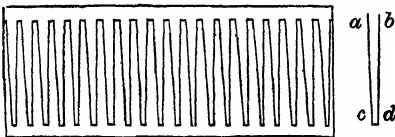


Fig. 3.

the teeth of a second comb. The annexed figure will show how this may be effected. The prepared horny plate is cut through by means of a stamping-cutter, consisting of two thin chisels inclined to each other, as *ac* and *bd*, which represent their edges; between these, and connecting the ends, *c*, *d*, is a small cross-chisel. When this compound cutter descends with sufficient force upon the plate, it will cut one of the teeth shown in the figure. By simple machinery, the table carrying the plate is made to advance a distance equal to the thickness of one tooth while the cutter is rising, and thus the successive cuts are made as represented. A slight pull is now sufficient to part the plate into two combs, the teeth of which only require filing and finishing.

India-rubber combs, now so extensively used, are manufactured by pressing the caoutchouc to the required form in moulds, and 'vulcanising' or combining it with sulphur afterwards. Xylonite combs are similarly made by moulding; but comb teeth of these materials are not so strong and elastic as those of horn and ivory.

**Comb**, a crest of skin, usually brightly coloured, found on the crown of the head in many birds, especially in the males. Like the analogous wattles, combs probably owe the perfecting of their development to Sexual Selection (q.v.).

**Combaconum** (*Kumbhakonam*), one of the oldest and most sacred cities of India, in the centre of the fertile Kaveri delta, 193 miles NE. of Madras, with Hindu temples, a famous *gopuram* or gate pyramid, and a government college. Pop. 65,000.

**Combat**, TRIAL BY. See BATTLE.

**Combatants**, soldiers whose duty it is to fight both in attack and defence, are either cavalry, artillery, engineers, or infantry. Non-combatants, on the other hand, perform administrative duties, and fight only in self-defence, though soldiers and

armed, as in the commissariat, transport, ordnance store, medical, pay, and veterinary departments. See FRANCIS-TIREURS.

In the navy, all seamen are combatants, but engineers, doctors, paymasters, and chaplains are non-combatants.

**Combe, ANDREW, M.D.**, physician and physiologist, was born in Edinburgh, October 27, 1797. He studied medicine there and at Paris, and in 1823 commenced to practise in his native city. In 1836 he received the appointment of physician to the king of the Belgians, but his health failing, he returned to Scotland, where in 1838 he became one of the physicians to Queen Victoria. Mild, benevolent, and wise, Andrew Combe obtained the esteem and admiration of all who could appreciate purity and excellence of character. By patient adherence to physiological principles in the treatment of a delicate constitution, he combated a serious pulmonary disease for nearly thirty years at home and abroad. His death was probably hastened by exposure to the poisonous air of an emigrant ship, in which he made a voyage to America: he wrote to the *Times* on the urgent necessity of a law regulating the sanitary arrangements in emigrant vessels, and in 1849 an act provided a remedy for the evil. He died at Gorgie, near Edinburgh, August 9, 1847. His principal works are: *Observations on Mental Derangement* (1831), *Principles of Physiology* (1834; 15th ed. 1860), *The Physiology of Digestion* (1836; 10th ed. 1860), and *The Management of Infancy* (1840; 10th ed. 1870). See his Life by his brother, George Combe (1850).

**Combe, GEORGE**, phrenologist and moral philosopher, the son of a brewer, was born October 21, 1788, in Edinburgh. He became a Writer to the Signet in 1812, and continued to practise until 1837, when he resolved to devote himself to popularising his views on phrenology and education. As early as 1816, he had made the acquaintance of Spurzheim, and become a convert to his system of phrenology. The result was his *Essays on Phrenology* (1819), and his *Elements of Phrenology* (1824), which reached a ninth edition in 1862. But his most important production is *The Constitution of Man* (1828; 9th ed. 1879), in which he endeavours to demonstrate the essential harmony of the nature of man with the surrounding world, and the necessity of studying the laws of nature. Combe's doctrines were violently opposed, being considered by many as inimical to revealed religion. He numbered amongst his friends Cobden, Robert Chambers, and Miss Evans (George Eliot). Combe contributed largely to the *Phrenological Journal* (20 vols. 1824-47) and to *Chambers's Journal* and the *Scotsman*. He travelled and lectured in the United Kingdom, Germany, and America, and published *Notes on the United States* (1841). He died 14th August 1858. Combe married, in 1833, Cecilia (1794-1868), daughter of the celebrated Mrs Siddons. Besides the works mentioned, he wrote *Lectures on Popular Education* (1833), *Moral Philosophy* (1840), *Principles of Criminal Legislation* (1854), *Phrenology applied to Painting and Sculpture* (1855), *The Currency Question* (1855), *The Relation between Science and Religion* (1857). His writings roused popular interest in the science of healthy living, but the phrenological works are obsolete. Combe's ideas on popular education were put into experimental shape in a secular school which he founded in Edinburgh in 1848, where the sciences were taught, including physiology and phrenology; but it was too much in advance of its time, and after a few years had to be abandoned. All his subjects, save phrenology, are now

taught in every well-appointed school. A physiology lectureship was founded by the trustees of George and Andrew Combe. See the *Life* by C. Gibbon (1878); and Combe's views and articles on *Education*, collected by Jolly (1879).

**Combe, WILLIAM**, author of *Dr Syntax*, was born at Bristol in 1741, and educated at Eton and Oxford, which he quitted without a degree. 'Godson' (or natural son) of a rich London alderman, who died in 1762, leaving him £2150, he led for some years the life of an adventurer, now keeping a princely style at the fashionable watering-places, anon a cook at Douai, and a common soldier. The last forty-three years of his life were passed mostly within the 'rules' of the King's Bench debtors' prison; but he died at Lambeth, 19th June 1823. In the *Dictionary of National Biography* (vol. xi., 1887) Professor Tout enumerates eighty-six works by Combe, published between 1774 and 1824; of these, the *Three Tours of Dr Syntax* (1812-21) alone are remembered, and even they owe much to Rowlandson's illustrations.

**Combermere, VISCOUNT** (Stapleton Stapleton-Cotton), a British field-marshal, son of Sir Robert Salusbury Cotton, Bart., of Combermere Abbey, Cheshire, was born in 1772 at Llewenny Hall, Denbighshire. Educated at Westminster School, he entered the army in 1790, and in 1794 was made lieutenant-colonel of a new regiment of light dragoons, with whom he served in India for several years. In 1808 he proceeded, with the rank of major-general, to the Peninsula; in 1809 he succeeded to the baronetcy; and in 1810 he was appointed to the command of the whole allied cavalry. He was present at the battles of Talavera, Llerena, Salamanca, the Pyrenees, Orthez, and Toulouse, and was raised to the peerage in 1814 as Baron Combermere; although not at Waterloo, he had the command of the cavalry of the army of occupation in France. He was commander of the forces in the West Indies, 1817-20; commander-in-chief in Ireland, 1822-25; and commander of the forces in India, 1825-30, where he captured Bhartpur. Raised to the rank of viscount in 1827, he succeeded Wellington as Constable of the Tower in 1852, and was made a field-marshal in 1855. He died February 21, 1865. See his *Correspondence* (2 vols. 1866).

**Combination.** A combination to commit a crime is, in English law, an indictable Conspiracy (q.v.). Combination, indeed, is the gist of the offence of conspiracy. Unless two or more persons are found to have combined there can be no conviction for conspiracy. Combinations of workmen to raise the rate of wages were formerly unlawful; but the law has been altered in this respect by recent legislation, in particular by the Trade Union Act, 1876, the Conspiracy and Protection of Property Act, 1875, and the Trade Disputes Act, 1906. See CONSPIRACY; TRADE-UNIONS; ASSOCIATIONS, TRUSTS, AND CARTELS.—See also ATOMIC THEORY, CHEMISTRY, PERMUTATIONS.

**Combining.** See COTTON, WOOL, SPINNING.

**Combining Weights.** See ATOMIC THEORY.

**Combretaceæ**, a tropical order of Myrtifloræ, including about 240 species of trees and shrubs, mostly astringent.

**Combustion** is the term commonly applied to those chemical processes which are accompanied in a marked degree by the production of heat and light. The most familiar of such processes are those in which oxygen of the atmosphere combines chemically with the constituents of what are ordinarily spoken of as combustible substances, such as wood, coal, fats, oils, &c. Chemical combination is, as a rule, accompanied by the evolution

of heat and frequently of light (see CHEMISTRY); but every case of chemical combination is not called combustion, because in many cases the quantity of heat evolved is inconsiderable.

When we speak of the combustion of, for instance, coal or wood, we mean the chemical process which consists, in general terms, in the combination of the oxygen of the air with the carbon and hydrogen which constitute the greater part of the combustible portion of either of these substances, and in the production of carbonic acid and water. Many instances are known to chemists in which the oxygen required for a combustion is not derived directly from the atmosphere, but from some oxidising (or oxygen-yielding) agent, and frequently the place of the oxygen may be altogether taken by some other element, as, for instance, when metals, such as antimony in powder, burn in chlorine.

The combustion of every combustible substance is accompanied by the evolution of a quite definite quantity of heat, which is invariable for each substance, whether the combustion takes place rapidly or slowly. A piece of phosphorus, for instance, as is well known, glows in the dark. This is a process of very slow combustion, and is never accompanied by much rise of temperature. When moderately heated in air, a piece of phosphorus bursts into flame, and the combustion is rapid and is accompanied by a considerable rise of temperature; whilst if the phosphorus be burned in pure oxygen, the combustion is an extremely brilliant spectacle, and a high temperature is attained. In each case the actual quantity of heat given out is identical for the same weight of phosphorus, but the time occupied by the combustion varies, and consequently the temperature at any given instant must also vary.

The quantities of heat given out by the combustion of the same weights of *different* substances vary greatly. The measurement of quantities of heat produced by combustion and in other ways is called calorimetry (see HEAT).

The name combustion is applied to a particular process in the Analysis (q.v.) of organic compounds. See also SPONTANEOUS COMBUSTION.

**Comédie Française.** See THÉÂTRE FRANÇAIS.

**Comedo.** See ACNE.

**Comedy.** See DRAMA.

**Comenius, JOHN AMOS** (properly KOMENSKI), a distinguished educational reformer of the 17th century, was born 28th March 1592, in Moravia, either at Comna or at Nivnitz. His parents belonged to the Moravian Brethren. He studied at Herborn (1612), and then at Heidelberg, became rector of the Moravian school of Prerau (1614-16), and minister at Fulnek, but lost all his property and library in 1621, when that town was taken by the Imperialists. He became a wanderer, and settled at Lissa, Poland. Here he worked out his new theory and method of education, wrote his *Didactica Magna*, and was chosen bishop of the Moravian Brethren in 1632. In 1631 he published his *Janua Linguarum Reservata*, which was translated into many European, and even into some oriental languages. There is a trilingual edition, with woodcuts, in the Advocates' Library, Edinburgh. In this work he points out a method of learning languages new at that time, which has been called the intuitive or perceptive system, in which the pupils were taught by a series of lessons on subjects easily understood or appreciable by the senses—such as natural history, the sciences, different trades and professions, &c. The *Vestibulum*, an introduction to the same, appeared in 1633. Comenius also published about the same time the *Ratio Disciplinae Ordinisque*

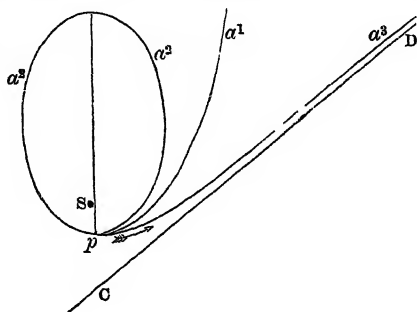
*Ecclesiae in Unstate Fratrum Bohemorum* (1632; republished 1702); and his *Pansophiae Prodomus* (1639), an attempt at a complete statement of the circle of knowledge. In 1641 Comenius was invited to England by parliament, through the philanthropist Hartlieb, to assist in reforming the system of public instruction; but as the breaking out of the Civil War prevented the execution of this design, he went to Sweden (1642). There he was patronised by Oxenstjerna, who gave him a commission to draw up a plan for the organisation of schools in Sweden; and this he completed at Elbing, four years afterwards. He also put to press (1643) a treatise on Pansophia. He returned to his Polish home at Lissa in 1648, and elaborated his work there. He next went (1650) to Sáros-Patak, Hungary, for a similar purpose. Here he composed his celebrated *Orbis Sensualium Pictus*, or *The Visible World* (Nurem. 1658), the first picture-book for children, which has been often reprinted and imitated. Finally, he settled in Amsterdam, where he published several other works. He died at Naarden on the 15th November 1671. Bacon's speculations appear to have stirred the imagination of Comenius to the conception of universal and systematised learning, to which he gave the name of Pansophia or Encyclopædia. His educational and pansophic works were published at Amsterdam (4 vols. 1657), and dedicated to that city in recognition of his hospitable treatment there. In education he was a realist; he was also fervently evangelical, and his whole system was intended to lead up to knowledge, virtue, and piety. Late in life a mystical tendency was apparent in his works. Whatever may be thought of his educational system, he first fully developed method, made important reforms in the teaching of languages, and introduced into schools the study of Nature.

See Laurie's *Comenius, his Life and Work* (1881), a German life by Kvaszala (1892), Keatinge's translation of *The Great Didactic* (1896), and Monroe's *Comenius and the Beginnings of Educational Reform* (1900).

**Comet.** The word comet is derived from the Greek *kómē*, 'hair', a title which had its origin in the hairy appearance often exhibited by the haze or luminous vapour, the presence of which is at first sight the most striking characteristic of the celestial bodies called by the name. The general features of a comet are a definite point or nucleus, a nebulous light surrounding the nucleus, and a luminous train preceding or following the nucleus. When first discovered a comet is usually a hazy, nebulous object without tail. As it approaches the sun it brightens, the nucleus becomes more distinct, and a tail is seen in a direction away from the sun, as if gaseous matter were repelled from the head by some force from the sun. Anciently, when the train preceded the nucleus—as is the case when a comet is receding from the sun—it was called the beard, being only termed the tail when seen following the nucleus as the sun is approached. This distinction has disappeared from all modern astronomical works, and the name tail is given to the appendage, whatever its apparent position. A tail is not, however, always present.

Like the planets, comets move under the influence of the sun's gravitation. They differ from planets in their physical appearance, and also in the character of the orbits they describe. The planets describe elliptic orbits of small eccentricity—i.e. of nearly circular form; but cometary orbits are extremely elongated, and in the neighbourhood of the sun are hardly distinguishable from parabolas. Let  $p$  be the point of perihelion passage of a comet, and let the direction of its motion be in the direction indicated by its arrow. There is a certain velocity of motion at this point which would give the orbit the form of a parabola,  $pa^2$ , the direction of motion always tending to parallelism with the

straight line  $pS$ . Any velocity less than this would cause it to describe a closed curve,  $pa^2$ ; any greater velocity would cause it to describe a hyperbola  $pa^2$ , in which case it would approximate to the direction of a straight line  $CD$ , and would never return. This would be the case if there were no disturbing force to interfere with the sun's attraction; and, conversely, comets approaching the



sun along the various paths above described would pass the perihelion with the various velocities above indicated. But the attraction of an extraneous body of sufficient magnitude interfering with the attraction of the sun might change the orbit from the ellipse to the hyperbola, and *vice versa*. As the parabola is the limiting form between the ellipse and hyperbola, just as the circle is the limiting form of an ellipse with no eccentricity, a parabola is only an approximation to a comet's orbit, as a circle is to that of a planet.

The comets which are *periodic*—i.e. those which describe ellipses, and therefore periodically approach the sun, and thus become visible from the earth—may be divided into three classes: (1) those of short period; (2) those of period about seventy-five years; (3) those of long period. In the first class, with their periods given in years, are Encke, 3·3; Tempel II, 5·1; Swift, 5·5; Winnecke, 5·5; Brorsen, 5·6; Tempel I, 6·0; Finlay, 6·5; Perrine, 6·5; D'Arrest, 6·6; Wolf, 6·8; Holmes, 6·9; Brooks II, 7·1; Faye, 7·4; Tuttle, 13·7. To these may probably be added twelve or thirteen more, recently discovered, which have only been seen once, but whose orbits have been calculated and found to be only moderately elongated ellipses. The greatest distance from the sun these comets reach is near the orbit of Jupiter (with the exception of Tuttle's, which reaches to Saturn), and it is supposed that the attraction of this planet has brought comets which have passed near it into this 'family' of orbits. The comets whose periods approach seventy-five years include the famous comet of Halley, 76·8; Westphal, 67·8; Pons, 70·7; Di Vico, 73·2; Olbers, 74·0; and Brorsen, 75·0. Only two of these comets, besides Halley's, have been seen at two returns as yet. Their greatest distances from the sun extend beyond the orbit of the planet Neptune. The orbits of comets of longer period are somewhat uncertain; it has been maintained by M. Flammarion and Professor Forbes that some of these belong to a family of a hitherto undiscovered trans-Neptunian planet. The periods calculated for some of the long-period comets are many thousands of years; but as the long ellipses are hardly distinguishable from parabolas in the parts of the orbit near the sun, where alone the comets are visible to us, not much reliance can be placed on these figures. Chambers's *Story of the Comets* (1909) states that thirty comets are known to be periodical, and have been seen at more than one apparition; that 341 have been calculated to have elliptic orbits not yet verified, or parabolic orbits, and thirteen hyperbolic orbits.

The very small number of hyperbolic orbits shows that comets rarely have sufficient velocity to carry them right away from the solar system in opposition to the sun's attraction, and thus comets are probably permanent members of the solar system. Another argument in support of this is, that though the sun is moving through space with a velocity of 20 kilometres per second, comets do not approach the sun more frequently from the direction towards which the sun is travelling than from any other direction. Thus comets are probably not bodies which the sun picks up in its journey through interstellar space, but are outlying members of the solar system which accompany it.

The discovery that comets are celestial bodies, extraneous to our atmosphere, is due to Tycho Brahé, who measured the parallax of the comet of 1557. Newton demonstrated that, like the planets, their movements are determined by the gravitation of the sun; and Halley, by determining the parabolic elements of a number of comets from the recorded observations, identified the comet of 1682 with one which had been observed in 1607 by Kepler, and also with a comet observed in 1531 by Apian at Ingoldstadt, and thus confidently predicted its return at the end of 1758 or beginning of 1759. The parabolic elements are elements of a parabola nearly coincident with the elongated elliptic orbit of the comet. They are: (1) The inclination. (2) The longitude of the node. These two determine the plane of the orbit. (3) The longitude of the perihelion, or point of nearest approach to the sun. (4) The perihelion distance, or nearness of approach to the sun. (5) The time of perihelion passage.

To determine these parabolic elements three observations of the comet are sufficient. A simple method due to Olbers enables the elements of cometary orbits to be quickly calculated; and by a table of such elements deduced from the recorded observations, it is possible at once to ascertain whether any newly observed comet is identical with any that have been previously observed. To predict, however, with accuracy the time of the return of a comet, a much more elaborate calculation must be made of the orbit, taking into account the perturbations of the planets to whose influence it is subject. This difficult problem was solved in the case of Halley's comet by the work of Clairaut, who announced in November 1758, just as astronomers began to look out for the return of the comet, that it would take 618 days more to return to the perihelion than in the preceding revolution. The perihelion passage was fixed about the middle of April 1759; but Clairaut distinctly forewarned the world that, being pressed for time, he had neglected small terms, which collectively might amount to about a month in the seventy-six years. The comet passed the perihelion on the 12th March 1759, exactly a month before the time announced, but within the assigned limits of divergence from that date. For the next perihelion passage, the different calculations executed by MM. Damoiseau, Rosenberger, Lehmann, and De Pontécoulant fixed respectively the 4th, the 26th, the 11th, and the 13th November 1835. Subsequently observations indicated the 16th—that is to say, a deviation of only three days from what turned out the most accurate calculation, and a deviation of twelve days from the most remote. The return of the comet to perihelion on 17th April 1910 was predicted by Messrs Cowell and Crommelin with an error of only three days. The early history of this comet is interesting, as calculation shows that it is identical with comets of which records are preserved. In particular, it appeared in 1066 before the battle of Hastings, and a representation of it is given on the Bayeux tapestry. The comet's course has been

traced back by Messrs Cowell and Crommelin, and Halley's comet is identified with one stated in Chinese records to have been seen in 87 B.C., and possibly with a still earlier one in 240 B.C.

*Encke's comet*, which has the shortest period of any comet as yet discovered, has been observed at no less than thirty-one apparitions. Its motion has been carefully studied, and a small acceleration in its periodic times has been taken to indicate the existence of a resisting medium in space. Backlund has shown that the acceleration is by no means regular, and therefore may be due to some other cause than a resisting medium in space.

*Biela's comet* has had a remarkable history which throws light on the structure of comets. It was discovered in 1826, and found to have a period of approximately 6.5 years. In 1846 it was seen to split into two parts, which kept at a distance of about 200,000 miles. In 1852 the two parts were at a distance of 2,000,000 miles. The comet was not seen in 1859 or 1865, but in 1872 its place was taken by a shower of meteors, which moved in the same orbit, radiating from a point in Andromeda. In 1867 it was shown by the researches of Leverrier and Oppolzer that Tempel's comet of 1865 moves in the same orbit as the November meteors. Schiaparelli showed that the Perseid meteors which are seen in August have an orbit identical with that of Tuttle's comet of 1862. We are thus led to regard a comet as made up of a loose collection of meteorites, gathered possibly round a larger central nucleus. When the comet approaches the sun, heat and other radiative influences tend to disintegrate the mass and to drive off gaseous constituents which form the tail. Confirmation of this is found in the fact that several comets are known to follow in the same track. The most remarkable case is that of the three bright comets of 1843, 1880, and 1882, and the fainter comet of 1887. These all move along in the same orbit, an ellipse which approaches to within 300,000 miles of the sun at its nearest point. Another instance is the third comet of 1881, which moves in the same track as that of 1807.

Comets are of great volume but small mass. The head is often 100,000 miles in diameter. Nevertheless, no disturbance in the movement of any of the planets or satellites has been detected in consequence of proximity to a comet. Several have been near the earth and had their movements appreciably modified, but have made no sensible modification on the movement of the earth. Thus their masses are small in comparison with that of the earth, though measured by other standards they may be very great. The most definite information on this point is obtained from Lexell's comet, which in 1770 enveloped the satellites of Jupiter, and remained near them for four months without producing any measurable effect on their movements. From this fact Laplace calculated that the mass of Lexell's comet did not exceed  $\frac{1}{1000}$ th of the mass of the earth. The same comet came to within 1,500,000 miles of the earth on 1st July 1770. If its mass had been equal to that of the earth, the year would have been lengthened by two hours forty-seven minutes. As it is certain that the year was not lengthened by so much as one second, it follows that the mass of the comet was less than  $\frac{1}{1000}$ th of that of the earth.

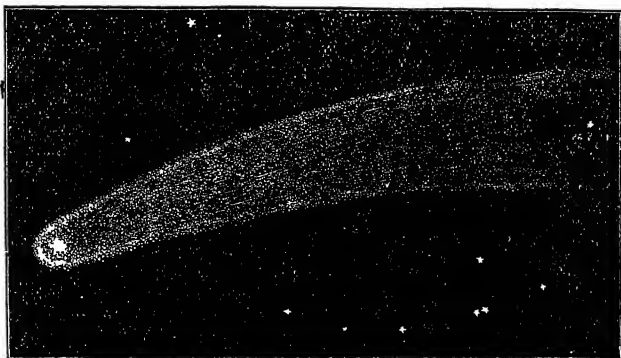
In 1868 Huggins found that the spectrum of the nucleus of the comet of that year showed three bright bands coincident in position with three given by the spectrum of the blue base of a Bunsen flame, and variously interpreted as due to hydrocarbons, carbon, or carbon monoxide. These bands have since been found to be characteristic of comets, though there are several exceptions, such as Brorsen's comet. There is in addition a faint

continuous spectrum, in which the dark Fraunhofer lines are occasionally seen, showing that part of the light is reflected sunlight. In the spectrum of the great comet of 1882, at its very near approach to the sun, Copeland and Lohse discovered a bright line due to sodium, and a number of other metallic lines, especially those due to iron. The sodium and iron lines have been seen in the spectra of other comets which have approached very near the sun. It may be inferred that the nucleus of a comet consists of a collection of solid and metallic bodies surrounded by gaseous hydrocarbons, and that near the sun parts of the solids are converted into luminous gas.

The tails of comets frequently extend over many millions of miles. They are exceedingly tenuous, as is shown by the fact that stars shine through them with light not appreciably dimmed. They are formed by the issue of gaseous matter from the nucleus in the direction of the sun. This matter is then repelled by some force from the sun, and driven backwards so that a tail or tails are produced on the side of the nucleus away from the sun. As the matter driven off shares the orbital motion of the comet round the sun, the tails are curved, as is shown in the illustrations of the comets of 1811 and 1858. From the examination of the tails of a large number of comets, Bredechin, a Russian astronomer, divides them into three types: (1) long tails, showing very slight curvature; (2) plume-like tails, showing slight curvature; and (3) short tails, curving very rapidly. The curvature of the tail offers a means of comparing the repulsive force with solar gravity, and Bredechin finds these to be (1) twelve times as great, (2) equal to, and (3) one-fifth of the sun's gravitational attraction. He considers the tails to consist of (1) hydrogen, (2) hydrocarbons, and (3) iron. The repulsive force may be due to the pressure of light or be of electrical origin, but its essential characteristic is that its amount varies with the area of the surface exposed to it, and not to the mass of the particle. Spectra have been obtained of the tails of Daniel's (1907) and of Morehouse's (1908) comet. They are made up of bright lines and bands, and therefore show that the tails consist of incandescent gas. Spectra which appear to be identical with those of comets' tails have been obtained by Professor Fowler by passing an electric discharge through vacuum tubes in which certain gaseous compounds of carbon are present at a pressure of  $\frac{1}{100,000}$  of atmosphere. One of the lines has been identified by Deslandres with the principal line in the cathode spectrum of nitrogen, and others by Fowler with the cathode spectrum of carbon monoxide.

Since the middle of last century the number of comets discovered annually has averaged from four to five. Most of these are faint and only observable with a telescope. Every few years one is visible to the naked eye, as, for instance, the daylight comet seen in January 1910, and Brooks' comet visible in the autumn of 1911. Comets of remarkable splendour are of still rarer occurrence. In the 19th century the comets of the years 1811, 1843, 1858, 1861, 1874, and 1882 are the most notable. The comet of 1811 was brilliant for many weeks in the northern heavens, being specially conspicuous in autumn, when its tail stretched 25° in length and 6" in breadth at the widest part—indicating a tail 100 million miles long. Argelander

calculated that its orbit is elliptic, but extends to a distance fourteen times as great as that of Neptune, or about 40,000 million miles. The period he assigned for its return is 3065 years. This comet enjoyed the undeserved credit of having contributed to the celebrated port-wine vintage of 1811. The comet of 1843 appeared first in the southern hemisphere, and was extremely brilliant in March. Its tail stretched over an arc of 40° and had a width of 1°; the actual length was no less than 200 million miles. It made a very close approach—less than 500,000 miles—to the sun. The comet of 1858, discovered by Donati at Florence on June 2, when it was very faint, was well placed for observation in September and October, when it displayed a long and beautifully curved tail and a



Comet of 1811.

very bright nucleus. Remarkable features were the changes which took place in the head and the succession of envelopes thrown off. The comet of 1861 was discovered by Tebbutt in New Zealand on May 13. The comet passed its perihelion on June 11, and, travelling north, became visible in Great Britain on June 29. Sir John Herschel held it to be brighter than the comets of 1811 and 1858.



Donati's Comet, 1858.

The tail on June 30 was 30° in length, on July 2 72°, and on July 4 80° and perfectly straight. It is probable that the earth passed through the tail on June 30. The comet of 1874 was discovered by Coggia at Marseilles, and was fairly bright during the summer. It was very near the sun when brightest, and the full extent of the tail was only seen after the head had set. The series of envelopes thrown off from the head were singular features of this comet. The bright comet of 1882, conspicuous to the naked eye during September, passed between earth and sun. Finlay and Elkin at the Cape of Good Hope saw no trace of it while it was in front of the sun, but it became visible soon after it had crossed the disc, and was clearly seen throughout the whole of the next day. The sun was also observed during the transit of Halley's comet across its disc in 1910, but nothing was seen. Hence it

appears that the nuclei of these comets did not contain any masses of more than thirty or forty miles in diameter. The comet of 1882 was followed for a considerable time telescopically, and its orbit well determined. It agrees closely with that of the comet of 1843, and its period appears to be about 700 years. Though it passed very close to the sun, no retardation was detected, and therefore even close to the sun there is no resisting medium of sufficient density to affect the motion of such a body.

Comets are such striking phenomena that it is no wonder they have been regarded with amazement and often with terror. References to their appearances are contained in Chinese, Egyptian, and Chaldean records. Catalogues of comets based on historical allusions were made by Hevelius in 1668, and also by Stanislaus Lubienitzki about the same

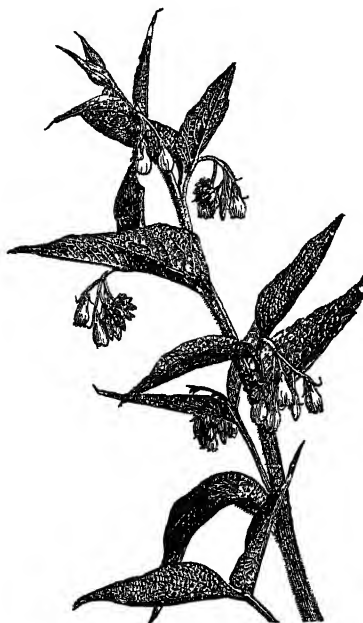


Morehouse's Comet, 29th September 1908; from a Greenwich photograph.

date. A much more critical catalogue, published by Nicolas Struick in 1740, was superseded by the *Cométographie* of Pingré in 1783; supplemented by Biot, especially from Chinese sources. Later cometary histories are very largely based on Pingré. The number of comets recorded before the Christian era is about eighty. Each subsequent century, roughly speaking, twenty to forty have been seen, till we come to the 19th. When telescopes were used and systematic search made for comets the number observed was largely increased. In the 19th century 335 comets were observed, and forty-nine in the first ten years of the 20th century. A list of the elements of the orbits of comets from the earliest times to 1893, as far as they have been computed, is given by Dr Galle. For further information see *The Story of the Comets*, by G. F. Chambers (1909).

**Comfrey** (*Symphytum*), a common palæartic genus of Boraginaceæ, somewhat coarse perennial herbs, although occasionally to be seen in flower-borders. *S. officinale* (purple) and *S. tuberosum* (yellow) are frequent in shady and moist places. *S. officinale* was formerly much esteemed as a vulnerary. Its young leaves and its blanched shoots are still occasionally used as boiled vegetables. The Prickly Comfrey (*S. asperrimum*),

a native of Siberia, 6-10 feet in height, has been recommended for feeding cattle. The stamens are covered in this genus by five awl-shaped processes pushed in from the outside of the corolla, and meeting so as to form a false bottom impassable to ants, flies, and other small honey-thieves, but which can be thrust aside by the



Comfrey (*Symphytum officinale*).

humble-bees which alone fertilise the flower. Many bees, however (especially *B. terrestris* and one or two others), prefer to bite a hole in the side of the corolla below this cover, and the flowers may thus be seen to be visited both in the legitimate and illegitimate way. See the section on Fertilisation in the article FLOWER.

**Comines**, a town on the borders of Belgium and France, 15 miles SW. of Courtrai by rail, divided by the Lys into two parts, of which that on the left (pop. 7000) belongs to Belgium; the other, on the right (pop. 6000), to France. The town has some manufactures, and was the seat of the family of Comines.

**Comines**, PHILIPPE DE, Sieur d'Argenton, a French statesman and historian, who was born about 1445 in the Castle of Comines (q.v.), belonged to a family whose ancestors had been citizens of Ghent. He joined the court of Burgundy, and was sent by Charles the Bold on important missions to France, England, and Spain. In 1472 he forsook Charles and entered the service of Louis XI. of France. He was rewarded with the rich fief of Talmont, and became one of Louis's most trusted advisers. On the accession of Charles VIII. he was deprived of Talmont, and cast into prison for having incurred the displeasure of the regent, Anne of Beaujeu. He accompanied Charles VIII. on his Italian expedition, was present at the battle of Fornovo, and had an interview with Machiavelli in Florence. He held sundry places and pensions under Louis XII., and died in 1509. His *Mémoires* consist of seven books, six of which deal with the reign of Louis XI., while the seventh treats of Charles VIII.'s wars in Italy. They are the earliest example in

French literature of the history as distinguished from the chronicle. Unlike the chroniclers, Comines cares little for the mere spectacle of courtly and military life. His sympathies are with the king against the nobles; his interest is centred in statecraft; his reflections on men and affairs are dispassionate, pregnant, and acute.

His *Lettres et Négotiations* were published in 1867-68. De Mandrot's edition of the *Mémoires* (1903) is from a better MS. than that by Chantelauze (Paris, 1881). The English translation by Danett (1896) was re-edited by Whibley in 1897; and see Whibley's study reprinted in his *Literary Portraits* (1904).

**Comiso**, a town of Sicily, 37 miles WSW. of Syracuse, with manufactures of soap and pottery. Cotton is largely grown here. Pop. 22,000.

**Comitia** were the legal or constitutional meetings of the Roman people, convened by a magistrate, usually for the purpose of putting a question to the vote. According to the constitution of the several gatherings, they were *comitia curiata*, *comitia centuriata*, or *comitia tributa* respectively. See **ROME**.

**Comity of Nations**—more frequently mentioned by its Latin equivalent, *comitas gentium*—is the international courtesy by which effect is given to the laws of one state within the territory and against the citizens of another state. 'In the silence of any positive rule,' says Story, 'affirming, or denying, or restraining the operation of foreign laws, courts of justice presume the tacit adoption of them by their own government, unless they are repugnant to its policy or prejudicial to its interests.' See Story's *Conflict of Laws*; and **INTERNATIONAL LAW**.

**Comma**, in the mathematical study of sound, is a small interval, generally corresponding to the vibration-ratio 81:80, which occurs between the true pitches of two notes, which on the piano, organ, and other tempered instruments, are represented by one only. See **TEMPERAMENT**.

**Commandant** is the officer, of whatever rank, in command of a fortress or military post of any kind—e.g. a station on the lines of communication of an army. The title is also given to an officer commanding a larger body of troops than is proper to his rank, as captain-commandant, lieutenant-commandant, &c., and to the senior lieutenant-colonel of a volunteer battalion in the British army, where there are two or more on its establishment. There are also commandants to most military schools.

**Commander**, in the British navy, is an officer next under a captain in rank, and next above a lieutenant-commander, and serves either as second in command in a large ship, or in independent command of a smaller vessel. In matters of etiquette he ranks with a lieutenant-colonel in the army, but junior of that rank; and he bears the title of captain by courtesy. Retirement is optional at the age of forty-five, and compulsory at fifty, or after five years without employment. In the United States navy, commanders have a rank next below that of captain, and next above that of a lieutenant-commander, and rank with lieutenant-colonels in the army.

**Commander-in-chief**, till 1904 the highest staff-appointment in the British army. On the death of the Duke of Wellington in 1852, this title, borne by him for many years, was allowed to lapse, and the administration of the army was placed under a general on the staff who was styled the general (or field-marshal, if of that rank) commanding in chief. In 1887 the title of commander-in-chief was revived; and in 1895 (on the resignation of the Duke of Cambridge) effect was given to the recommendations of the Hartington Commis-

sion, by a more perfect organisation of our national defences under one supreme authority—though nominally since 1855 the commander-in-chief had been strictly subordinate to the Secretary of State for War. His office, technically called the Horse Guards, was the military department of the War Office (q.v.). In 1904 the title was abolished, the Army Council taking supreme authority (see **ARMY**), with a new officer, the Inspector-general of the Forces, under it, besides the Chief of the General Staff, the Quartermaster-general, and the Master-general of the Ordnance. All promotions and military appointments were recommended by the commander-in-chief, those of great importance being supervised by the war minister, and, if necessary, discussed by the cabinet. He was responsible for recruiting operations, the technical education of officers and men, and everything connected with the efficiency, distribution, and mobilisation of the troops, together with the construction and armament of fortifications; and he exercised an inspectional control over the men under the immediate command of general officers. See **WOLSELEY**, **ROBERTS**.

There is still a local commander-in-chief in India, under whom all the forces there are placed, and in many of the colonies the governor bears this title, which would also be given to the officer in command of any large army engaged in active operations. A naval commander-in-chief is the chief admiral at any port or station. In the United States the president is *ex officio* the commander-in-chief of the army and navy, but many governors of states also bear the military title. By the old German constitution, the emperor was supreme commander-in-chief of army and navy.

**Commander of the Faithful**, a title assumed in 622 by the Khalif Omar (see **KHALIF**).

**Commander's Islands**. See **ALEUTIAN ISLANDS**.

**Commandery**, the district under a *commander*, in connection with the Templars (q.v.), the Hospitallers (q.v.), and other religious orders.

**Commandite**, **SOCIÉTÉ EN**, or **PARTNERSHIP IN**, an expression used for at least two centuries in France, to express a partnership in which one may advance capital without taking part in the management of, or incurring further liability in connection with the business. The term 'sleeping partner' as used in this country till 1907 would have nearly expressed the same idea but for the attendant unlimited liability. The phrase is derived from the old meaning in the commercial nomenclature of France of the word *commande*: the authority given to one person to transact business for another. The working partner had a *commande* from him who merely advanced capital. See **COMPANY**.

**Commedia**, the Italian form of the word comedy, was in the middle ages applied to a narrative with a happy ending. Thus Dante's great work, beginning with hell and ending with paradise, was called *Commedia*. This use, like the corresponding use of tragedy, probably after the example of Italy, was followed in English. David Lyndsay's *Tragedy of the Cardinal*, for example, is a narrative poem; and Lydgate speaks of Chaucer's comedies and tragedies. The Italian word, of course, means also comedy in the ordinary sense. The *Commedia dell'arte*, whose origin has been sought in the Atellan forces (see **ATELLANÆ**) was a dramatic form in which only the general plan was laid down, and the rest left to the improvisation of the actors. It seems to have been brought into favour by Francesco Chereza, actor to Leo X., and was so called because performed by professional actors, members of a craft. For its stock characters, and those of the masked comedy, another popular form, see **PANTOMIME**; also **HAR-**

LEQUIN, PUNCH, SCARAMOUCHE, &c. Comedy on the classical model was *Commedia erudita*.

**Commelinaceæ**, an order of petaloid monocotyledons, all herbaceous, chiefly neotropical, of which a few species are cultivated in herbaceous borders on account of the beauty of their flowers, notably spiderwort, or *Tradescantia* (*Virginica*, and other species), *Commelina caelestis*, &c. Others are grown in hothouses, notably the peculiar *Cochlostemma odoratissima* from Ecuador, in which the stamen filaments expand into large wings.

**Commemoration**, or ENCENIA, the great festival of the Oxford academic year, usually takes place on the third Wednesday after Trinity Sunday. It is of very ancient date, public exercises and recitations having been held from time immemorial in honour of the Act, or period when Masters of Arts and Doctors complete their degrees. The proceedings consist of a Latin oration in honour of founders and benefactors; the presentation of the honorary degree of D.C.L. to strangers eminent in science, politics, &c.; and the recitation of the Newdigate or English prize poem, the Latin prize poem, and the Latin and English prize essays. The more strictly academic and solemn portion of the proceedings was frequently wont to receive scanty attention from a great part of the audience; and the noisy humours of the gallery have often encroached on the stately periods of the public orator. In 1876 the undergraduates were removed from the special gallery they had hitherto occupied, and distributed amongst the general audience, which includes ladies and strangers as well as members of the university. 'Commencement' is the corresponding festival at Cambridge, where, however, it is of less general observance.

**Commendam**, an ancient manner of holding ecclesiastical benefices. When a living fell vacant by the preferment of its holder, it was *commended* by the crown to the care of a clerk, usually a bishop in one of the poorer sees, to hold till a proper pastor was provided for it. Such a living was called an *ecclesia commendata*, and was said to be held *in commendam*. A commendam in ecclesiastical law may be defined as the power of receiving and retaining a benefice contrary to positive law, by supreme authority. Holdings in commendam were abolished in 1836.—**COMMENDATORS**, in Scotland, in Roman Catholic times, were stewards appointed to levy the fruits of a benefice during a vacancy. They were mere trustees; but gradually the pope assumed the power of appointing commendators for life, without any obligation to account. This abuse led in 1466 to a prohibition of all commendams except those granted by bishops for six months and under. See ABBOT.

**Commensalism** (literally, 'at the same table'), the intimate, but never parasitic association of two different kinds of organisms, for the benefit of one, or very often of both. Of such advantageous partnerships there are so many different forms and degrees, that no precise definition of the term can be given. (1) Every one who has looked at shore animals must have observed how often mollusc shells, for instance, are covered with sponges, hydroids, worm-tubes, acorn-shells, and the like. But this is a purely external association, and depends simply on the fact that the shells afford convenient anchorage for the free-swimming embryos. In many cases no great advantage can accrue on either side. The habit is comparable to that of vegetable epiphytes upon trees. This grade might be spoken of as mainly external and unadvantageous association. (2) In other cases, however, the association, though probably accidental, brings its reward. When one sea-mat (Polyzoa) grows entangled with another of greater

vigour, or when different kinds of polyyps are similarly associated, and that is often, there may be distinct advantage to the weaker form, since without becoming a parasite it enjoys the privileges of a messmate. Or the advantage may take another form, when the associate is carried about by its bearer. Thus, Cirripedes are common upon whales, and have evidently an advantage both in security and continual freshness of feeding-ground over those which adhere to fixed objects. This grade might be distinguished as that of fixed external associates with the advantage on one side. (3) It is, however, evident that if a crab be covered with acorn-shells, or polyyps, or sponges, there is no longer a one-sided, but a mutual advantage. It is well for the sedentary growth to be carried about continually to new pastures; but it is well also for the crab to be masked. Covered with a rich growth, either vegetable or animal, the crabs must appear all innocence, and like walking-woods of Birnam, can steal unnoticed upon their victims. A gasteropod may be similarly masked by polyyps, and doubtless gives and reaps similar advantages. This grade may be described as that of fixed associates with mutual advantage, to this extent, at least, that the weaker animals are borne about, and the bearers are masked. (4) But a higher stage of fixed association is sometimes exhibited, that, namely, where the partnership is deliberate, where the masked bearer is not passively benefited, but is an active accomplice. Probably the most striking case of such deliberate partnership is that referred to (and illustrated) under the article ANEMONE—viz. the habit which some hermit crabs have of bearing about sea-anemones on the mollusc shell which they inhabit, or even upon their claws. It would appear that in some cases the crustacean deliberately chooses its ally, induces it to fix itself on the shell or claw, and takes care not to leave it behind at the epochs of shell-changing. When deprived of its commensal, the crab is said to be restlessly ill at ease until another of the same species is forthcoming. Off some parts of the British coast, the beautiful sea-anemone (*Adamsia palliata*) is found enveloping the mollusc home of a hermit crab (*Eupagurus prideauxii*). The use of the sea-anemone as a mask, and also as equivalent to a stinging organ, is obvious enough, while the hermit crab returns the benefit by carrying about the sea-anemone and giving it a share of the spoil. This grade may therefore be described as deliberate partnership with mutual advantage.

So far only fixed commensals have been spoken of, but organisms may be constantly associated without being attached. Sometimes different organisms, both plant and animal, are found in almost constant association without any obvious connection obtaining between them. In many cases this companionship may be simply due to the fact that similar environmental conditions suit both. Small fishes are sometimes found as free commensals within sea-anemones; the Remora (q.v.) attaches itself temporarily to sharks and other fishes; the little crabs (Pinnotheres, &c.) found living freely inside various bivalves are probably true messmates, and similar habitual partnership is very common among crustaceans; a brittle-star is known to live as a free messmate on a crinoid; many worm-types are found in constant though free associations with other animals; and the same habit is exhibited by some Coelenterates and Protozoa. Many of the insects which frequent plants are in strict sense commensals, feeding not on their hosts, but on other visitors, &c. In some cases they form an actual bodyguard.

Commensalism must, of course, be distinguished from parasitism, whether external or internal,

for in parasitism the one organism more or less directly preys upon the other. Yet it is evident that a commensal may readily degenerate into a parasite. Commensalism must also be distinguished from that most intimate kind of partnership known as Symbiosis (q.v.), and illustrated by the union of algoid and fungoid organisms to form a lichen, or by the occurrence of algæ as constant internal associates of Radiolarians, some Cœlenterates, and some worm-types. As part of the animate environment, commensals have influenced one another in very direct ways.

See ENVIRONMENT; Van Beneden's *Animal Parasites* (1876); Semper's *Animal Life* (1881); *Cambridge Natural History* (vol. iii.); E. Step's *Messmates* (1913).

**Commensurable.** Two quantities or numbers are said to be commensurable which are of the same kind, and each of which contains a third quantity or number a certain number of times without remainder; or when both can be measured exactly by the same unit, however small.

**Commeny,** a town in the French department of Allier, 211 miles S. of Paris by rail, is close to a great coal-field, and owes its rise to coal and iron works; pop. 10,000.

**Commerce,** CHAMBER OF. See CHAMBER OF COMMERCE, MERCANTILE LAW.—For the so-called Commercial System, see MERCANTILE SYSTEM.

**Commercial Travellers.** A commercial traveller ('C.T.') is a person whose occupation is to transact business as the accredited travelling representative of a trading house to other trading houses. In the later half of the 18th century in Britain 'many districts remained completely secluded, so that foreign products never reached them at all,' and 'even at the beginning of the 19th century the Yorkshire yeoman was ignorant of sugar, potatoes, and cotton.' It has been the work of the commercial traveller to assist materially in altering this state of things, and to bring about 'equality of distribution of produce, and corresponding equality of prices, and generally to promote that 'facility of exchange which is the very soul of industry.' Commercial travelling in the specific sense is not an old institution. The 'commercial traveller,' 'bagman,' or 'rider' (in the United States, 'drummer') was the successor to the 'chapman' or travelling merchant, who carried with him not samples merely, but stock. Chaucer says—

In Surrye whylom dwelte a companye  
Of chapmen riche, and therto sadde and trewe,  
That wyde-whete senten hir spicerye,  
Clothes of gold, and satyns riche of hewe.

The application of steam to machinery, the consequent rise of the factory system, increased facilities in banking, improved means of locomotion, and the increasing competition for business have made the commercial traveller an important factor in the commercial world. By far the greater portion of the business done in Britain is by commercial travellers. Within recent years a formidable competitor has entered the field in the person of the foreigner, whose superior education and commercial training have hitherto placed the British commercial traveller at a disadvantage; and there is room especially for men possessing a thorough knowledge of foreign and colonial trade, and above all of modern languages. No restrictions are placed on travellers by the British government, and 'the road' is free to all. Travelling is also free in many other countries, though some require an ordinary selling license to be taken out when goods are carried for sale. In other countries, again, a special commercial traveller's license must be obtained, the cost of which may be considerable or but nominal. In some countries British travellers must produce

a certificate from a British chamber of commerce stating that they are legitimately employed. A Blue-book is issued from time to time containing these regulations.

There are several excellent institutions connected with the body, owing largely to the efforts of men like George Moore and George Stockdale. The Commercial Travellers' Schools for destitute orphans and necessitous children were founded in 1845; the school at Pinner accommodates 360 children. The Commercial Travellers' Benevolent Institution was founded in 1849 for the relief of necessitous commercial travellers over the age of fifty-five years, being members, and for their widows. The relief is given in the form of annuities. The Commercial Travellers' Society of Scotland was founded in 1838 for the relief of members incapacitated by disease, accident, or infirmity, and for securing a payment at death. The British Commercial Travellers' Provident Society, like the last named, is based on the Friendly Societies Act. There is also a Commercial Travellers' Christian Association (1882); and the United Kingdom Commercial Travellers' Association (1883) has done good work in pushing forward hotel and railway reforms, and in promoting social intercourse among commercial travellers. A newspaper, *On the Road*, devoted entirely to the interests of commercial travellers, was established in 1883.

In the United States the number of commercial travellers has increased rapidly. They have many wealthy benevolent associations. Their and other commercial interests are greatly promoted by the great Philadelphia Commercial Museum, founded in 1894.

**Commers',** or KOMMERS (Lat. *commercium*), a festive gathering of students of a German university, to celebrate the beginning or end of a semester, or any other academic occasion. Speeches are made, songs sung, and much beer is drunk. The drinking is regulated by a strict ritual, the chairman giving the word of command in Latin. The ceremony of drinking a toast and rubbing the glass on the table is called 'rubbing a salamander'—why, is not known. New-comers are welcomed by a Fuchskomms (*fuchs*, a freshman, literally a fox), and those who are 'fettig' are sped by an Abschiedskomms. A Kommsbuch is a students' song-book. Several characteristic songs form the themes of Brahms's 'Academic Festival' overture.

**Commidendron**, a genus of Compositæ, small trees or shrubs, allied to the daisies and asters. There are three species, confined to St Helena.

**Commination** (Lat., 'threatening'), the 'denouncing of God's anger and judgments against sinners,' read in the Anglican Church on Ash-Wednesday (q.v.). A solemn service, at which penitents were expelled from the church, after instructions and prayers for their amendment, appears to have been held on the first day of Lent from a very early date, perhaps from the beginning of the 6th century; but the commination office used in the Church of England is rather a continuation of the medieval practice of reciting the 'articles of the sentence of cursing,' which were at one time read in the parish churches four times a year; only the opening exhortation to repentance was composed by the English Reformers. The present office is nearly the same as those found in the Sarum and York uses. The curses contained in Deut. xxvii. are read as statements, not as prayers; and the congregation answer 'Amen' to every sentence, as acknowledging the truth of what has been stated, rather than as confirming the curse. The American Prayer-book omits this office, but several prayers taken from it are appointed to be said on Ash-Wednesday, at the end of the litany.

**Commiphora.** See BALSAMODENDRON, BALSAM OF GILEAD, BDELLIUM, MYRRH, BURSERACEÆ.

**Commissariat** is a name for the organised system whereby armies are provided with food, forage, fuel, quarters, and all other necessities except warlike stores. In feudal times soldiers were mainly dependent for food on their lords; but they lived very much by plunder. In the Crusades thousands died of starvation. For centuries contractors not only found the supplies but distributed them, until Frederick the Great, and later Napoleon, began to have a corps of trained men for the duties. Both realised the value of feeding their soldiers well, on the principle that 'an army marches on its stomach.' But Napoleon never reached his ideal through the unpopularity of the expense entailed by a complete system. In Britain the *proviand-master* of Queen Elizabeth was the germ of a supply department. Between that time and the Crimean war (1854) many systems were tried; all were unsatisfactory, and that war proved to all the dire effects of improvidence in this direction. By 1875 some improvements had been made, and the supply of warlike stores had been placed under a separate department, the Ordnance Store. Since 1888 the whole control of transport and supply has been under the charge of the Army Service Corps. The principle on which the British Army Service Corps was organised proved its value in the Great War, when the system was highly tried by the need for a rapid increase that reached eventually to fifty times the previous *personnel*. Some of the belligerents had to recast their systems while fighting. The quartermaster-general, who is the third military member of the Army Council, has under him two directors—of transport and of supply. The *executive* in both cases is in the hands of the Army Service Corps, which is under the disciplinary control of the two directors, whose work, again, is co-ordinated by the quartermaster-general. The officers of the corps work at the provision of transport, food, forage, fuel, light, and supplies for all branches of the army, both in peace and war, as well as the allotment of barracks and quarters and their equipment. The rank and file are in armed companies of trained soldiers, which contain 6 officers (in war) and over 100 rank and file; 71 (before the Great War) were transport companies, 7 mechanical transport companies, 6 supply companies, 4 remount companies. There were about 400 officers from lieutenant-colonel downwards, and 69 quartermasters. In the field the corps provides drivers for all military transport, including that which accompanies the fighting line or carries ammunition, and provides supply columns of various strengths to the cavalry division, to each infantry division, each mounted brigade, and to the extra-divisional (or 'army') troops; also a supply park (final reserve in the field) to each infantry division. The mechanical transport mentioned above is in the park, and is equipped with 3-ton and other motor lorries.

**Commissary**, in general, is any one to whom the power and authority of another is committed. An ecclesiastical commissary is an officer of the bishop, who exercises spiritual jurisdiction in distant parts of the diocese. A military commissary is an officer charged with furnishing provisions and clothes to an army.

When the papal authority was abolished in Scotland, a supreme commissary court was established in Edinburgh in 1563, by a grant of Queen Mary. This court had jurisdiction in actions of divorce, declarators of marriage, nullity of marriage, and all actions which originally belonged to the bishops' ecclesiastical courts. Its powers were gradually conjoined with those of the Court of Session, and

it was finally abolished in 1836, the small remains of its once important jurisdiction being united in the sheriff of Edinburgh. In England the commissary court is the court of the bishop's commissary, exercising spiritual or ecclesiastical jurisdiction of the bishop in parts of his diocese.

**Commission.** As a commercial term, commission is sometimes taken to be synonymous with Brokerage, but there is a distinction. Brokerage is the percentage paid to a passive intermediary in a transaction, who incurs no responsibility; commission is the percentage paid to an active agent in a transaction, who usually does incur some pecuniary and always some moral responsibility.

The practice of secret commissions, which are strictly a species of bribery, caused a considerable amount of interest and discussion in the opening years of the 20th century. They take the form of presents, either of money or in kind, given by traders or contractors to agents or employés outwith the knowledge of their employers. The practice had become so general, extending as it does into every kind of domestic and commercial transaction, as to become a scandal. Lord Russell of Killowen in 1900 was the first to attempt some reform in the matter, and subsequently Lord Halsbury, then Lord Chancellor, introduced a 'Prevention of Corruption' bill in 1903, making the acceptance of a bribe by an agent, and the giving or even offering of one to such a person, a misdemeanour on the part of both giver and receiver, and punishable by fine or imprisonment. The measure passed the House of Lords, but was withdrawn in the House of Commons, as it was again in 1904-5; but it was finally passed by both houses in 1906. See BRIBERY.

A commission as a certificate of rank is granted by the highest authority of a state. All military and naval commissions in Britain must be signed by the sovereign; but in the United States a commission may be issued by a governor of a state as well as by the president of the republic, commissions in the volunteers (or militia) being generally granted by state governors. The appointment of justices of the peace in the United Kingdom is also made by a 'commission of the peace,' issued under the great seal. The great seal itself is in charge of a Lord-keeper, but is put 'into commission' when a change of ministers is taking place. This means that certain persons are appointed to exercise jointly, but without individual powers, the functions of the office. Another instance of the functions of a great public officer being delegated to others 'in commission' is that of the Lord High Admiral, who formerly had control of all naval affairs. This, however, is a permanent commission, although commissioners of Lords of the Admiralty change with every change of the ministry.

An office in commission is an office in suspense. Yet, curiously enough, the phrase has a directly opposite meaning in naval affairs, for when a ship is ordered to be placed 'in commission,' it means that she shall be fully equipped and prepared for active service.

Permanent commissions are also constituted, not merely for the delegation of existing duties, but also for the execution of duties with which no person had been previously charged. As instances we may take the Civil Service Commission in 1855 (see CIVIL SERVICE); the Railway Commission, appointed in 1873 to carry out the act for the better regulation of railways passed in 1854, and to otherwise act as a sort of court of arbitration or appeal in disputes between railway companies; the Irish Land Commission, appointed to carry out the provisions regulating the land laws in Ireland; the Crofters Commission (1886; superseded by the Land Court in 1911) to fix fair rents for the Scottish

crofters. The members of these are nominated in terms of special acts of parliament.

Other permanent commissions are the Charity Commission, created 1853 (of four members, one of whom is unpaid), to examine into all the charities and the management of them, in England and Wales; the Commission for the management of the National Debt; the Ecclesiastical and Church Estates Commission; the Land Commission of England; the Public Works Loan Commission; the Thames Conservancy Commission; that for income-tax cases; the Civil Service Commission; and the Irish Land Commission—bodies more or less administrative, and partaking to some extent of the character of public departments.

In law, a commission may be issued by mandate of a court to take evidence from parties residing abroad or incapacitated from appearing in person. A Commission in Bankruptcy is issued for the purpose of taking charge of the effects of an insolvent for behoof of his creditors. A Commission in Lunacy is appointed by the Court of Chancery to inquire into the mental condition of an alleged lunatic whose property may be in question. There are now permanent commissioners in lunacy whose duties include visitation and supervision of asylums.

In governmental relations, commissions are sometimes constituted where Britain exercises protectorate but has not formed complete colonial establishments, as in Cyprus, Zanzibar, and some islands of the western Pacific, there being in such cases a delegation of the authority of the crown; there is a High Commissioner for South Africa, with resident commissioners under him in such districts as Basutoland and Bechuanaland. In India (q.v.) the administrative head of a province is sometimes called chief-commissioner. Sometimes commissions are international—i.e. composed of representatives of various nations for international purposes. A conspicuous example of such was the commission in 1871 on the Alabama question (see ALABAMA); and under the arbitration treaty of 1911 Britain and the United States appointed a commission composed of three nationals of each of the countries.

Again, a commission may take the form of a temporary embassy for certain specific purposes. The appointments are then made by the Prime Minister and cabinet, as when Mr Gladstone was sent to the Ionian Islands in 1858, or when in 1887 Mr Chamberlain went to America to confer with Canadian and United States delegates in the troublesome fisheries dispute; and in the case of the commission sent to the West Indies to inquire into the effect of sugar bounties on the colonies.

In its parliamentary sense, a commission may be either Special or Royal. In the former case it is appointed usually, and in the latter case invariably, in response to a motion in one or other of the Houses. A royal commission is appointed only by the crown; but a special commission may be appointed by a department of state. The expenses of a commission of this kind are usually defrayed by the parties requiring it, but those of a royal commission are included in the estimates for the current year. The commissioners may be paid by fees regulated by government. When a commission sits in London, it has the power of authorising the payment of witnesses on the scale recognised in courts of law; but when a commission sits in the country, witnesses are not paid.

A royal commission is appointed by motion in parliament, and is issued by a royal warrant nominating certain 'trusty and well-beloved cousins and counsellors' to undertake a specified inquiry. Of such was the royal commission to inquire into the condition of the crofters (1882),

which was a wholly different body from that appointed by act of parliament in 1886 to carry out certain legislative decrees. The former was one of inquiry; the latter, one of administration. The royal commissions appointed to inquire into the causes of the depression of trade (1886-87), into the recent changes in the relative values of the precious metals (1886), and into the coal-supplies of the country (1902) are notable appointments of this kind.

When a royal commission is nominated by royal mandate, a secretary is appointed, and such clerical assistance as may be necessary is provided out of some of the departments. The commissioners are empowered to call and hear evidence (although not on oath), to examine documents, localities, &c. The evidence is reported *in extenso*—question and answer duly numbered—and is submitted, along with the formal report, to the sovereign and to parliament. The whole is then incorporated in a blue-book. The multiplication of royal and special commissions is regarded by many as having become rather a legislative nuisance and a financial burden. Royal commissions always include members of the House of Lords or of the House of Commons, or of both.

Another kind of commission is that sometimes given to two or more judges to inquire into certain alleged crimes, such as the commission (1867-69) to inquire into the Sheffield trade-union outrages; that (1888-90) of three judges appointed by act of parliament to inquire into the 'charges and allegations' brought by the *Times* against Mr Parnell and others. Another important commission was that appointed in 1911 to inquire into the relations between the railway companies and their servants.

It should be added that the sovereign, who nominally presides over the annual deliberations of the General Assembly of the Church of Scotland, delegates the duty to a Scottish peer as Lord High Commissioner, a fresh commission being issued every year. King George V. appointed a commissioner to perform certain functions of the crown during his absence in India in 1911. The Great Seal may be put into commission and entrusted to Lords Commissioners not merely during a change of government, but when the Lord Chancellor has occasion to be out of the country for a brief term—as when in 1913 the Lord Chancellor visited America. The office of the Lord High Treasurer has been in commission since the time of Queen Anne; see TREASURY. For the ecclesiastical court created by Queen Elizabeth, see HIGH COMMISSION; and for army commissions, see below at COMMISSIONS.

**Commission Agent**, or **MERCHANT**, is a person employed to sell goods consigned or delivered to him by another who is called his principal, for a certain percentage, commonly called his commission or factorage. See **BROKER**.

**Commissionaires** is a name given a class of attendants at continental hotels, who perform certain miscellaneous services. Employed to attend at the arrival of railway trains and steamboats to secure customers, they wait to take charge of luggage, see it passed through the hands of the custom-house officers, and send it on to the hotel; for all which service they charge a fee.

In 1859 the *Corps of Commissionaires* was established by Sir Edward Walter in England, with divisions in London, Edinburgh, Glasgow, Leeds, Liverpool, Manchester, and other large cities in the United Kingdom. The corps has recently extended its operations to the principal cities of Australia, and purposes to continue its further development throughout the colonial empire. The corps is composed of picked men from every branch of His

Majesty's naval and military service, and now numbers over 4500. They can be engaged by the day or any other period, and for any duty where honesty, sobriety, and intelligence are required.

**Commission del Crederé.** See DEL CREDERE COMMISSION.

**Commissioner, Lord High.** See ASSEMBLY (GENERAL), COMMISSION.

**Commissioners of Supply.** See SUPPLY.

**Commissions, ARMY,** are warrants from the head of the state for holding various military offices, whether combatant or non-combatant. Officers of Army Service Corps, Royal Army Medical Corps, and Army Veterinary Service have lately been granted commissions as combatants, entering the service as lieutenants. Chaplains, ordnance store officers, army school inspectors, paymasters, and others have commissions as non-combatants, but often have honorary combatant titles as well; some are nominated, some transferred from combatant branches, and some admitted by examination. Similar commissions exist in the Territorial force. The majority of combatant first commissions are gained by competitive examination. They may be gained (1) Through Royal Military College, Sandhurst, for guards, cavalry, infantry, Indian army, West India regiment. (2) Through Royal Military Academy, Woolwich, for artillery and engineers. (3) From Special Reserve (q.v.), for all branches except engineers and Indian army. (4) From universities, including colonial, which have established an approved military class, for all combatant branches except engineers. (5) Through Royal Military College, Kingston, Canada, seven commissions annually, of which one is in engineers. (6) From colonial military forces, for all branches except engineers and Indian army. (7) From the ranks. (8) Through Netley Hospital, for Royal Army Medical Corps, after competitive examination. (9) Through an approved veterinary college, for Army veterinary service, after competitive examination. Subsequent commissions up to that of lieutenant-colonel are given, as vacancies occur, to the senior officer of the next lower rank, provided he has been favourably reported on and has passed the appointed examination, outdoor and indoor, in all the branches of the military art—drill, field-training, military engineering, tactics, topography, law, history of a prescribed campaign, military organisation. The rank of colonel is for the most part conferred by Brevet (q.v.), generally for distinguished service, but also attaches to certain appointments. It is given to a lieutenant-colonel who has completed his five years' term of regimental command and is continued on the active list. The commander of a Regiment (q.v.) is a full colonel. Promotion to major-general, lieutenant-general, and general is by selection as vacancies occur (see GENERAL).

Till 1871 all combatant commissions were purchased, except in the Royal Artillery, Engineers, and Marines, and a few given as prizes to distinguished cadets. In the old Indian Staff Corps first commissions were largely in the gift of the directors; regimental officers then subscribed to a purchase fund which was used to 'buy out' senior officers, whereupon the senior of each rank below obtained his 'step.' In the home army even first commissions could be purchased on passing a very easy qualifying examination, and the man of means could often purchase farther steps over the heads of less opulent comrades by 'buying out' an officer of the next higher rank. The price of a first commission might vary from £450 in the line to £1260 in the Life Guards, and promotion could rarely be obtained without paying for it.

Gladstone's entire abolition of the purchase system by royal warrant in 1871 increased the intrinsic

value of commissions and the number of those who are in a position to compete for them. The competition has in consequence become more severe at the examinations, usually held twice a year, of all the categories of candidates detailed above; before the Great War the flow of candidates was lessening seriously, owing to the pay remaining as a century ago, while the average income of all classes had greatly increased. But the substantial rises of pay granted after the war are expected permanently to obviate any shortage, both in the Home and in the Indian army. The officer has harder work than of yore, and higher professional attainment is called for. Army classes in all the great schools prepare boys for the examinations, and there are many private tutorial establishments. An effort is made so to arrange the syllabus as to encourage boys to compete direct from the schools, and thus avoid the less wholesome life at the 'crammer's' (see CADET). Commissions in the Special Reserve (see MILITIA) are obtained without competition, on recommendation to the War Office by the commander of the unit. In the Territorial force commissions are granted in the same way; but in both cases the officer is under probation for a period. (See a War Office pamphlet, *A Short Guide to the Various Ways of obtaining a Commission.*)

In the United States commissions are granted to suitable military persons by the President, and are published through the adjutant-general's department.

**Commissure,** an anatomical term applied to nervous connections between adjacent parts of the nervous system. Though it is not always used in quite the same way, the general signification of the term, and the physiological import of the structure, is that of a uniting bridge. See BRAIN, NERVOUS SYSTEM.

**Commitment.** See CRIMINAL LAW.

**Committee** (Fr. *comité*), a portion, generally consisting of not less than three members, selected from a more numerous body, to whom some special act to be performed, or investigation to be made, is *committed*. But though a committee usually consists of several members of the body by which it is appointed, it may consist of one member, or, what is more frequent, of the whole of the members acting in a different capacity from that which usually belongs to them. For the committees of parliament, whether 'select,' 'of the whole house,' 'grand,' or 'standing' committees, see PARLIAMENT.

**Commodianus,** the author, probably African, of an accental Latin verse work, *Instructiones adversus Gentium Deos pro Christiana Disciplina* (c. 254-57 A.D.), largely based on Cyprian. See Durel, *Recherches sur Commodien* (1913).

**Commodore,** a rank intermediate between admiral and captain. It is not permanent, but is bestowed for a time on a captain. Usually a commodore commands more ships than one, detached from a fleet on some special service; he hoists at that time a white broad pennant, with a red cross, at the main if a commodore of the first class, at the fore if of the second class; but the rank has also been bestowed on captains holding shore appointments, such as command of R.N. barracks, and on captains holding staff appointments in the Grand Fleet. In etiquette, the commodore ranks with a colonel commandant in the army.

Until 1862 the title of commodore, without any commission as such, was given in the United States navy to such captains as commanded, or had commanded, a squadron. In 1862 the rank of commodore became a commissioned one. His rank is assimilated to that of a brigadier-general in the United States army.

**Commodus**, LUCIUS AURELIUS, a Roman emperor, born at Lanuvium in 161 A.D., was the son of the great Marcus Aurelius and his profligate wife, the younger Faustina. He was carefully educated under his father's care, but lived to become one of the most worthless and bloody wretches that ever disgraced a throne. At his father's death in the spring of 180, he was successfully fighting the Marcomanni and other tribes on the upper Danube, but he at once concluded a treaty with the barbarians, and hastened to Rome to enjoy the pleasures of power. After the discovery of his sister Lucilla's plot against his life in 183, he gave uncontrolled vent to the senseless savagery of his nature. Nearly all who, by virtue, ability, and learning, had risen to honour during his father's lifetime, were sacrificed to appease his savage jealousy of the good and the great. Proud of his own physical strength, he bemeaned himself by exhibiting in gladiatorial combats, and besides used, in public, to sing, dance, play, and act the buffoon. Though a glutton and a shameless debauchee, who wallowed in the most sensual abominations, he yet demanded to be worshipped as a god, and assumed the title of Hercules Romanus. Many unsuccessful plots were devised against the life of this mingled monster and madman, until at length his mistress, Marcia, finding her own name marked down in his tablets for death, in concert with two confederates, tried first to poison him, then caused him to be strangled by Narcissus, a famous athlete, on the 31st of December 192.

**Common Bench.** See BENCH, and COMMON LAW.

**Commoner**, one under the rank of nobility; also a member of the House of Commons. For the *Commoners* at Oxford, as opposed to scholars, see OXFORD.

**Common Forms** are the ordinary clauses which are of frequent occurrence in identical forms in writs and deeds.

**Common Good.** See BOROUGH.

**Common Law**, in England, is the ancient customary law of the land. Before the Norman Conquest, the rights of an Englishman were determined mainly by the customs of the manor, borough, or shire in which he lived. After the Conquest, the king's judges began to go their circuits in every part of the country, doing justice according to the custom of the realm or the common law. In some points they kept to the ancient local customs, in others again they introduced new rules. Primogeniture, e.g., is a rule introduced by the influence of the judges; the ancient English rule of equal division survives only as the 'custom of Kent' under the name of Gavelkind (q.v.). The custom of certain ancient boroughs, which gave the land to the youngest son, survives under the name of Borough English (q.v.). The custom of a place, or of a body of persons, is allowed to supplement or modify the common law if it has been observed from a time 'whereof the memory of man runneth not to the contrary.' Legal memory does not go back beyond the first year of the reign of Richard I., but evidence may be given to impugn the 'immemorial' character of a local custom by showing that it had its origin later than that year.

Even in making new rules, the judges never assumed to legislate; they professed to expound the good customs of the realm, and in applying the rules of common law, each generation of judges was guided by the decisions of its predecessors. Decisions followed in a series of subsequent cases acquired special authority, and were quoted as leading cases. The law fixed by custom and by judicial decision could only be set aside or amended by an act of parliament. But without setting aside

the law, courts of equity, and especially the Court of Chancery (q.v.), framed rules of their own, which enabled them to prevent the stricter rules of common law from being used in defence of injustice. By the Judicature Acts (q.v.), courts of common law and equity were made parts of one supreme court; the two systems are administered concurrently; where there is any conflict between equity and common law, the rules of equity prevail. See EQUITY.

English settlers going to an uncivilised country take with them 'as much of the common law as the nature of things will bear.' In Canada, Australia, &c., and in the United States, the historical basis of the law is the same as in England. In Scotland, and in some other countries, the term common law is used in a sense analogous to its English meaning.

**THE COURTS OF COMMON LAW.**—The superior courts of Common Law in England had their origin in the Curia Regis of the early Norman kings, the chief officers of which were the Chief-justiciar, the Chancellor, and the king's justices. The justices sat in the King's Bench to supervise the proceedings of inferior courts and corporations, and to deal with criminal matters directly concerning the crown. In the Common Bench or Common Pleas they held pleas between subject and subject. In the Exchequer they sat, as Barons of the Exchequer, to decide revenue cases. At first all these courts followed the king, to the great inconvenience of suitors. The Common Pleas were fixed at Westminster by Magna Charta; and in course of time the three superior courts of Common Law were all established on one side of Westminster Hall, each court having its own chief and four (afterwards five) puisne or junior judges, who were called justices in the King's Bench and Common Pleas, and Barons in the Exchequer. On the passing of the Judicature Acts (1873-76), the three courts became divisions of the High Court of Justice. The offices of Chief-justice of the Common Pleas and Chief-baron of the Exchequer are now abolished, and the three divisions are consolidated in the King's Bench Division. The Lord Chief-justice of England is the presiding judge; he is appointed by the crown on the advice of the prime-minister, and his salary is £8000. There are fifteen puisne justices, appointed by the crown on the advice of the Lord Chancellor, each of whom has a salary of £5000. The sittings of the Division are held at the Royal Courts in London; the judges also try cases on their circuits and at the Central Criminal Court. The jurisdiction of the Division includes all special authorities formerly belonging to any of the old Common Law Courts. It takes, e.g., appeals from Revising Barristers (q.v.) which formerly went to the Common Pleas, and revenue cases which belonged to the Exchequer. Appeals from any of the old Common Law Courts went to the judges of the other two courts, sitting in the Exchequer Chamber, and from them to the House of Lords. Appeals from the King's Bench Division now go to the Court of Appeal, and thence to the House of Lords.

Besides the superior courts, there are many inferior courts which exercise a limited common-law jurisdiction. Each manor has its own courts, but except in regard to Copyholds (q.v.), manorial jurisdiction has been superseded by local courts of modern origin. The same remark applies to the Hundred Court and the ancient County Court. The Court of Common Pleas in Lancaster and the Court of Pleas in Durham, now form part of the High Court. The *modern* County Court (which ought more properly to be called a district court) has a common-law jurisdiction; and several statutes contain provisions for remitting the less important

class of common-law actions to the County Court for trial.

Of Borough Courts some (as, e.g., the Court of Hustings in London) are obsolete; others (as, e.g., the Mayor's Court in London and the Court of Passage in Liverpool) are still of importance. The City of London Court is framed on the model of the modern County Courts. The Court of the Cinque Ports is held before the mayor and jurats of each port; from them appeals are taken to the Lord Warden's Court, and thence to the King's Bench Division. Courts of Request for the recovery of small debts existed in several boroughs; they are now obsolete, as also is the Court of Pie Poudre, or dusty foot, held by the steward of a manor to which a market belongs, for the immediate decision of questions arising in the market. There are still courts of some importance, established for the benefit of privileged bodies of persons.

See Martland and Pollock's *Hist. of English Law* (2d ed. 1898); Holdsworth's (1903-9); Pollock's *Expansion of the Common Law* (1904), *Genius of the Common Law* (1912).

**Common Pleas.** See COMMON LAW.

**Common Prayer.** See PRAYER-BOOK.

**Common-riding** is the Scottish equivalent of Beating the Bounds. See BOUNDS.

**Common Room**, an apartment in a monastery in which a fire was constantly kept burning for the use of the monks, and which was presided over by a monk called the master. It was the prototype of the common rooms in the colleges of the English universities, where the dons take their wine after hall.

**Commons**, the dinner provided in English colleges and inns of court for their members. In the inns of court it is provided only during term. Separate tables are appointed for the benchers, for the barristers, and for the students and other members of the inn. See INNS OF COURT.

**Commons, HOUSE OF.** See PARLIAMENT.

**Commons and Enclosures.** This is one of the numerous instances in which a different meaning is attached to the same term in the legal systems of England and Scotland. In England the property in the common land belongs to the lord of the manor; although rights over the common land are possessed by certain persons who hold land in the manor, and are known as commoners. Thus Blackstone defines a common as 'a profit which a man hath in the land of another, as to feed his beasts, to catch fish, to dig turf, to cut wood and the like.' But in Scotland, where the law has adopted the divisions and followed the nomenclature of the civil law and of the legal systems of continental Europe, all these profits, or rights to derive profit, are known as *Servitudes* (q.v.), whereas a common, or commonity, as it is more frequently called, is a common right of property existing in several individuals, frequently the inhabitants of a whole village, in a piece of ground. In each individual the right of course is limited, so as in reality to amount to little more than a servitude; but there is no overlord, the land is not the land of another, but the land of the community as a body.

The nature and origin of rights of common have been the subjects of elaborate investigation, but are still obscure. They are probably derived from the old Germanic rights of common pasture on the *Folkland* (q.v.). In England at present almost the only land subject to common rights is waste land; but formerly rights of joint cultivation extended over a great part of the arable land. These are not yet quite extinct. So long as the lands subject to rights of common were extensive and fertile, their enclosure was a source of wealth

both to lords of manors and to the nation as a whole. Accordingly enclosures began to be frequent in the 16th, and were continued on a great scale to the end of the 18th century. Formerly the enclosure of a common required a private act of parliament. The commoners, who were generally poor and unable properly to represent their case, often suffered by enclosure, obtaining inadequate compensation. By the Act 6 and 7 Will. IV. chap. 115, and subsequent acts, the necessity for a private act of parliament is abolished. By the Act 8 and 9 Vict. chap. 118, which has been often amended, a Board of Commissioners is appointed to inquire into the propriety of any proposed enclosure or partition, and to report to parliament, which may then pass a public act authorising their proceedings. This is the course generally adopted.

In Scotland, commonities or commons were made divisible by an action in the Court of Session, at the instance of any person having an interest by the Stat. 1695, chap. 38.

The lands still subject to rights of common are for the most part such as could not be cultivated with advantage. The increase of population, however, has made them valuable as places of exercise and recreation. This value has been clearly stated by J. S. Mill (*Dissertations and Discussions*, vol. ii. p. 213): 'We must needs think, also, that there is something out of joint, when so much is said of the value of refining and humanising tastes to the labouring-people—when it is proposed to plant parks and lay out gardens for them, that they may enjoy more freely nature's gift alike to rich and poor, of sun, sky, and vegetation; and along with this a counter-progress is constantly going on of stopping up paths and enclosing commons. Is not this another case of giving with one hand and taking back more largely with the other? We look with the utmost jealousy upon any further enclosure of commons. In the greater part of this island, exclusive of the mountain and moor districts, there certainly is not more land remaining in a state of natural wildness than is desirable. Those who would make England resemble many parts of the Continent, where every foot of soil is hemmed in by fences, and covered over with the traces of human labour, should remember that where this is done, it is done for the use and benefit, not of the rich, but of the poor; and that in the countries where there remain no commons, the rich have no parks. The common is the peasant's park. Every argument for ploughing it up to raise more produce applies *a fortiori* to the park, which is generally far more fertile. The effect of either, when done in the manner proposed, is only to make the poor more numerous, not better off. But what ought to be said when, as so often happens, the common is taken from the poor, that the whole or great part of it may be added to the enclosed pleasure-domain of the rich? Is the miserable compensation, and though miserable not always granted, of a small scrap of the land to each of the cottagers who had a goose on the common, any equivalent to the poor generally, to the lovers of nature, or to future generations, for this legalised spoliation?'

Acting upon the principles expressed in this extract, the legislature in the 19th century regulated enclosures with reference to the enjoyment of the general public, as well as to the rights of the lord of the manor and of the commoners. Restraints have been placed on the enclosure of commons in or near towns, and provision has been made for laying them out and maintaining them as places of recreation. Near London especially, many commons have thus been secured to the public. See Miss Octavia Hill, *Our Common Land* (1878); Elton,

*The Law of Commons* (1887); works by Scrutton, Chambers, Cooke, Hall, Williams, Shaw Lefevre, Sir R. Hunter (1897), Gonner (1912); Slater, *The English Peasantry and Enclosure* (1907); J. L. and B. Hammond, *The Village Labourer* (1912).

In the United States 'common' in one sense signifies the common or general fields set apart as pasture-land at the foundation of towns or villages; the idea of such common fields may probably have been suggested by those of semi-feudal England. Common fields also existed in the villages of French and Spanish settlers. The title to these lands was confirmed to the inhabitants by act of congress. Unappropriated lands in Virginia have similarly been confirmed as common lands by statute, and the constitution of Illinois sets apart certain lands as commons. Unless the statute expressly forbids, commons in this sense may be divided at the instance of individuals interested, if they think fit to take legal proceedings for that purpose. In the other sense, the term 'common' is applied to a public park which may belong to the municipality or to the nation—e.g. the Yellowstone Park—respecting which no individual or individuals can claim a division. Such parks are under the direct control of the authorities. As applied to a school, the epithet 'common' means public, supported by taxation, and open to all children of a certain age. It has no reference to the studies of the school.

**Common Sense.** THE PHILOSOPHY OF. There are certain beliefs that have been current among men in all ages, which by some philosophers have been declared to be groundless illusions. Of these, the most remarkable instance is the belief in an external, material world, independent of any mind to perceive it. Berkeley's doctrine (see **BERKELEY**) seemed to his contemporaries to contradict this belief, and affirm that there is no such thing as a material world; and Hume, carrying the same principles to their full length, disintegrated the world of spirits, and left nothing in nature but isolated ideas and impressions.

A dead-lock in philosophy was the result of these doctrines of Berkeley and Hume; and the solution offered by Reid consisted in setting up common sense as an arbiter from which there could be no appeal—that is to say, the universally admitted impressions of mankind were to be taken as corresponding to the fact of things without any further scrutiny. It is only the same view otherwise expressed, when it is declared by other philosophers that the deliverance of consciousness must be presumed true. According to Sir W. Hamilton, in the most elaborate vindication of the common-sense philosophy that has ever been produced (in his edition of Reid's works), consciousness assures us that, in perception, we are immediately cognisant of an external and extended *non-ego* (not-self); and that the testimony of consciousness must be viewed as entitled to prompt and unconditional assent.

The conclusiveness of this reasoning is disputed by many, who say that it is an abnegation of the tasks of philosophy, and may establish mere prejudices as dictates of consciousness. Consciousness (q.v.) is a very wide word, comprising indeed everything that we call mind. Suppose, it is argued, we were to maintain that the veracity of each one's memory was beyond all question or dispute, it would be apparent at once how the case really stands. But there must be a standard truth. Experience is the criterion how far the memory is to be trusted; and possibly the same may be true of the larger fact named consciousness. See **PHILOSOPHY**, **PSYCHOLOGY**.

The truths of common sense, assumed to be those of consciousness, are such as these: the

laws of Identity, Contradiction, and Excluded Middle; the axioms of Mathematics; the law of Causality (see **CAUSE**); the doctrine of an innate moral sense (see **ETHICS**); the doctrine of man's Moral Liberty (see **WILL**); the existence of an external world independent of every perceptive mind. Some of these truths, which however by no means stand all on the same footing, are termed Intuitions, Intuitive Cognition, Instincts, Feelings, Beliefs, Principles, Ultimate or Primordial Elements, Truths *a priori*. Kant's mission was to investigate the origin of such of those truths as might be accounted *a priori*; see **KANT**, **A PRIORI**. The philosophy of common sense, as promulgated by Reid, bore reference especially to the denial by Berkeley of the received view of the material world. See **SCOTTISH PHILOSOPHY**, **RELATIVITY OF KNOWLEDGE**.

**Commonwealth** (practically, a translation of *Lat. respublica*, 'republic') is used in a special sense for the form of government established in England after the execution of Charles I. in January 1649. Usually the Commonwealth is held to extend till the Restoration in 1660; and in the *Calendar of State Papers* this is the usage of the word. But the Commonwealth is sometimes limited to the period 1649–53, ending with the establishment of Cromwell's Protectorate. See **CROMWELL**, **ENGLAND**. Several states of the American Union are officially called commonwealths, as is also the 'Commonwealth of Australia.'

**Commune** is the unit or lowest division in the administration of France, corresponding in the rural districts to the English parish or township, and in towns to the English municipality. In France there are over 36,000 communes, with a considerable measure of self-government, with the power of holding property, &c. Each commune has a council elected by universal suffrage, and the council is presided over by a *maire* and one or more *adjoints* or assistants. In the larger communes the *maire* is selected by the central government out of the members of the council; in others he is appointed by the prefect of the department. The central government through its officials exercises generally a very large control over the affairs of the commune. For other communes, see **BOROUGH**, **CITY**, **MIR**, **RUSSIA**, **VILLAGE COMMUNITIES**.

The rising of the commune of Paris in 1871 should not be confounded with Communism (q.v.). It was a revolutionary assertion of the autonomy of Paris, that is, of the right of self-government through its commune or municipality. The theory of the rising was that every commune should have a real autonomy, the central government being merely a federation of communes. The movement was based on discontent at Paris, where the people found themselves in possession of arms after the siege by the Germans. The rising began on the 18th March 1871, and was only suppressed ten weeks later after long and bloody fighting between the forces of the commune and a large army of the central government, 6500 Communards having fallen during 20–30th May, and 38,578 been taken prisoners. See **FRANCE**; and see histories of the Paris commune by Lissagaray (trans. 1886) and Thomas March (1896).

**Communism** signifies, in ecclesiastical language, that relation, involving mutual claims and duties, in which those stand who are united by uniformity of belief in one religious body or church. To exclude from this relation and its involved rights is to *excommunicate*. The most visible symbol of this relation being the partaking together of the Lord's Supper, that rite is often called the Communion. See **LORD'S SUPPER**, **PRAYER-BOOK**, **LITURGY**; and for Communion Table, see **ALTAR**.

**Communism** is a system of society in which common property is the recognised form. In later times it is an attempt to prevent or remedy the evils arising out of the inequalities of private property by holding property in common. But in primitive societies, in the hunting and pastoral stages of civilisation, communism was universal. It was only when the transition was made to a settled life and to agriculture that private ownership in land began to appear, and even then it was slowly introduced. Long after the private use of land had been established, the common ownership of it by the tribe or clan was still recognised and enforced, and the arable land of the community was subject to periodical redistribution with the view to cultivation. Survivals of this system still exist in various countries of the world, notably in Russia under the Mir.

In the ancient world a partial communism prevailed in Crete and Sparta. Towards the decline of Greece more systematic speculations and experiments in communism appeared. The most eminent example of the former was the republic of Plato, in which a community of goods and also of wives was taught, as the form of society among the ruling and military class. These were to be supported by the industrial classes, whose form of life is not indicated. In Palestine, about the Christian era, the Essenes were a society of recluses with celibacy and the community of goods.

A most remarkable instance of community of goods is that of the early Christians at Jerusalem, recorded in Acts, iv. 32. Under the influence of Christianity the rigorous and often merciless ideas and rights of private property developed in the ancient world, especially among the Romans, were greatly modified. Denunciations of wealth tending to communism are not infrequent in the church fathers. Not to mention the corporate property of the church itself, which in medieval times embraced about one-third of the land in the countries where it was established, many of the monastic institutions were based on the community of goods. During the middle ages, sects holding the community both of goods and women appeared, like the sect of the Giovannali in Corsica.

At times of social and spiritual change or fermentation communistic ideas usually grow up with special vigour. Such was the case at the Reformation, when the anabaptists Munzer and Bockholt set up communism in Germany, and similar notions had a wide diffusion in other countries (see ANABAPTISTS). The most eminent literary form of it, combined with the noblest humanitarian ideals and practical suggestions for reform, which even yet have not been realised, was the Utopia of Sir Thomas More (1516). In that great work, besides the institution of common property, we have the most advanced views on toleration, universal education, a mild criminal code, sanitation, and a working-day of six hours. Campanella's *Civitas Solis* (1623) has a similar community of goods under the despotic rule of the wise men, with a working-day of four hours.

At the discovery of America the Spanish conquerors found a system of agricultural communism under a central despotism both in Mexico and Peru. Like the partial communism of Crete and Sparta it may have been a survival or continuation of the primitive communism. In the earliest English settlements in America, both Virginia and New England, a system of common property was attempted, but soon abandoned. During the fermentation which preceded and accompanied the French Revolution communistic ideas again emerged in the writings of Morely and Mably. They are also found vaguely expressed in the works of Rousseau, and through him they to some

degree affected the principles of Robespierre and St Just; but the general tendency of the Revolution was to consolidate individual rights and private property. The conspiracy of Babeuf was intended to establish a systematic communism by revolution.

Socialism (q.v.) must not be identified with communism. Yet it is largely coloured with communistic conceptions, and in some of its schools a thoroughgoing communism is taught. About 1920 a quite fresh meaning of the word, imported from the continent of Europe, became widely current in England. In 1847 Marx used the word as equivalent to socialism in the important *Manifesto of the Communist Party* written by him and Engels, and constantly reprinted and circulated ever since. The Russian Bolsheviks call themselves Communists (Bolshevist is a nickname like Tory or Quaker), and their followers in England, Germany, and elsewhere have adopted the same name. Russian bolshevism is Marxian socialism, with stress laid on some special doctrines, and the word communist, as now most commonly used by and of certain groups of extreme socialists, simply means socialists who approve of the teachings and policy of the Russian Bolsheviks. Different are the communistic societies of the United States. These are mainly efforts to realise for their members a happier state of things by community of property, without a revolutionary propaganda; see BROOK FARM, FOURIER, OWEN (R.), PERFECTIONISTS, RAPP, SHAKERS.

**Commutation.** See ANNUITY, TITHES, PENSIONS.

**Commutator**, an apparatus attached to many electric machines for reversing the currents. See ELECTRICITY, DYNAMO-ELECTRIC MACHINES.

**Comnenus**, a family, originally Italian, of which many members occupied the throne of the Byzantine Empire (q.v.) from 1057 to 1204, and that of Trebizond (q.v.) from 1204 to 1461. See ALEXIUS, ISAAC.—ANNA COMNENA (q.v.), who lived in the first half of the 12th century, was a high literary as well as historical celebrity.—DAVID COMNENUS, the last representative of the imperial race in Trebizond, was executed at Adrianople in 1462, with all his family, by command of Mohammed II.

**Como**, a city of Lombardy, Northern Italy, beautifully situated at the south-west extremity of the Lake of Como, 30 miles N. of Milan by rail. It lies in a valley, surrounded by hills, clad with luxuriant gardens, olive plantations, and orange groves, with here and there an old ruin cropping out. The city is surrounded by old walls flanked with towers, the gateways by which the walls are pierced being fine specimens of medieval military architecture. Among the principal buildings of Como are the cathedral (1396-1732), and the town-hall, built of marble, dating from the beginning of the 13th century. The chief articles of manufacture are silk, satin, gloves, and soap. By means of its port, Como carries on extensive trade in the produce of the district with Switzerland. Population with suburbs, 50,000. Como, the ancient *Comum*, was the birthplace of Cæcilius Statius, the two Plinys, of several popes, and of the physicist Volta. In 1107 it began to war with Milan, and in the course of twenty years was utterly destroyed by its antagonist. As an important headquarters of the Ghibelline party, it was rebuilt in 1158 by Frederick Barbarossa, and remained a republic for two centuries, when it fell into the hands of the Viscontis, its history since that time being bound up with that of Milan.

**Como**, LAKE OF (Ital. *Lago di Como*, or *Il Lario*, ancient *Larius Lacus*), a sheet of water, in Northern Italy, lying at the foot of the Bernine Alps. It is chiefly formed by the river Adda, which enters it at its north, and issues at its south-eastern

extremity. The total length of the lake from Como to Riva is about 30 miles. Fifteen miles from its northern extremity, the promontory of Bellaggio divides it into two branches, the shorter of which is called the Lago di Lecco. The greatest breadth of the lake is  $2\frac{1}{2}$  miles, but throughout the greatest part of its length it is much less. It is 663 feet above sea-level, has a mean depth of 870 feet, and a maximum of 1352 feet. The beauty of the scenery and the salubrity of the climate have made the Lake of Como the most celebrated in Italy, its shores being everywhere studded with noble villas.

**Comodoro Rivadavia**, an Argentine oil-field and port on the Golfo de San Jorge (Chubut).

**Comorin**, CAPE (*Kumdré*), the most southerly extremity of the peninsula of India, being, in fact, a sandy accretion to the termination of the Western Ghats. The low headland is in the state of Travancore, and its lat. and long. are  $8^{\circ} 4' 20''$  N., and  $77^{\circ} 35' 35''$  E.

**Comoro Isles**, four islands belonging to France, in the Mozambique Channel, since 1908 part of the colony of Madagascar. Vanilla is the chief article of export. The islands, which are of volcanic origin, are mountainous, and have an extremely fertile soil, are called Angaziya or Great Comoro, Anjouan or Johanna, Mohilla, and Mayotta. Great Comoro is 35 miles long; its highest point is 8500 feet. Johanna is next in size. Mohilla, the smallest, is 15 miles long. These became French in 1886. Total pop. 100,000. Mayotta or Mayotte, 21 miles long, and with a population of 15,000, has been a French possession since 1841. At the capital, Dsaoudi or Nzaondzi, are government buildings, a few hundred French soldiers, and numerous officials. In all the islands the blood of the natives is partially Arab, partially Malagasy, the Sakalavas having occupied part of Mayotte after the conquest of Madagascar by the Hovas. See MADAGASCAR.

**Company.** The term, though it may be applied to any partnership, is now generally used to denote an incorporated company. Such a company differs from a Partnership (q.v.) chiefly in these respects: A partner cannot transfer his share in the firm without the consent of the other partners; the shares in an incorporated company are, as a general rule, freely transferable. A contract made, or act done, by any partner in relation to the business of the partnership is binding on all the partners; the management of the affairs of a company is vested in directors and other officials, and a shareholder is not an agent for the company. Again, the liability of each partner for the debts of the firm is unlimited, except in case of a limited partnership under the act of 1907; in a company the liability of each shareholder may be, and usually is, limited either by shares or by guarantee. So distinct is the law as to companies from the law as to partnership that the Partnership Act, 1890, which codifies the law on that subject, expressly excludes from the definition of partnership any company or association which is registered as a company under the Companies Acts, or is incorporated by act of parliament or letters patent or royal charter. Large partnerships or 'unincorporated companies' were formerly not uncommon. They were regulated by the law of partnership, modified and adapted to the needs of a large and fluctuating number of members, and the liability of the members was unlimited. Now, however, the Companies Consolidation Act, 1908, sec. 1, re-enacting a provision in the act of 1862, prohibits the formation of any company, association, or partnership consisting of more than twenty persons for the purposes of carrying on any business that has for its object the acquisition of gain (or, in the case of associations formed for the business of banking, of more than ten persons) unless

it is registered as a company under the act, or is formed in pursuance of some other act of parliament (such as railway companies formed under private acts) or of letters patent, or is a mining company subject to the jurisdiction of the Stannaries Court.

Incorporated companies may be classed under three heads: (1) Those created by royal charter or by special acts of parliament which completely define their powers (see CORPORATION and Chartered Companies *infra*). (2) Those created by special acts which adopt by reference the provisions of one or more general statutes. The general statutes so adopted, in the ordinary case, are the Companies Clauses Acts, 1845-89, and, it may be, other statutes, such as the Railway Clauses Act, 1845, or the Waterworks Clauses Acts, 1847 and 1863, appropriate to the objects of the particular company. These statutes contain general clauses regulating the constitution, management, and powers of companies whose business cannot be carried out without the exercise of compulsory powers, privileges, and monopolies; and these clauses, when included in the special act of a company, are applicable to that company as if they were part of its special act. This class includes most companies formed for the purpose of carrying out large enterprises of a public nature—e.g. railway companies, harbour companies, canal companies, and companies for the supply of water or gas or electricity. (3) Those created under the Companies (Consolidation) Act, 1908, or under the earlier Companies Acts, which have been consolidated by that act. The vast majority of ordinary trading joint-stock companies in the United Kingdom belong to this class; i.e. they owe their incorporation not to royal charter or to a special act of parliament, but to registration under the Companies Acts.

Prior to 1908 the principal act relating to the formation and registration of joint-stock companies was the Companies Act of 1862. That act, however, had been amended by many later statutes; and in 1908 it and all the amending statutes were repealed and re-enacted in the Consolidation Act. The Consolidation Act of 1908 has itself been amended in some details by more recent statutes—e.g. the Companies Act, 1913.

Companies formed under these Companies Acts are of three kinds: (1) companies limited by shares, in which the capital of the company is divided into shares and the liability of every member is limited to the amount unpaid on his shares; (2) companies limited by guarantee, in which each member undertakes to contribute a certain sum in the event of the company being wound up, and his liability is limited to that sum; (3) unlimited companies, in which the liability of every member is unlimited, as it is in the case of an ordinary partnership. The act also recognises 'private companies,' in which the right of the members to transfer shares is restricted, the number of members (exclusive of persons who are in the employment of the company) is limited to fifty, and any invitation to the public to subscribe for shares or debentures is prohibited. A private company—which may consist of two members only, and usually is formed to carry on a family business—is exempt from certain provisions of the Companies Act of 1908; but certain additional requirements have been imposed on such companies by the Companies Act, 1913.

To form a company, seven or more persons—or, in the case of a private company, two or more persons—must execute a *Memorandum of Association*, which sets out the name of the company, the place where its registered office is to be situated, its objects or powers, the amount of its capital, and, if the liability of the members is to be limited, the extent to which their liability is limited. Each

of the signatories of the memorandum must agree to take at least one share in the company. The memorandum is stamped and lodged with the registrar of joint-stock companies, who issues a certificate of incorporation, which is conclusive evidence that all the requisites to registration have been duly complied with, and that the company is duly registered. The memorandum corresponds to the charter of a company created by charter. The company has no powers other than those set out in its memorandum, and any act done by the company or its agents outside the scope of these powers is *ultra vires* and void.

The memorandum of association may in the case of a company limited by shares, and must in the case of a company limited by guarantee or unlimited, be accompanied by *Articles of Association*. Model articles, which may or may not be adopted, are furnished in Table A, Schedule I., appended to the act of 1908. The function of the articles is to regulate the management of the company. Thus they usually contain regulations as to the division of the capital into shares, the transfer and forfeiture of shares, the holding of meetings, the votes of members, and the appointment and powers of the directors. These regulations form a binding contract between all the members and the company. The articles must be signed by the same persons as signed the memorandum, and are filed with the registrar at the same time as the memorandum.

Upon due registration the persons who subscribed the memorandum and the articles, and such other persons as may from time to time become members of the company, become a body corporate, having perpetual succession and a common seal, with power to hold lands. Every company is bound to keep a *register of members*. In an ordinary company, the capital of which is in shares, every shareholder is, so long as he is a shareholder, a member of the body corporate. The register of members contains the name and address of each member, the amount and numbers of his shares, the date of acquiring them, and the amount paid up. It is open to the inspection of any member gratis, and of any other person on payment of one shilling. The register is *prima facie*, but not conclusive, evidence of membership. In the case of companies registered in England, no notice of any trust is entered on the register; but in the case of Scottish companies, the practice is to enter shares as held by trustees, though this does not affect the personal liability of the trustees as members of the company. The company may issue *certificates* to holders of shares or stock; and these certificates are *prima facie* evidence of the title of the member to the shares or stock. Shares in a company are personal estate, transferable in the manner provided by the articles of the company. The ordinary form of transfer is executed by the transferor, and handed to the transferee with the share certificate. The transferee then executes it, and sends it to the company for registration. The articles of a company, however, not infrequently give the directors power to refuse a transferee.

If the public are invited to subscribe for shares, the company must either issue a *prospectus*, which is filed with the registrar, or else file a statement in lieu of prospectus. In order to secure a full disclosure of the position, and to enable the public to form an intelligent opinion on that position, the prospectus, or the statement in lieu of it, must set forth certain particulars. It must state, *inter alia*, the *minimum subscription* on which the directors may proceed to allotment. No shares offered to the public can be allotted until the fixed minimum number of shares has been subscribed, and the amount due on allotment has been paid in cash. If no such minimum is fixed, or if none is stated in

the prospectus, the whole issue must be subscribed before any shares are allotted. Moreover, the company cannot commence business until the amount of the minimum subscription has been subscribed.

A company must hold a general meeting, known as the 'statutory meeting,' within not less than one month, and not more than three months, after the date at which it is entitled to commence business. At least once in every year there must be held an annual general meeting. Extraordinary general meetings may be called at other times, and the holders of not less than one-tenth of the issued shares may require such a meeting to be called. The articles usually provide for every member having a vote in respect of each share held by him; but if the articles contain no provision on the subject, each shareholder has one vote. The articles also commonly provide for shareholders who are absent from the meeting voting by proxy, and for a poll being taken. There is no power to vote by proxy unless it is expressly provided for by the articles. Resolutions by a general meeting are of three kinds: (1) ordinary resolutions, which may be passed by a majority of members present; (2) special resolutions, which are necessary to effect certain vital alterations, and require two meetings—the resolution being passed at the first of these meetings by a three-quarters majority of those present, and being confirmed at the second meeting, held within a definite period after the first, by a simple majority; and (3) extraordinary resolutions, which must be passed by a three-quarters majority at a general meeting, but need not be confirmed by a second meeting. An extraordinary resolution may be passed to wind up a company voluntarily on the ground that it cannot continue its business by reason of its liabilities, and that it is advisable to wind it up. A copy of every special resolution and of every extraordinary resolution must be sent to the registrar.

The general management of the company is usually deputed to Directors (q.v.), who are the agents of the company in carrying on its business. The number, powers, necessary qualification, and method of election of the directors are regulated by the articles. The first directors, too, are, as a rule, named in the articles. The shareholders, by resolutions, may enlarge the powers conferred on the directors by the articles, and enable them to do anything that it is competent for the company itself to do.

There are three ways in which a company may be wound up. (1) It may be wound up compulsorily by the court. A compulsory winding up by the court is commenced by a petition to the court, and, generally speaking, is equivalent to proceedings in Bankruptcy (q.v.). The petition may be presented by the company itself, or by a creditor or creditors, or by a contributory or contributories. The circumstances in which a company may be wound up by the court are various; but the most frequent ground is that the company is unable to pay its debts. (2) A voluntary winding up takes place when the period fixed for the duration of the company has come to an end, and the company has passed an ordinary resolution to wind up; or when, for any cause, the company has passed a special resolution to wind up voluntarily; or when the company has passed an extraordinary resolution that it cannot by reason of its liabilities carry on its business, and that it is expedient that the company be wound up. From the date of the passing of the prescribed resolution, the company must cease to carry on business, except so far as may be required for the beneficial winding up. (3) When a company has resolved to wind up voluntarily, the court may order that the winding up shall proceed under the supervision of the court. The granting

of such an order, called a 'supervision order,' is in the discretion of the court, and the application is generally made by the company itself or by creditors.

In whatever manner a company is wound up, the duties of the *liquidator*, who is appointed to carry out the winding up, are very similar. These duties are to take possession of, and realise, the assets, to call upon the members to contribute according to the extent of their liability, to pay the company's debts and the costs of the winding up out of the funds so raised, and to distribute the surplus, if any, among the shareholders. In a winding up, every present and past member of the company is, in proportion to his capital, liable to contribute to the assets to an amount sufficient for the payment of the company's debts, the expenses of the winding up, and the adjustment of the rights of the contributories among themselves. While liability to contribute may thus attach to persons who have ceased to be members of the company, no past member will be liable if he has ceased to be a member for one year or upwards prior to the commencement of the winding up; or in respect of any debt or liability incurred after he ceased to be a member; or unless the existing members are unable to satisfy the contributions requiring to be made by them. The liquidator may thus require to make up two lists of contributories, called the A and B lists respectively, the one of present and the other of past members. In the case of a company limited by shares, the contributions required from any member, present or past, cannot exceed the amount unpaid on the shares held, or formerly held, by him. In the case of a company limited by guarantee no member can be made liable beyond the sum he has undertaken to contribute. In the case of an 'unlimited' company, no limit is set to the contributions which may be required from each member.

**CHARTERED COMPANIES** are corporations trading under a charter granted by a sovereign power, and having certain privileges, rights, and obligations, therein defined. Such companies have undoubtedly constituted the foundation of the colonial empire of Britain, although in most instances the profits of trade and not the formation of colonies was their primary object. The history of some of the earliest trading companies in Britain will be found described at **HANSEATIC LEAGUE**. Chartered companies, as now understood, may be said to date from the time of Elizabeth, and many were formed for trading purposes with the New World and the Indies. The Company of Merchant Adventurers of England, which originated in 1359, received a charter from Elizabeth about 200 years later. The Russia Company (first chartered in 1554) set the example of annexing territory in 1613 by setting up King James's arms at Spitsbergen. Many companies were organised in the 17th century for the further exploiting of America and the East. The most famous were the East India Company (q.v.), chartered by Elizabeth in 1600, and the Hudson Bay Company (q.v.), chartered in 1670. The Darien Scheme (q.v.) was a Scottish company, sanctioned by royal authority in 1695. Nearly all the original British colonies in North America were first formed by chartered companies, of which the Virginia Company (1609) and the Massachusetts Bay Company (1629) were most prominent (see **UNITED STATES**). Other European countries, particularly Holland and France, were at this time actively promoting trading companies. Of the old companies, the Hudson Bay Company still exists, though shorn of many of its original privileges. In the last quarter of the 19th century a fresh development in chartered companies took place, nearly all of them in Africa. The principal among

these are the British North Borneo Company (see **BORNEO**), chartered in 1881; the Royal Niger Company (see **NIGERIA**), chartered in 1886, bought by government in 1900 and its territories formed into the protectorate of Nigeria; the Imperial British East Africa Company (see **ZANZIBAR**), chartered in 1888, its territories taken over by government in 1896, and now the Kenya Colony and Protectorate; and the British South Africa Company (see **RHODESIA**). These companies have not the same unlimited powers as the old companies; they have no monopoly of trade, and their sovereignty rights are limited. The state exercises control over all political matters, and the rights of natives are strictly protected; the government also retains the right to forfeit the charters if it considers their purposes are not being properly carried out.

**Company**, in Military Organisation, is a captain's command. In the British infantry there are now 4 companies in a Battalion (q.v.), each consisting of 6 officers, 10 sergeants, 5 corporals, 4 drummers and buglers, 207 rank and file, including signallers, stretcher-bearers, drivers of pack-cobs, and batmen. Garrison artillery, Engineers, and Army Service Corps are also in companies, with no higher units in war. There is a specially trained signal company with each infantry Division (q.v.). A company is divided into 4 platoons, with a lieutenant in command of each, and each section into 2 squads under a sergeant. The platoon is the 'fire-unit.'

**Comparative Anatomy** is the science which examines and compares the structure of two or more different kinds of animal, so as to discover their points of resemblance and unlikeness. See **ANATOMY**, **ANTHROPOID APES**, **BIOLOGY**, **BIRD**, **FISHES**, **MAMMALS**, **REPTILES**, &c.; also **CUVIER**, **HUXLEY**, **OWEN** (SIR RICHARD), &c.

**Comparetti**, DOMENICO, born at Rome in 1835, taught Greek at Pisa, Florence, and Rome, and has written on South Italian dialects, Virgil the Magician, Sindbad, and Italian folklore.

**Compass**, or MARINER'S COMPASS, a magnetic instrument used to indicate the direction of a ship with respect to the magnetic north and south line.

The directive property of the magnet seems to

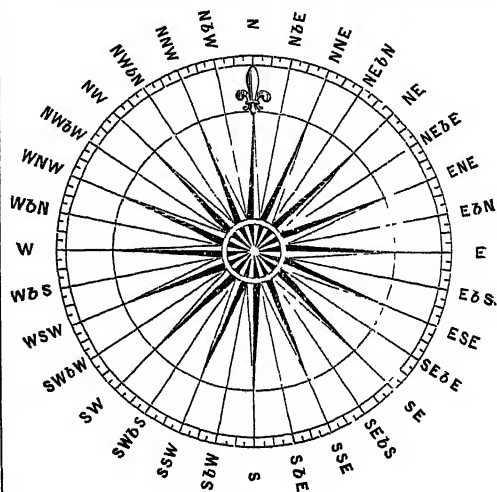


Fig. 1.

have been unknown in Europe till the 12th century. It appears, however, on very good authority that it was known in China and throughout the East

generally at a very remote period. The Chinese annals assign its discovery to the year 2634 B.C., when they say an instrument for indicating the south was constructed by the Emperor Ho-ang-ti. The earliest reference to the making of magnets is in a Chinese dictionary of 121 A.D., where lodestone

centre piece of sapphire poised on an iridium point (fig. 3). Instead of a single needle there are eight thin strips of steel fastened to the silk threads as shown in the figure. The thin paper rim bearing the points is divided at intervals so that the contractions and expansions due to change of

temperature may not produce warping of the aluminium. The whole arrangement weighs only 200 grains or so, and thus there is very little tendency to flatten the point of the supporting needle. Hence the 'friction error' can be made very small; in fact, if it is found that a card can be made to rest even half a degree out of the magnetic meridian, the supporting point is rejected for a sharper one. The weight, such as it is, being mostly in the rim, the period of vibration of the card is long (40 seconds or so), which makes the card very steady. The bowl is saved from violent oscillation by having in the bottom a quantity of castor-oil. The gimbals are supported on knife-edges, and their being made of brass wire-rope dispenses with the not very durable india-rubber pads otherwise used. A simple device prevents the card from jumping off the pivot when heavy guns are fired—a matter of some importance in an engagement. The binnacle has complete provision for stowing away the magnets, soft iron bars, and spheres used to counteract the magnetism of the iron of the ship.

Along with Kelvin's compass is supplied a piece of apparatus for converting it into an azimuth compass, which is a compass for finding the angle subtended

at the observer's eye by the projections of two objects on the horizontal plane.

The gyroscopic compass utilises the principle of the Gyroscope (q.v.). Its axis is thereby kept parallel to that of the earth, so that a reading gives not merely directions but latitude.

Modified forms of the compass are in use on land by surveyors, miners, and travellers, and need not be further alluded to here.

For the earth's action on a magnetised needle suspended free to move horizontally and vertically, see the articles MAGNETISM, DECLINATION.

The great difficulty connected with the use of the compass arises from the disturbing influence of the ship's magnetism, of which part is considered permanent, and part—due to the soft iron—is temporary, and varies with the position of the ship. Various methods are in use to regulate this difficulty, which in iron vessels is sometimes so great as to make an ordinary compass almost useless. The principal are (1) counteracting the permanent induced magnetism by properly placed permanent bar magnets; and (2) supplying about the compass soft iron masses in such a way that, however the ship turns, the transient induced magnetism on the left of the compass shall be

exactly equivalent to that on the right. Many of the best ships carry a standard compass placed as far as possible from the iron of the ship, especially from vertical masses like iron masts and funnels.

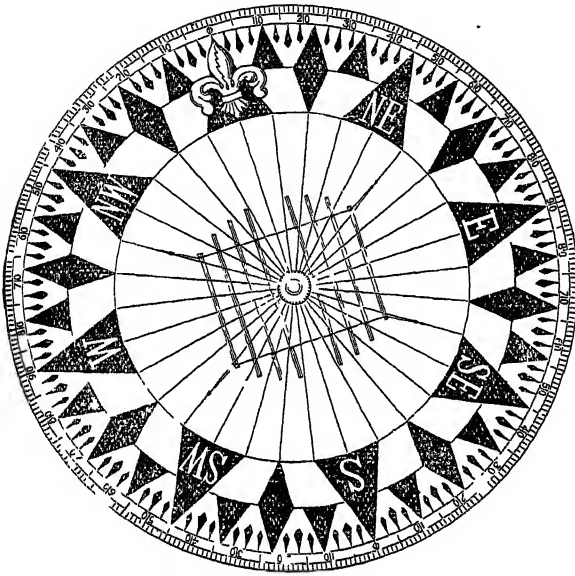


Fig. 2.

is defined as 'a stone with which an attraction can be given to the needle;' but this property of the lodestone could not fail to have been observed at a very much earlier time. At first the Chinese would appear to have used the compass exclusively for guidance in travelling by land, and we hear of their using it by sea only somewhere about 300 A.D.

The ordinary mariner's compass is made up as follows: The needle is a magnetised strip of steel, or in the better compasses a number of thin strips magnetised separately and then bound together. This is balanced so as to swing horizontally on a fine pivot. Fastened to the upper surface of the needle and swinging with it is a circular card marked with the thirty-two 'points, and having the point marked N immediately over the end of the needle that is attracted to the north. The pivot on which the needle swings stands up from the bottom of a copper bowl, which has a glass covering to protect the contents from wind and weather. The compass-bowl is made of copper (a good conductor of electricity) in order to damp the vibrations of the needle. For the needle in moving induces currents of electricity in the copper bowl, the electro-magnetic forces of which tend (according to Lenz's Law) to oppose the motion producing them. For the same purpose also the compass-bowl is sometimes filled with spirit, but the additional friction of the liquid interferes with the sensitiveness of the needle. The bowl is supported in Gimbals (q.v.) so as to remain horizontal in all positions of the ship. The whole arrangement is placed in the binnacle, situated when possible in the fore and aft line, and having provision for the placing of lamps to illuminate the compass-card by night.

The compass-card is represented in fig. 1. In Lord Kelvin's compass a thin aluminium ring (fig. 2) is connected by silk threads with an aluminium boss, which rests on an aluminium cup having a

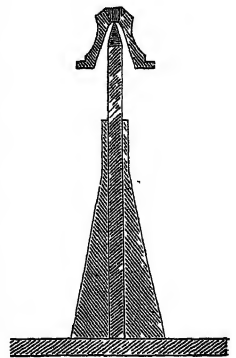


Fig. 3.

When it is mentioned that an error of one point ( $11\frac{1}{2}^\circ$ ) in steering means an error of about one mile in five, the necessity for the various precautions will be readily recognised. For details on this subject, see the *Admiralty Manual on the Deviations of the Compass*, and the references there given.

**Compass-plants** are those which, when unduly exposed to the sun, place their leaves in a north-and-south direction, as *Silphium* and the prickly lettuce (*Lactuca Scariola*).

**Compensation** is the term used in law to denote the statutory right of an outgoing tenant in respect of certain classes of unexhausted improvements specified in the Agricultural Holdings Acts; see LANDLORD AND TENANT. The word is loosely applied to any claim of damages arising in respect of injury. Thus where a workman is injured by accident arising out of, and in the course of, his employment, the right given, under the Workmen's Compensation Act, 1906, to him, or, in the event of his death, to his dependants, is termed a right of compensation; see MASTER AND SERVANT, WORKMEN'S COMPENSATION. In Scots law its proper meaning is that mutual creditors and debtors may set off one debt against another. This applies, as it did in the civil law, where each of the parties is at the same time debtor and creditor in clearly ascertained debts. In order that one debt may extinguish another, compensation must be pleaded.—For compensation of errors in physics, as illustrated in the compensation pendulum, see PENDULUM.

**Competition** (Lat., 'a seeking together') has been well defined by Dr Johnson as 'the act of endeavouring to gain what another endeavours to gain at the same time.' In political economy it is simply the form taken by the struggle for existence as applied to industry. Formerly prices and generally the economic relations of men to each other were regulated by custom or authority. The growth of freedom has now brought it about that these relations are determined by individual effort. The general rule is that each man must be responsible for his own economic well-being. The workman brings his labour to the market and gets what he can for it. The capitalist engages labour on the terms most favourable to himself, and sells his produce at such price as it can bring. The owner of land generally takes the highest rent he can obtain. In short, the industrial world is a world of conflicting or competing interests.

As we have said, this system of competition is an outcome of modern freedom, and the rise of it may be historically traced. In mediæval times the relations of men were fixed by custom or authority. But the restraints of custom and authority were felt to be vexatious, oppressive, and injurious, and in the various spheres of human activity, in religion, politics, and economics, the free individuality of men sought and found wider room to develop itself. This great movement began with the revival of learning, the discovery of America, and the Protestant Reformation, and has been continued through the revolutions of the 17th, 18th, 19th, and 20th centuries. In the industrial sphere it means that, whereas in former times a man's calling, place of residence, and the remuneration of his industry were fixed for him, he is now at liberty to decide them for himself as best he can. Each man is free to do the best he can for himself, but as he finds numerous individuals who exercise the same freedom within a limited field, there arises the prevailing system of competition.

No one conversant with the facts will deny that the system of free competition has been attended with enormous progress, and that it has acted as a powerful stimulus to human energy and the spirit of improvement. But the development of the

system has brought with it most important limitations, some of which may be noted. While such a system must always be limited by law and justice, and the necessities of political union, legislation has been obliged to provide special safeguards against the evils of competition, notably in the English Factory Acts. Trade-unions are an attempt to regulate competition in the interest of labour. Employers' combinations have a like object in the interest of the capitalist. In America especially the development of 'trusts' tends to make competition a dead-letter. These trusts are combinations of capitalists with a view to regulating prices. The protective system of many countries is intended to maintain native industries against foreign competition. It should be noted also that even yet custom is largely influential in many spheres, and that not a few of the evils of competition are mitigated by the kindly feeling which prevails in all the relations of life. Employers do not generally bring wages down to the lowest level attainable by competition. In actual experience the competitive system is modified by a great variety of influences. Thus, the Trade Boards Acts (1909 and 1918) were designed for the protection of unorganised and 'sweated' labour by the establishment of legal minimum wage-rates in selected trades.

**Compiègne**, a quiet and old-fashioned but picturesque town in the French department of Oise, on the river Oise, a little below its junction with the Aisne, 52 miles NNE. of Paris by rail. Of its churches three deserve notice, St Germain (15th century), St Antoine (12th century), and St Jacques (13th century). The hôtel-de-ville is a late Gothic edifice with a fine central belfry. But the chief pride of Compiègne is its palace, built anew by Louis XV., and splendidly fitted up by Napoleon, who often occupied it. It was during part of the Great War the seat of the General Headquarters. From the gardens an arbour walk, 1600 yards long, leads towards the beautiful forest of Compiègne, which was a favourite hunting-ground of many of the kings of France. The inhabitants of Compiègne manufacture canvas, cordage, and sugar. The population is about 16,000. Compiègne is mentioned in the times of Clovis under the name of *Compendium*. It was at the siege of this town, in 1430, that the Maid of Orleans was captured; and here, in 1810, Napoleon first met Maria Louisa of Austria, on occasion of their marriage.

**Complement** of an angle is what it lacks to make up  $90^\circ$ ; of an arc, to make up a quadrant; and hence, in Astronomy, the complement of a star in its zenith-distance. In Music, two intervals, which together make up an octave, are called complementary (see INVERSION). In Arithmetic, if any number is subtracted from the next higher power of ten, the result is its complement. Thus 7 and 3 are complementary; so are 63 and 37; 881 and 119; and  $1\cdot4384386$  is the complement to  $8\cdot5615614$ . In Chromatics, red is the complement of green, orange of blue, and yellow of violet—these colours in combination producing white.

**Complexion**. See SKIN; also TEMPERAMENT, HIPPOCRATES.

**Compline**. See BREVIARY.

**Complutensian Bible**. See ALCALÁ DE HENARES and XIMENES.

**Compony**, or GOBONY. See BORDURE.

**Compositæ**, an order of sympetalous dicotyledons, the richest of all in species, these numbering above 11,000; it is also the most widely distributed through all regions of the globe, although most abundant in temperate and subtropical climates.

and, furthermore, the richest in individuals, it having been reckoned that about every tenth flowering plant on the earth is a composite. The rationale of this may be broadly seen (at least if we grant an individual constitution and structure especially well adapted to both vegetation and reproduction), for we can see that the consequent great number of healthy individuals must be associated with active local competition and survival of the fittest, and with distribution of these over a wide area; while this again is at least one condition of considerable differentiation of varieties, and so ultimately of species.

While popularly a daisy or dandelion is regarded as a simple flower, the roughest examination suffices to analyse this into an orderly assemblage, technically a *capitulum* of small but distinct florets; hence the beginner is apt, without more ado, to refer all similar aggregates, say a head of Scabious (Dipsacaceæ) or Seapink (Plumbaginaceæ) to the Compositæ. We find, however, such aggregates arising in all alliances, and naturally so; racemes, spikes, or umbels of flowers wholly distinct in structure may all be shortened down into heads or capitula, since reproductive development is tending everywhere to check vegetative growth. We are thus led to inquire of what forms are the composites to be regarded as the reduced members, and the evidence of comparative anatomy goes to prove their relationship to Campanulaceæ and their irregular forms the Lobeliaceæ; in a word, to view the yellow 'tubular' florets of our daisy as a head of tiny bells, while the white strap-shaped or 'ligulate' ones of its ray, like all those of a dandelion, resemble the flowers of lobelia.

In shortening down, or arresting the inflorescence into a head, the bract of each separate flower remains in place; and in a *Zinnia*, or sunflower, we find each floret with its separate bract throughout the whole capitulum; in most cases these disappear. Those of the outermost florets, however, together with the immediately lower leaves of the flower-axis (which bear no florets, and are thus in strictness not entitled to their common name of bracts), become usually crowded into an *involucre*. This subserves in bud the protective purposes of a calyx to the whole inflorescence at once, and thus the calyx of the separate florets becomes unnecessary. In its place we find at most a circle of fine downy hairs, which may be characteristically serrated or feathered, and which only reach full development and usefulness when the fruit has to be distributed. On account of its merely epidermic nature and late appearance, its calycine nature has been denied, and the term *pappus* substituted. The evolutionist need, however, feel little hesitation in regarding the pappus as simply representing the epidermic fringe of a reduced calyx; nor is verifactory evidence wanting. The stamens grow upon the united corolla and themselves unite by the anthers, thus forming a ring, or rather pollen-bearing tube, up through which the style grows, all much as in bell-flowers. The style bears two stigmas, indicating an originally two-carpeled arrangement, but the ovary is one-celled, and contains only a single ascending ovule. The ovary hardens as a nutlet, which is commonly floated away upon the wind when ripe by help of its pappus; it may be anchored where it descends by its minute grappling-hooks or serrations. In this way it is conveyed to new soil, it may be at a great distance—an obvious advantage, alike to the species or the individual, when germination takes place.

The classification is difficult. The order may be divided into Tubulifloræ, in which the disc-flowers are not ligulate, and Ligulifloræ, in which all are ligulate.

Although many composites are cultivated and useful plants, none attain the highest economic importance; yet the artichoke, and Jerusalem artichoke, salsafy, lettuce, endive, &c., are familiar inmates of the kitchen-garden, while chicory is extensively cultivated as a substitute for coffee, and even sometimes, as well as Jerusalem artichoke, for the purpose of feeding domestic animals. A very few, like safflower and saw-wort, yield dyestuffs; from the seed of others—e.g. sunflower—a bland oil is expressed; while many are of time-honoured repute for their medicinal properties—e.g. chamomile, arnica, wormwood, elecampane, &c. A still greater number—e.g. dahlias and sunflowers, asters and chrysanthemums—are esteemed ornaments of our flower-gardens, particularly in the latter part of summer and in autumn. Being mostly herbs, or rarely shrubs, the order is quite unimportant as regards timber; the Striehout (*Tarchonanthus camphoratus*), a small tree of the Cape of Good Hope, is, however, close-grained and beautiful. See Small, *Origin and Development of the Compositæ* (1919).

**Composite Order.** See COLUMN.

**Composition.** Under the title Composition and Resolution of Velocity and Forces, we deal with one of the fundamental problems in mechanics—viz. to compound two velocities (or forces) into a single velocity (or force) which shall be their equivalent. We shall consider it as applied to velocities in the first place.

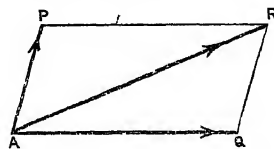
If a point is moving with two independent velocities, it moves in some one definite *direction* with a definite *speed*. This single velocity (for the term includes the idea of direction as well as speed) is equivalent to the two *component* velocities, and is termed their *resultant*. A good example is afforded by a ball thrown up in a moving railway carriage; it partakes of the train's motion horizontally, while it also simultaneously moves vertically upwards.

When the two components are in the same straight line, their resultant is in all cases equal to their algebraic sum. In the case of velocities in different directions, the magnitude and direction of their resultant is obtained by the following theorem, known as the *Parallelogram of Velocities*. If a point A move with two velocities, represented in magnitude and direction by AP and AQ respectively, their resultant will be similarly represented by AR, the diagonal of the parallelogram of which AP and AQ are continuous sides.

For, let the point move along AQ with velocity AQ, and let the page be in motion in the direction AP with velocity AP. After a unit of time has elapsed, the point will have moved from A to Q along AQ, but, owing to the motion of the page, the line AQ will have moved into the position PR, so that the point will really be at R; hence its motion has been in the direction AR, with a velocity whose magnitude is represented by AR.

Similarly, we may compound any number of velocities in one plane into a single resultant. In the case where three components are not coplanar, a corresponding theorem, the *Parallelepiped of Velocities*, is used to find the resultant.

The resolution of velocities is exactly the converse problem; for where a directed length such as AR can be made the diagonal of a parallelogram, then the continuous sides are the components. Of course, in this manner, an infinite number of pairs of components can be obtained, each having the given velocity as their resultant. But the



resolutions usually required are those in which the components are in given directions at right angles.

Since forces can be graphically represented in the same manner as velocities, all that has been said of velocities applies equally well to forces; and obvious changes in the terminology at once give the means of compounding and resolving forces. See DYNAMICS, KINEMATICS, STATICS.

**Composition**, in Bankruptcy, a certain percentage which creditors agree to receive from a bankrupt in lieu of full payment of his debts, and the acceptance of which operates as a discharge to the bankrupt. See BANKRUPTCY.

**Compos Mentis**. See INSANITY.

**Compostella**. See SANTIAGO DE COMPOSTELLA.

**Composts** are a kind of Manure (q.v.), consisting of mixtures of substances adapted to the fertilisation of the soil, which being allowed to ferment, and undergo chemical changes for a considerable time in heaps, become more valuable than they were at first, or ever could have been if applied separately. Composts were formerly made of farm-yard manure, and earth or lime in addition. Road-scrappings, peat-moss, leaves, and clearings of ditches also formed materials for the purpose. By allowing these to lie for six months in heaps of from three to four feet in depth, food was prepared for plants. The mass was usually applied to the turnip-crop, and when artificial manures were unknown, considerable benefit arose from such dressings. The use of guano and other light manures has superseded in a great measure the necessity of this laborious process, and composts for the turnips or barley-crops are now little used. The wonderful effects that have resulted from the application of small doses of artificial manures have impressed farmers in general with the truth that the most energetic elements bear a small proportion in weight to the whole mass of farm-yard dung or composts, and that the mixing of manure in heaps with earth does not so much add to its virtues as to repay the labour expended in the process. More care is now rightly bestowed in preserving manure from washings by rain. Composts formed of leaves, ditch-scurings, road-scrappings, or any earthy substance containing a large percentage of vegetable matter, with the addition of lime, may still be used with benefit for pastures that are deteriorating, or where the soil is stiff. Indeed, there should still be a compost-heap at every farm. Wherever tidy and careful management prevails, there is a good deal of road-scrappings, ditch-scurings, and other rubbish to be disposed of, and the compost-heap is a handy and useful receptacle for all such matter. The value of well-made compost for the top-dressing of pasture-land is greater than is generally understood or acknowledged, and it can be carted out and spread at old times when there is a lull in the more urgent farm-work. Where moss prevails, lime should enter largely as a component. On the other hand, where the soil is of a strong and clayey nature, earthy substances containing vegetable matter in larger proportions should be used. Vegetable matter has the effect of imparting a softness to the surface that is particularly conducive to the free growth of pastures. Compost made of turf, leaves, earth, and bone-dust is used with great benefit by gardeners, for vines and fruit-trees which are injured by too concentrated manures.

**Compound** (corruption of Portuguese *campanha*, 'yard or court') is the usual name in India for the enclosure in which a house stands, with its out-houses, yard, and garden.

**Compound Animals**. See COLONIAL ANIMALS.

**Compounding of Felony**, in England, is the offence of entering into an agreement for valuable consideration not to prosecute a felony, and is punishable with fine and imprisonment. Any member of the community who enters into such a bargain is guilty of this offence, even though he suffered no injury from the felony. Compounding of informations upon penal statutes, or of misdemeanours, is punishable in grave cases. But in less serious cases an agreement to abstain from prosecuting the offender is not unlawful, and in misdemeanours affecting some private rights the court will often permit the prosecutor to accept pecuniary amends, and withdraw the prosecution. Advertising a reward for stolen property, coupled with words implying that no questions will be asked, or that no prosecution will be instituted, or that a pawnbroker returning the property will be paid what he has advanced on it, is punishable by a fine of £50 each on the advertiser, publisher, and printer.

**Compound Interest**. See INTEREST.

**Comprador** (Portug., 'buyer'), a Chinese employed by Europeans as intermediary in business dealings in China, and as head of their native staff.

**Compressed-air Bath**, a strong chamber of riveted iron plates in which two or more persons can sit, and into which air is driven to any required pressure. The inflow of fresh and the escape of foul air are regulated by valves. Another appliance for using either compressed or rarefied air consists of a mask tightly covering mouth and nose, and connected by a tube and suitable valves with some form of air-cistern in which the pressure can be varied as desired. By this appliance patients can inspire either compressed or rarefied air, or can breathe out into either of these. Treatment by *Aerotherapeutics* has long been a favourite study, but the results have varied much, and have lacked exactness. The general effects of compressed air are to lessen the frequency of the movements of the chest, and of the heart or pulse beats, while allowing the absorption of more oxygen, and increasing the blood-tension. Rarefied air produces the opposite effects. Many diseased conditions, therefore, should benefit by this treatment, especially asthma, chronic bronchitis, and catarrh under compressed air; while in the treatment generally we have a useful system of lung gymnastics, which increases the power of the respiratory muscles and the vital capacity of the lungs.

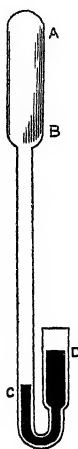
**Compressed-air Motors**. One mode of employing air as a motive power has been described under AIR-ENGINE (q.v.). Another obvious way is to compress the air and then apply it in the manner of high-pressure steam. But the great loss of power, due principally to the dissipation of the heat which results from the high compression of the air, will always render the employment of such a motive power very wasteful. There are, however, many conditions under which the use of compressed air is convenient and advantageous. The air-gun, although more a toy than a useful weapon, is one of the oldest examples of a compressed-air motor. Partly by compression and partly by exhaustion of air, pneumatic tubes are worked in connection with central post-offices for the transmission of letters and messages to and from various districts in large cities. In boring in mines, and in blasting and tunnelling operations, compressed air is an exceedingly useful agent, the power being easily carried by tubes into confined areas where the air when liberated, after it performs its primary duty, is of great value for aiding the ventilation of the spaces (see BORING). In the application of automatic brakes to passenger trains.

compressed air has also been found to be the most convenient power (see BRAKES). Air compressed and stored in a reservoir under the vehicle has also been employed as a motive-power for tiamway-cars. In a different direction the agency of compressed air is important in the artificial production of cold for chilling-houses for meat-preservation on land, and for frozen-meat chambers for preserving fresh meat on board vessels (see REFRIGERATION).

**Compression and Compressibility.** When a body is subjected to the action of any force which causes it to occupy less volume, it is said to be compressed, and the diminution of volume is termed *compression*. The term *compressibility* is frequently used to signify that property of bodies whereby they yield to that particular form of stress known as pressure; but more strictly it is employed to denote the measure of this property as possessed by different substances. Under the same pressure it is obvious that the same volume of various substances will diminish by different amounts; and, to measure this change, the *compressibility* is defined to be the ratio of the amount of compression per unit volume to the compressing force applied. It thus may be determined by measuring the amount of compression of a known volume when under a certain pressure; dividing this by the product of the original volume and the pressure gives the average compressibility (per unit pressure) of the substance throughout the range of pressure employed. The unit of pressure generally used is *one atmosphere*, which is defined in this country as being the weight of a column of mercury, one square inch in section, 29·905 inches in height, at the temperature of 0° C., and weighed at sea-level in the latitude of London. Its actual value in pounds-weight per square inch is nearly 14·7; so that 152·3 atmospheres of pressure is equivalent to a pressure of one ton per square inch.

In gases the relation between pressure and volume is given by Boyle's Law (see GASES)—viz. the volume of a given mass of gas is inversely proportional to its pressure. From this it follows that the compressibility is inversely proportional to the pressure—i.e. the diminution of volume due to a given increment of pressure is correspondingly small as the pressure is great. The behaviour of a gas under pressure is closely related to the proximity of its temperature to the critical point (see CRITICAL TEMPERATURE); for if below this temperature the gas can, and if above it, cannot be liquefied by pressure alone. It is only since 1877 that liquefaction has been effected in those gases formerly termed permanent.

From the first attempts to compress liquids it was concluded that they were incompressible, but Canton in 1762, by a comparatively simple experiment, showed that the compressibility of water though small is quite appreciable, and that it is less at higher than at lower temperatures. The measurement of the compressibility of liquids is usually made in a glass vessel (see fig.) termed a piezometer. A tube, ABCD, open at one end, D, is bent upon itself between C and D, widened at one end into a cylindrical bulb, AB, and at the other into a cistern, D. The liquid experimented on fills the bulb and stem to C, from which point to D, mercury fills the tube. On the surface of the mercury at C an index floats. The instrument is placed in a larger and much stronger vessel containing water to which pressure (measured by an attached gauge) is applied. The contents of the piezometer being



thus compressed, the mercury column ascends in the stem, and when the pressure is relieved the index is left at that point to which the mercury rose under the highest pressure applied. The actual amount of compression, and the original volume, as well as the pressure, being known, the compressibility can be thereby calculated, a correction being finally added for the compression of the glass piezometer itself. From experiments made with such apparatus, the following conclusions (see *Report on some of the Physical Properties of Fresh Water and Sea-water*, by Professor P. G. Tait; *Challenger Expedition Commission Reports*, Physics and Chemistry, part iv.) seem now to be well established regarding the compressibility of liquids, more especially of water. The compressibility of water decreases as both the temperature and pressure are raised; under moderate pressures (e.g. one or two atmospheres) it has a point of minimum value about 60° C., while its actual value at 10° C. and at a pressure of one ton per square inch is very nearly  $\frac{1}{100000}$ . Sea-water is less compressible than fresh water; the ratio of the compressibility of the former to the latter being ·915. Solutions of common salt are less compressible as they are stronger; the compressibility falling off uniformly with increased strength. Both sea-water and salt solutions diminish in compressibility with temperature and pressure in the same manner as fresh water. It has also been proved that the maximum-density point of water is lowered by pressure; the actual amount of this lowering being 3°·1 C. per ton—i.e. water under a pressure of one ton per sq. in. has its maximum density point at 0° 9, instead of at 4°, as under ordinary atmospheric pressure.

The compressibility of solids is generally very much smaller than that of either liquids or gases. It is best measured by noting the shortening of a rod or fibre of the material tested while subjected to hydrostatic pressure; the linear compressibility thus obtained is, approximately, one-third the cubical compressibility. For glass it is ·00000265 per atmosphere.

**Comptometer.** See CALCULATING MACHINE.

**Compulsion.** The effect of compulsion on the validity of obligations and payments, and on criminal responsibility, is noticed under CONTRACT, CRIME, FORCE AND FEAR, and DURESS.

**Compurgators** were twelve persons whom Anglo-Saxon law permitted the accused to call in proof of his innocence, and who joined their oaths to his. They were persons taken from the neighbourhood, or otherwise known to the accused. It was rather in the character of witnesses than of jurymen that they acted, though the institution has been spoken of as the Anglo-Saxon jury; what they swore to was not so much their knowledge, as their belief. The number of compurgators varied with the rank of the parties and the nature of the accusation, but was usually twelve. The system of compurgators was adopted even in civil actions for debt. Compurgation, which was a custom common to most of the Teutonic races, fell into disuse after the Conquest; but the ceremony of what was called canonical purgation of clerks—convict was not abolished in England till the reign of Elizabeth. See JURY.

**Comrie**, a pleasant and sheltered village of Perthshire, on the Earn, 7 miles W. of Crieff. It has often been visited by earthquakes, notably in October 1839, January 1876, and April 1921. These are apparently due to its geological position on the great line of fault between the Highlands and the Lowlands. Here George Gilfillan was born in 1813.

**Comstock Lodge**, a lode of silver and gold to

which Virginia City (q.v.), Nevada, owed its prosperity. Discovered in 1859, the lode, with its rich pockets or bonanzas, yielded at times over \$10,000,000 annually, and as much as \$38,000,000 in 1877. Its yield from the beginning to 1890 was \$340,000,000, but since then it has fallen off, and with it the population of Virginia City. The shaft is 3500 feet deep, but work is now confined to the upper levels, the workmen having been driven from the depths by an influx of hot water (170° F.).

**Comte**, AUGUSTE, the founder of Positivism (q.v.), was born 19th January 1798, at Montpellier, where his father was treasurer of taxes. At the Lycée of his native place he was distinguished equally for his aptitude for mathematics and his resistance to official authority, characteristics which did not desert him on his entering the École Polytechnique at Paris in his seventeenth year. Here he took the lead in a protest of the students against the manners of one of the tutors, and was expelled, after a residence of two years had obtained recognition of his abilities from the professors. A few months were spent with his parents, and then Comte returned to Paris, where for a time he made a scanty living by teaching mathematics. It would seem that, some years before, he had completely freed himself from the influence of all existing social and religious theories, and a reforming zeal was beginning to possess his mind, when in 1818 he came into contact with St Simon, by whom his inclination towards the reconstruction of thought and life was confirmed and strengthened. A definite relation was established between them, by which Comte remained for six years the disciple and collaborator of the older thinker; but there gradually became apparent a disagreement of aim and method, and the necessity felt by Comte of asserting the independence of his own conceptions led to a violent rupture. In 1825 Comte married, but the union proved unhappy, and after seventeen years of intermittent discord, ended in a separation. In the following year Comte began a course of lectures in exposition of his system of philosophy, which was attended by several eminent men of science, but the course was soon interrupted by an attack of insanity, which disabled the lecturer for a few months. His labours were afterwards resumed, and the six volumes of his *Philosophie Positive* was published at intervals between 1830 and 1842, during which period his livelihood was chiefly obtained from the offices of examiner and tutor in the École Polytechnique. After these positions were taken from him, owing to the prejudices of his colleagues, he resumed the private teaching of mathematics, but in his later years he was supported entirely by a 'subsidy' from his friends and admirers. In 1845 Comte became acquainted with Clothilde de Vaux, and until her death within a year afterwards, a close intimacy was maintained between them. On Comte's side it was a passionate attachment, the purity of which was happily preserved, and its influence is clearly shown in his later works, especially in the *Politique Positive*. Comte died in his sixtieth year on 5th September 1857, and was buried in the cemetery of Père-la-Chaise. His system is expounded in the article POSITIVISM.

Comte's principal works were *Cours de Philosophie Positive* (6 vols. Paris, 1830-42; freely translated into English, and condensed by Harriet Martineau, 2 vols. 1853), *Traité Élémentaire de Géométrie Analytique* (1843), *Traité d'Astronomie Populaire* (1845), *Discours sur l'Ensemble du Positivisme* (1848), *Système de Politique Positive* (4 vols. 1851-54; trans. 1875), and *Catholicisme Positiviste, ou Sommaire Exposition de la Religion Universelle* (1852; trans. 1858). Comte's *Testament* was published in 1884, his *Correspondance Inédite* in 1903-4. See books by Dr J. K. Ingram, H. D. Hutton, H. Gruber, G. Deherme (1909), and W. Ostwald (1914); and works cited at POSITIVISM.

**Comus**, in later antiquity, a divinity of festive mirth and joy, represented as a winged youth, sometimes drunk and languid as after a debauch, or slumbering in a standing posture with legs crossed. Comus thus became the representative deity of riotous merry-making, of tipsy dance and jollity, and as such figures in Milton's noble poetic tribute to chastity, the mask of *Comus*; though here the poet, as elsewhere, has devised his own mythology, and made him the child of Bacchus and of Circe, 'much like his father, but his mother more.'

**Comyn**, CUMMING, or CUMYN, a family which rose to great power and eminence in England and Scotland. It took its name from the town of Comines, near Lille, on the frontier between France and Belgium. While one branch remained there, and in 1445 gave birth to the historian Philippe de Comines (q.v.), another followed the banners of William of Normandy to the conquest of England. In 1069 the Conqueror sent Robert of Comines, or Comyn, whom he created Earl of Northumberland, with 700 horse to reduce the yet unsubdued provinces of the north. He seized Durham, but had not held it for 48 hours when the people suddenly rose against him, and he perished in the flames of the bishop's palace, leaving two infant sons. The younger, William, became Chancellor of Scotland about 1133, and nine years later all but possessed himself of the see of Durham. The chancellor's grandnephew, Richard, inherited the English possessions of his family, and acquired lands in Scotland. By his marriage with Hexilda, the granddaughter of Donald Bane, king of the Scots, he had a son William, who was Great Justiciary of Scotland, and about 1210 became Earl of Buchan by marrying Marjory, daughter and heiress of Fergus, the last Celtic Earl of Buchan. Their son, Alexander, Earl of Buchan, married Isabella or Elizabeth, second daughter of Roger de Quenci, Earl of Winchester, and with her acquired the high office of Constable of Scotland, with great estates in Galloway, Fife, and the Lothians. By a previous marriage with a wife whose name has not been ascertained, William Comyn was father of Richard—whose son John (Red John Comyn) became Lord of Badenoch—and of Walter, who by marriage became Earl of Menteith, and was one of the guardians or regents of Scotland during the minority of Alexander III. Through other marriages the family obtained, for a time, the earldoms of Angus and Athole, so that, by the middle of the 13th century, there were in Scotland 4 earls, 1 lord, and 32 belted knights of the name of Comyn. Within seventy years afterwards this great house was so utterly overthrown that, in the words of a contemporary chronicle, 'there was no memorial left of it in the land, save the orisons of the monks of Deer' (founded as a Cistercian monastery by William Comyn, Earl of Buchan, in 1219). The Comyns perished in the memorable revolution which placed Bruce on the throne of Scotland. Their chief, Black John Comyn, Lord of Badenoch, great-grandson of William, Earl of Buchan, had, in 1291, been an unsuccessful competitor for the crown, as a descendant of the old Celtic dynasty through the granddaughter of King Donald Bane. His son, also called Red John Comyn, was one of the wardens of Scotland, and distinguished himself by his gallant resistance to the English. Suspected by Bruce of betraying him to Edward, Comyn fell under Bruce's dagger, before the altar of the Franciscan friars at Dumfries in 1306; and his kindred went down, one after another, in the struggle to avenge him. John Comyn, Earl of Buchan, the son of Alexander and Isabella de Quenci, was defeated by Bruce in a pitched battle, near Inverury, in 1308, when his earldom was wasted with such relentless severity, that—we are told by the poet

who sang the victories of Bruce—for sixty years afterwards men mourned the desolation of Buchan. Such of the Comyns as escaped the sword found refuge, with their wives and children, in England, where, although they were so poor as to be dependants on the bounty of the English court, they married into the best families, so that, in the words of Mr Riddell, 'their blood at this day circulates through all that is noble in the sister kingdom.' See M. E. Cumming-Bruce, *Family Records of the Bruces and the Comyns* (Edin. 1870).

**Conacre** is the custom of letting land in Ireland in small portions for a single crop, the rent being paid either in money or in labour.

**Conant**, THOMAS JEFFERSON, D.D., American biblical scholar, born in Brandon, Vermont, in 1802, graduated at Middlebury in 1823, and filled chairs of Languages in various colleges, dying on the 30th April 1891. In 1856 he published a translation of the book of Job, and in 1857 he was appointed by the American Bible Union to revise the Scriptures. On this work he was engaged until 1875, and he was also a member of the American committee of the Old Testament Company who prepared the revised version. His translations of Gesenius' Hebrew grammar have been standard text-books, and his other works include critical English versions of both Old and New Testament books.

**Concan.** See KONKAN.

**Concarneau**, a village of Brittany, on the east coast of Finistère, 15 miles by rail SE. of Quimper. Its inhabitants are largely engaged in the sardine-fisheries and in pisciculture.

**Concealment** is a technical expression in the criminal law of both England and Scotland; as in concealment of pregnancy and birth, concealing treasure-trove, concealing ore from a mine, concealment by a seller from a purchaser of any instrument material to the title with intent to defraud, &c. The concealment of another's crime may expose to a charge of misprision, or it may amount to a charge of accessions after the fact—e.g. where the body of a murdered person is concealed. In bankruptcy, concealment of debtor's property is a serious offence. In civil transactions, but especially in particular contracts, such as insurance and suretyship, where a high measure of good faith is expected, the concealment of a material fact may often invalidate an obligation.

**Concealment of Birth.** See BIRTH.

**Concepción**, (1) a province of Chile, stretching from the Andes to the coast north of Arauco. It is an important agricultural and cattle-raising district, and has valuable coal-mines. Area, 3500 sq. m.; population, 250,000.—CONCEPCIÓN, the capital, near the mouth of the Biobío (crossed by a viaduct 5700 feet long), is a regular and handsome town, although it has suffered severely from earthquakes. Its cathedral, Palace of Justice, and hospital are noteworthy; and its port, Talcahuano, on Concepción Bay, is the safest and best harbour in all Chile, and ranks next to Valparaíso as a mart of foreign trade. Pop. 66,000.—(2) CONCEPCIÓN DEL URUGUAY, the former capital of the Argentine province of Entre Ríos, on the Uruguay, 180 miles SE. of Paraná by the Entre Ríos Railway, with large slaughter-houses and active river-trade; pop. 10,000.—(3) CONCEPCIÓN, a town of Paraguay, on the Paraguay River, about 260 miles above Asunción, with trade in *maté*. The population, officially returned for 1917 as 15,000, includes the surrounding districts; the town itself has less than 4000 inhabitants.—(4) The name of several places in Bolivia, the largest being CONCEPCIÓN DE APOLOBAMBA, capital of Caupolicán, in the province of Beni, formerly a Franciscan mission. Its Indian popula-

tion cultivate coca and cacao, and collect medicinal barks from the surrounding forests.—(5) CONCEPCIÓN, a town of Mexico, 50 miles W. of Chihuahua, in the upper Yaqui valley, famous for its apples.—(6) CONCEPCIÓN DE LA VEGA, a town of San Domingo, 5 miles SE. of Santiago; pop. 9000.

**Concept.** See PSYCHOLOGY, IDEA.

**Conception.** See PREGNANCY, REPRODUCTION. The Immaculate Conception is the subject of a separate article. A special order of nuns, called 'Sisters of the Conception of Our Lady,' was founded in Portugal in 1484 by Beatrix de Sylva, in honour of the immaculate conception. It was confirmed in 1489 by Pope Innocent VIII. In 1489 Cardinal Ximenes put the nuns under the direction of the Franciscans, and imposed on them the rule of St Clara. The order subsequently spread into Italy and France.

**Conceptualism.** See NOMINALISM.

**Concert-pitch.** See PITCH.

**Concertina**, a musical instrument invented in 1829 by Sir Charles Wheatstone, the sounds of which are produced by free vibrating reeds of metal, as in the accordion. The scale of the concertina is very complete and extensive, beginning with the lowest note of the violin, G, and ascending chromatically for four octaves. Violin, flute, and oboe music can be performed on the concertina with good effect, and it has an extensive repertoire of music specially written for itself. Every sound in the scale is double, and can be produced either by pulling the bellows open, or by pressing them together. Concertinas are now made in Germany, but not so perfectly as in England. The keys in the German concertina are constructed on the same principle as those in the accordion, which play one note when the bellows are expanded, and another when contracted.

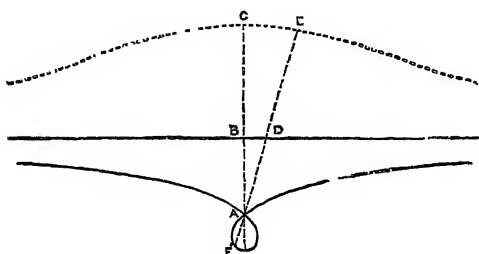
**Concerto**, a musical composition for a solo instrument, with orchestral accompaniments, calculated to give the performer an opportunity to display the highest mechanical skill, as well as intellectual cultivation in the art. The concerto consists of three movements, each of which, like the whole, has a certain character, and like the symphony or the sonata, to which it approximates in form, requires a clear development and treatment of the motives, and a strict adherence to the rules of form. A peculiar feature, usually introduced in the first movement, but frequently also in the last, is the Cadenza (q.v.). When the form is in any way abridged, it is then called a concertino. From the beginning of the last century to the present time, the pianoforte and the violin are the solo instruments mostly used for the concerto. The oldest violin concertos are those by Torelli, the first being published in 1686. The form was developed by Corelli, Tartini, Bach, and Handel, and reached its modern shape under Mozart, though some important modifications were introduced by Beethoven, whose violin concerto and pianoforte concertos are regarded as the highest achievements in this form. Concertos for wind-instruments have been less regarded, and are generally written by the performers themselves, and seldom deserve to be called classical works. Weber's clarinet concerto may be mentioned as one of the few exceptions. There are also concertos for various combinations of solo instruments, such as Bach's for two or more pianofortes, or Beethoven's for piano, violin, and violoncello.

**Conch** (Gr. *konchê*, 'a shell'), a marine shell, especially of the *Strombus gigas* (see STROMBUS); and, in art, a spiral shell used by the Tritons as a trumpet, and still used by some African peoples in war. The native whites of the Bahamas are called

'Conchs' from the commonness of the shells on their coasts. For the Indian conch, see CHANK-SHELL.

**Conchifera** (Lat., 'shell-bearing'), a term applied by Lamarck to bivalve molluscs and the very different Brachiopods (q.v.), but now rarely used.

**Conchoid** (Gr., 'shell-like,' from the shape), a plane curve invented to solve the problem of trisecting a plane angle, doubling the cube, &c. Given any straight line and a point without it, we can describe two companion curves which are dissimilar, but have the straight line as their common Asymptote (q.v.) between them. Thus both branches extend in either direction to infinity, and can never meet though continually approaching each other. The conchoid is obviously symmetrical with respect to the straight line drawn perpendicular to the given line from the given point. This curve has been utilised in architecture to give a waving outline to tapering columns. Through A the fixed



point draw any line ADE, measure DE and DE' each = BC, then E and E' trace the two branches of the conchoid. When BC = BA, there is a cusp at A; when BC is greater than BA, the inferior branch has a loop as in the figure.

**Conchology**, that branch of natural history which deals with the shells of molluscs. From the time of Aristotle the beauty and variety of these structures have made them favourite objects of study, and few zoological subjects have excited so much popular enthusiasm. The study often became unscientific, and sometimes a craze, as when extravagant sums were paid for rare forms of no particular beauty or interest. Since the shells are only external coverings, and were seldom considered in relation to their tenants, or in connection with the internal and external influences to which they owe their shapes, conchology has been somewhat barren of scientific results. It is, however, possible that with the accumulation of knowledge in regard to the constitution and conditions of molluscs, the study of their shells may come to have fresh scientific interest and dignity. See BIVALVES, MOLLUSCA, SHELLS, &c.

**Concierge** is the French name for a janitor of a house, hotel, or public buildings, who in many Continental towns where the people live largely in flats exercises important supervision over all who pass his *conciergerie*. The famous Paris prison so called is part of the Palais de Justice. See PARIS.

**Conciliation Boards** for the settlement of trade disputes consisted till 1896, whether permanent or for a special purpose, of representatives of employers and of workmen. The passing of the Conciliation Act of 1896 empowered the Board of Trade to make inquiries, promote arrangements, and, if desired, appoint an arbitrator to act with representatives of the two parties. See ARBITRATION, TRADE UNIONS.

**Conclave.** See POPE.

**Concord**, capital of New Hampshire, U.S., on the Merrimac River, 73 miles NNW. of Boston by

rail. It extends two miles along the river, with wide streets, and contains a fine granite state-house and other public buildings. Its quarries of white granite are celebrated; and with abundant water-power, it has manufactures of cotton, woollen, leather, and wooden goods, machinery, carriages, organs, &c. Pop. 22,000.

**Concord**, a town of Massachusetts, in the county of Middlesex, 23 miles by rail NW. of Boston. It is the seat of a large prison and reformatory. As early as 1767 the people of Concord opposed the measures of the British government, and in the revolutionary war a skirmish took place here, 19th April 1775. The place is notable as having been the home of Emerson, Hawthorne, Thoreau, and other men of letters. Pop. 6500.

**Concord**, a city and capital of Cabarrus county, North Carolina, 21 miles NE. of Charlotte. It has foundries and extensive manufactures of cotton. Pop. 10,000.

**Concord**, in Music. See MUSIC.

**Concordance** (Low Lat. *concordantia*), originally a system of harmonising things that differ or appear to differ. Thus there is a concordance of the Gregorian and Julian calendars, and of passages in the Bible that do not seem to agree. Subsequently it came to be used for a book arranged so as to form an alphabetical index of all passages, or at least of all the more important words in any work. For writings of universal import, from which passages are continually being adduced to prove or support principles affecting our daily life and action, such a handbook is indispensable. The necessity of a concordance for the Bible seems to have been felt at an early period. The first regular concordance of the Vulgate was made about 1244 by Hugo de Sancto Caro, with the assistance of many other Dominican monks. This work was frequently printed (e.g. Lyons, 1540, 1531), and led to Hugo's division of the Bible into chapters being universally adopted. Amended editions were prepared by Arlotto de Prato (about 1290), and (in the 14th century) by Konrad of Halberstadt. Concordances to the Vulgate were published at Basel in 1521 and 1561, by Rob. Stephanus (Paris, 1555), by Fr. Lucas (Antwerp, 1617), and by the Abbé F. P. Dutripon (Paris, 1838). A Greek concordance of the New Testament and Septuagint was prepared by Euthalius of Rhodes about the year 1300, but has been lost. Concordances of the Septuagint were compiled by Conrad Kircher (Frankfort, 2 vols. 1607), by Abraham Fromm (2 vols. Amsterdam, 1718) and by Dr Hatch (6 parts, 1889-92). Xystus Betuleius published in 1546 the first printed concordance of the Greek New Testament, which was republished and amended by Stephens (Paris, 1594; Geneva, 1600). A better concordance was compiled by Erasmus Schmidt (1638), whose work, as revised and enlarged by Bruder (1842; new ed. 1880), is now of standard value. An abridgment was issued by Schmoller (1869). The first Hebrew concordance was drawn up by Rabbi Isaac Nathan about 1438, and by Johann Buxtorf (edited by his son Johann Buxtorf, Basel, 1632). On the work of Buxtorf the later concordances of J. Fürst (1840), Bernhard Bar (1861 et seq.), and Davidson (Lond. 1876) are based. The chief concordances for Luther's Bible are those of Lankisch (1718), Büchner (1740; 17th ed. 1885), Beck (1770), Wichmann (1782), Schott (1827), Hauff (1828), Bernhard (1850). The first concordance of the New Testament in English was by Thomas Gybson (Lond. 1835), and of the whole Bible in English by John Marbeck (1550). The best known of the numerous concordances for the authorised English version of the Bible was compiled by Alexander Cruden, and first published in 1737 (3d ed. with his

corrections, 1769); Dr R. Young's (1864) and Rev. J. B. R. Walker's (1894) are more recent. The *Englishman's Hebrew and Greek Concordances* (1860) deserve mention. The first Concordance of the Koran appeared at Calcutta in 1811, but was superseded by that of Flügel (1842). The *Complete Concordance to Shakespeare*, compiled by Mrs Cowden Clarke (1845; new ed. Lond. 1881), and that by John Bartlett (1894) are admirable. More or less complete concordances have also been prepared to some of the classical authors, to Dante, Petrarch, Chaucer, Pope, Milton, Gray, Cowper, Burns, Shelley, Wordsworth, Tennyson, and other poets.

**Concordat**, usually an agreement made between the pope, as the head of the Roman Catholic Church, and a secular government, on matters which concern the interests of its Roman Catholic subjects. Such concordats may take either of two forms. The pope may, after consultation with the government in question, issue a bull regulating the affairs of the Roman Catholic Church in the country, the contents of the said bull being afterwards ratified by the government and incorporated in the law of the land. Or again, a formal treaty may be drawn up and signed by plenipotentiaries on both sides. Various theories have been held on the obligation of such contracts. Secular jurists have denied that they impose any real obligation on the state, which may annul them at pleasure. Extreme Ultramontanes, on the other hand, have regarded concordats as privileges which the pope grants for the time without entering into any contract properly so called, while the more moderate of Roman canonists recognise a contract binding both sides. As a matter of fact, no modern government can engage that its stipulations with the pope will be respected by its successors in office. Thus the Austrian concordat was secured by the clerical party in 1855 and swept away by their opponents in 1870. The concordat re-establishing the church in France after the Revolution was concluded by Napoleon (as first consul) and Pius VII. in 1801, and was in force till the separation of church and state in 1905.

**Concordia**, a town of the Argentine state of Entre Ríos, on the Uruguay, 302 miles N. of Buenos Aires by river. It has a custom-house, and a river-trade exceeded only by that of Buenos Aires and Rosario, exporting salted meat and Paraguay tea. It has railway connection with Paraná, Uruguay, and South Brazil. Pop. 20,000.

**Concordiæ Formula.** See AUGSBURG CONFESSION, CONFESSIONS, CHEMNITZ (MARTIN).

**Concrete.** There is but little difference between concrete and coarse mortar. The mortar used in the masonry of castles and churches erected during the middle ages is in fact a concrete with small pebbles instead of the larger ones used in modern concrete. Any mixture of lime, sand, and water, with broken stones or bricks, bits of slag, gravel, or other hard material, is called a concrete. The hard lumps are termed the *aggregate*, and the mortar in which they are embedded is called the *matrix*. The mixture varies with the nature and quality of the materials, but it often consists of 1 part of quicklime, 2 of sand, and 5 of gravel. It is better to use such a material as broken stone rather than water-rolled gravel, which has often too smooth a surface. Lime concrete, as the kind above described may be termed, is used principally for foundations, that is, a thick bed of it is formed below the lowest course of stones or bricks in walls, in cases where the ground itself is not sufficiently firm and solid.

The Hennebique and other methods of 'reinforced concrete' for building purposes are very extensively used in America, and are rapidly growing in favour

in Britain. A framework of steel bars arranged to give strength where most required is embedded in concrete, and the whole building forms one complete solid mass. The steel gives the concrete the tensile strength which it does not itself possess, while the concrete provides the other elements of strength wherein the steel is lacking.

Portland cement concrete is made either by mixing it with gravel alone, or more generally by using the cement along with sand and broken stones, as in the very similar concretes used at Portland Breakwater Fort and at Cork Harbour (cement, 5 cubic ft.; sand, 10 ft.; broken stones, 28 ft.; water, 23½ gallons); but considerably different proportions are also employed. Portland cement being the binding material in this concrete, the question arises whether there is sufficient experience of its durability, especially where it is exposed to the action of sea-water, to warrant its employment in structural works of great or even of moderate size. See CEMENT.

Concrete made of the hydraulic lime from Teil in France, which contains 66 per cent. of silicate of lime, has been employed in the construction of breakwaters and similar works at Cherbourg, Marseilles, and other places. The Teil hydraulic lime is one of the strongest known, and the concrete made with it has resisted the action of sea-water for many years. Ordinary lime concrete does not set under water.

A concrete is made of broken stones and tar, or, better, bitumen or asphalt; and either may be hardened by the introduction of dried and pounded lime, clay, or brick-dust. The solid materials should be heated. For backing armour-plates in forts a concrete of cast-iron turnings, asphalt, and pitch has been used; and for piers, gravel mixed with a thirtieth part of iron borings.

Of late, reinforced concrete has been used as a material for building ships. At first small craft only were made of it, but sizes have increased with growth of experience and confidence.

**Concrete**, a term in logic opposed to *abstract*. A *concrete* notion is the notion of an object as it exists in nature, invested with all its qualities, as any particular flower, leaf, or tree; an *abstract* notion is the notion of any attribute of that flower, leaf, or tree, such as its colour, form, or height; qualities which may be thought of independently of the objects in which they inhere, though they cannot so exist.—The abstract method of handling a subject is adapted to speculation and reasoning; the concrete, to poetic effect and impressive illustration.

**Concretion**, in Medicine, a formation of solid unorganised masses within the body, either by chemical precipitation from the fluids, or by the accidental aggregation of solids introduced into the system from without. In the former case, a concretion is termed a Calculus (q.v.); in the latter, the concretion may be either wholly composed of solids foreign to the body, or these may be mingled with the elements of the secretions, as with mucus, or calculeous matter. Thus beans, peas, needles, &c., introduced into the cavities of the body, have become the nuclei of concretions, by attracting around them mucus, or crystalline deposits from the urine. The most remarkable forms of concretion, however, are perhaps those formed in the stomach and intestines of man and the lower animals, from the more solid and indigestible parts of the food, or of substances improperly swallowed. Thus, young women have been known to acquire the habit of swallowing their own hair to a great extent; and very large concretions have been thus formed, which have proved fatal, by obstructing the passage of food. The

use of oatmeal in large amount has also been found to lead to concretions, especially when eaten coarsely ground and unboiled; such concretions have commonly been found in the intestines. The excessive domestic use of magnesia in the solid form as a laxative has been known to have a similar effect. In certain animals, intestinal concretions are not uncommon, and grow to an immense size; they used to be greatly prized as antidotes, and were used in medicine under the name of Bezoars (q.v.). In certain forms of morbid deposits, such as fibrous tumours (see TUMOUR), and in Tubercle (q.v.), concretions not unfrequently form; they are for the most part composed of phosphate and carbonate of lime.

**Concretionary Structure** is a condition in rocks produced by molecular aggregation subsequent to the deposition of the strata, whereby the material of the rock is formed into spherules or balls, as in the concretions of magnesian limestone and the somewhat similar structures occasionally seen in certain tuffs and crystalline igneous rocks. *Concretions* are nodules, balls, or irregular masses of various kinds which occur scattered through the body of a rock, and consist of mineral matter which was formerly diffused through the material of the rock. Some of these concretions are crystalline, as gypsum in clay; others may be spherical, and have an internal radiating structure, as iron-pyrite in shale. Fantastically shaped concretions are not uncommon in certain fine clays; such are the 'fairy-stones' of the country people here, and the 'loss-puppen' of Germany.

**Concubinage**, the state of cohabitation of a man and woman without the sanction of a formally legal marriage. We find examples in the Old Testament, showing that it was permissible as a relief from a childless marriage. The Roman *concubinatus* was a permanent relation affording freedom from many of the severe marriage restrictions of the civil law. It was a perfectly respectable arrangement, and the woman had a footing in law, although a less dignified position socially than a wife. The offspring, called natural children, came to have limited rights of succession, and could be completely legitimated by subsequent marriage. Augustus, with a view to promote regular marriages, and check the growing licentiousness, enacted a comprehensive marriage-law (*Lex Julia et Papia Poppæa*), which confined concubinage to women of low rank and those who had lost their station. Christianity required the complete sanctity of marriage, although the civil law long continued to tolerate separation at pleasure. In the Eastern empire concubinage was entirely prohibited by the Emperor Leo. The ancient laws of the Germans recognised, along with regular marriage, a similar informal connection of the sexes still not unknown as Morganatic Marriage (q.v.). The *barragania* of medieval Spain and the *hand-fasting* of our own ancestors were merely forms of concubinage. See CELIBACY and MARRIAGE.

**Concurrent** is a technical term for the person who accompanies a sheriff's officer as witness or assistant.

**Concussion of the Brain**, in Medicine, is one form of Shock (q.v.)—that, namely, where the symptoms are due to an injury which has shaken or jarred the brain, and stunned the patient, without producing any mechanical injury, so far as can be ascertained, to the brain or skull. It is generally believed that concussion alone can produce severe symptoms and even death, though conclusive proof of this has not yet been given. It is apt to occur from a severe blow or fall on the head, from railway accidents, from the bursting

of a shell, &c. The symptoms are those which characterise shock—pale and cold skin, feeble pulse and respiration, with the addition of unconsciousness. This condition may last a few minutes, or it may in severe cases be prolonged for hours or days. But in most cases it is succeeded by a period of reaction after an hour or more (often ushered in by vomiting, which is thus a favourable symptom), when the skin becomes warmer, the pulse stronger, and consciousness gradually returns. Recovery is usually complete; but sometimes loss of memory, weakening of mental power, undue excitability, or some other sign of impairment of the nervous mechanism, such as dumbness or paralysis of a limb, remains for a long time. In these cases particularly, when a patient is in receipt of compensation or pension, the mere thought that he will lose this if he gets better is a deterrent to recovery.

In regard to treatment, the patient should as quickly as possible be put to bed in a well-aired room, with warm bottles or blankets applied to the body and limbs, and should have injuries to other parts attended to; but beyond this, the less he is interfered with the better. In particular, brandy and other stimulants should on no account be given, except by medical direction, for, though occasionally necessary, they do much more harm than good in the great majority of cases. During the period of reaction the patient must be kept very quiet; and for a long time after apparent recovery he must abstain from alcohol and from excessive mental exertion.

**CONCUSSION OF THE SPINAL CORD** is due to similar causes acting upon the vertebral column instead of the head. The symptoms vary much with the site and severity of the injury. In many cases they are altogether absent or quite trivial at first, and only attract attention after some hours or days have elapsed; yet serious after-effects are rather more common than in cases of concussion of the brain. Here also, however, complete recovery is the rule. The treatment must be in the first instance the same as in concussion of the brain.

Concussion of the spinal cord has attracted special attention in recent times owing to its frequent occurrence as a result of railway accidents. The slow and insidious nature of the symptoms presented by many such cases, and the difficulty of deciding whether those symptoms are real, and whether they have resulted from the alleged injury, have given rise to much litigation with respect to damages. The subject is very fully treated by Erichsen, *Concussion of the Spine, &c.* (1875; 2d ed. 1882). See also SHOCK.

**Condé**, in the French department of Nord, situated at the confluence of the Haine and Scheldt, 7 miles NNE. of Valenciennes by rail, is a fortress of the third rank, and gives name to the famous family; pop. 6000.—CONDÉ-SUR-NOIREAU, a town in the department of Calvados, 23 miles SSW. of Caen by rail, has cotton-mills; pop. 6000.

**Condé**, LOUIS I. DE BOURBON, PRINCE DE, younger brother of Antony of Bourbon, king of Navarre, was born 7th May 1530, representative of an ancient and famous race taking their name from the town of Condé. During the wars between Henry II. and Spain, Condé distinguished himself by his gallantry, winning especial honour at the siege of Metz, the battle of St Quentin, and the capture of Calais from the English—the chief military events of the time. On the accession of Francis II. (1559), the family of the Guises became all-powerful in the state, and Condé and his brother Antony, partly from jealousy of the Guises, and partly from sincere religious conviction, joined the Huguenots, who were now

struggling for legal recognition. To destroy the power of the Guises, and further the interests of the Huguenots, Condé was induced to join the Conspiracy of Amboise (1560). The plot miscarried, and Condé escaped execution only by the death of the king, which by necessitating the regency of the queen-mother, Catharine de Medicis, the bitter enemy of the Guises, changed the policy of the country. Concessions were now granted to the Huguenots, and Condé was made governor of Picardy. The massacre of Huguenots at Vassy by Guise (1562), however, led to the first civil war, and Condé and Coligny gathered an army of Huguenots. At the battle of Dreux, Condé was defeated and taken prisoner, but the assassination of Guise soon afterwards made possible the Pacification of Amboise (1563), by which Condé was released, and the Huguenots were granted liberty of worship. This concession being gradually withdrawn by Catharine de Medicis, the second Huguenot war broke out in 1567. In the south of France Condé had coins struck with the inscription: 'Louis XIII., first Christian king of France.' But at the battle of Jarnac (1569) Condé was defeated and taken prisoner, and immediately after his surrender, shot dead by his bitterest enemy, the Baron de Montesquieu. Condé was a brave leader, and exceedingly popular with his soldiers, but he had neither the lofty character nor the genius of Coligny.—His great grandson,

**Condé, LOUIS II. DE BOURBON, PRINCE OF**, known as 'the Great Condé,' was born September 8, 1621. Carefully educated by the Jesuits in their college at Bourges, Condé acquired a taste for literature, which he retained all through his life. In his seventeenth year he was introduced at court, and the year following was intrusted by his father with his government of Burgundy. By his marriage, much against his will, to the niece of Richelieu, he gained the support of that minister, and for a time of Richelieu's successor, Mazarin. At this period the Thirty Years' War was still raging, and since 1635 France had been engaged in a protracted struggle with Spain. In 1643, when he was only twenty-two, Condé was appointed to the chief command of the French forces, and in his first campaign defeated the Spaniards at Rocroi in the most brilliant of all his victories. As for more than a century the Spanish armies had been deemed all but invincible, this victory placed Condé at once in the first rank of commanders. In 1644, with his great rival Turenne as his subordinate, in a series of engagements he inflicted at Freiburg a severe check on the Bavarian general, Mercy; and in the following year again defeated the same general at Nordlingen. These successes were gained at an immense cost of life, and in the matter of strategical skill have been disapproved by subsequent military authorities. By the death of his father in 1646, Condé, who had hitherto been known as the Duc d'Enghien, became the head of the house, and was thenceforth addressed as *Monsieur le Prince*. The capture of Dunkirk in 1646, and a great victory at Lens in 1648, in which the famous Spanish infantry were again completely beaten, were the other achievements of Condé during this the first period of his career. The war of the Fronde, occasioned by the quarrels of the court and the parliament, had now broken out, and Condé was required to support the power of the queen and Mazarin. With the aid of Condé the court party came to terms with the Fronde; but Condé himself, who after this service expected to be chief in the state, gave such offence to the queen and Mazarin by his arrogant conduct, that they had himself and his brothers arrested and imprisoned for a year at Vincennes, a proceeding approved alike by the Fronde and the people of Paris. Popular feeling,

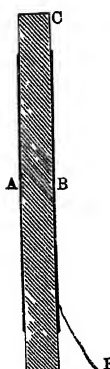
however, soon changed in his favour, and grew so strong against Mazarin that he was forced to leave Paris and set Condé at liberty. But Mazarin's power over the queen was still absolute, and Condé, disappointed once more in his ambition, and finding the queen, Fronde, and people once more all against him, retired to Guienne, and raised an army on the plea of rescuing the young king, Louis XIV., from bad advisers. Thus began what is known as the third war of the Fronde. At Bleneau he defeated the royal troops, but was at length forced by Turenne to make for Paris. Here in the Faubourg St Antoine he sustained a defeat which deprived him of all hope of ultimate success, and a peace was concluded in 1653. The terms of this peace, however, were such as Condé would not accept, and deprived of all support in France, he went over to Spain, and for six years served in all the campaigns against his country. Hampered in his action by the Spanish generals, he could effect little against the strategy of Turenne. The battle of the Dunes, near Dunkirk, where Turenne, aided by 6000 of Cromwell's Ironsides, inflicted a severe defeat on the Spaniards, put an end to the war. At the peace of the Pyrenees (1659) which followed, it was said that the affairs of Condé were more difficult to settle than those of Europe. So formidable was he deemed, that the young king found it advisable to restore him to all his honours and estates, and even to his government of Burgundy. Retiring to his estate at Chantilly, Condé remained here till his services were required in another war between France and Spain, when at his suggestion and by his action, Franche Comté was overrun and conquered (1668). The next year, on the resignation of Casimir, king of Poland, Condé would probably have been chosen his successor but for the jealousy of Louis. In 1674 he fought his last battle. This was at Seneffe in Belgium, where he had for his opponent William, Prince of Orange. The battle lasted seventeen hours, and both sides claimed the victory. On the death of Turenne in 1675, Condé succeeded him in the command of the army on the Rhine, but his health was now such as to render him unfit for active service. Retiring again to Chantilly, he lived there till his death on 11th December 1686, associating much with the great men of letters of the period, Molière, Racine, Boileau, and La Bruyère. Condé had all his life been noted as a scoffer at religion, but the year before his death he publicly announced his conversion. He took especial pleasure in the society of Bossuet, whose oration on his death, regarded as one of the masterpieces of French literature, has served ever since to throw a deceptive lustre round the name of Condé. He had no political genius, and even as a commander he owed his successes more to the fiery energy of his character than to sheer military talent. There is no ground to suppose that in his public career he was influenced by any other motive than selfish ambition; and in his private character, though he could on occasion display a certain magnanimity, he was in intense degree self-willed and overbearing. When all deductions have been made, however, Condé still remains in the first rank of the Frenchmen of his century.

See Mahon's *Life of Condé*, Fitzpatrick's *The Great Condé and the Period of the Fronde*; *Histoire des Princes de Condé*, by the Duc d'Aumale (7 vols. 1862-95); Miss E. Godley, *The Great Condé* (1915); and the *Mémoires* of Cardinal de Retz, Madame de Motteville, &c.

**Condenser** is an apparatus in which aqueous or other vapour is condensed into a liquid form either by the introduction of cold water, as in the condensing Steam-engine (q.v.), or as in distillation, by placing the condenser in another vessel, through which a current of cold water passes. When the water-supply is deficient at sea or on the

coast, salt water may be distilled and condensed. See DISTILLATION, GAS, WATER, RETORT.

The ELECTRIC CONDENSER is an apparatus consisting essentially of two parallel conducting plates, separated by a layer of non-conducting material or dielectric, employed to receive and retain quantities of electricity greater than either or both of the plates would do alone. The simplest and typical form of condenser is that which was first used by Franklin. It is simply a sheet of glass, C (see fig.), both sides of which, excepting a margin at



the edges, are covered with tinfoil, A and B. To charge such a condenser, one of the sheets of tinfoil, say B, is connected with the ground, E (either by some metallic connection or by being placed on the hand of the experimenter), while the sheet, A, remains insulated. If A be now charged with electricity, positive for example, a negative charge is induced on that side of B nearer A, while an equal quantity passes to the ground. Increasing the charge in A induces a corresponding increase in B. This process, although by means of it large quantities of electricity may be accumulated, cannot go on indefinitely; for on reaching a certain limit, depending on the dimension,

&c. of the apparatus, the nature of the dielectric used, and the difference of potential of the two conducting plates, either a *disruptive discharge* (see ELECTRICITY) takes place, or the charge passes off through the insulating supports of the condenser.

All the various forms of condensers satisfy the definition given above. One useful form is that in which the two conducting plates are fixed on the ends of brass rods which pass through brass knobs on the tops of two glass pillars, the dielectric in this case being air. The more common form, however, is the Leyden Jar (q.v.). Another is made up of sheets of tinfoil and paraffined paper, placed alternately in layers; the first, third, fifth, &c. sheets of tinfoil are connected to one terminal, and the second, fourth, sixth, &c. to another.

The *capacity* of a condenser is defined to be that quantity of electricity with which one plate must be charged in order to raise its potential by one unit. It can be shown that, in the case of condensers of the Leyden jar form, the capacity is numerically equal to the product of the outer and inner radii of the coating, divided by the difference of the radii—i.e. is greater as that difference is less. Hence the thinner (within certain limits) the glass between the two coatings of such a condenser, the greater is its capacity.

**Condescendence**, in the judicial procedure of Scotland, is an articulate statement annexed to a summons, setting forth the allegations in fact upon which an action is founded.

**Condillac**, ÉTIENNE BONNOT DE MABLY DE, philosopher, was born of a noble family at Grenoble, 30th September 1715. His life was uneventful. As a child his delicate health delayed his progress in education; but in youth he numbered among his friends Rousseau, Diderot, Duclos, &c. Many of his works were composed for his pupil, the Duke of Parma, grandson of Louis XIV.; and he was titular Abbé de Mureau. He was chosen a member of the French Academy in 1768. He died on his estate of Flux, near Beaugency, on 3d August 1780.

A great part of the *Essai sur l'Origine des Connaissances Humaines* (1746), and nearly all the *Traité des Systèmes* (1749), are occupied with a

polemic against innate ideas and abstract systems. He expounds his analytic method in the *Logique* (1780) and the *Art de Raisonner* (part of the *Cours d'Etudes*, in 13 vols. 1755). The *Langue des Calculs* appeared in 1798.

In the *Traité des Sensations*, Condillac uses his analytic method to solve the problem of the origin of our ideas and the formation of the mental faculties. He divided philosophical systems into three classes—(1) Abstract systems, (2) hypothesis, (3) the 'true' system of Locke, which rests on the facts of experience. But in confounding sensation and perception, and endeavouring to base all thought on sensation, he departed from Locke, and became the founder of Sensationalism. To Condillac all reasoning is only a variation of the form of expression. He held that all ideas and mental operations are only transformations of sensation. So he was compelled to put into the primary sensation all that he sought to develop out of it. His curious device of the statue, gradually endowed with the various senses and mental faculties, was for the purpose of isolating sensations. He substituted for the Cartesian test of truth his own criterion of identity. He recognised three kinds of evidence—of fact, of feeling, and of reason; and he affirmed that the same method of analysis is common to all the sciences. Unlike his scholars and followers, the encyclopædists Diderot, D'Alembert, Holbach, Condillac was not a materialist. He was a strong believer in Free Trade. *Le Commerce et le Gouvernement*, published in 1776, treats economy as the science of exchanges, and has exercised much influence upon later economists.

The first of several editions of his *Œuvres Complètes* appeared in 1798. See monographs by Robert (1869), Dewaule (1891), Saltykow (1901), Lebeau (1903), and Baguenault de Puchesse (1910).

**Condiments**, or seasoning agents, include saline substances, such as common salt; acidulous bodies, such as acetic acid or vinegar; oily condiments, such as butter and olive-oil; saccharine substances, such as sugar and honey; and aromatic and pungent condiments, such as mustard, ginger, pepper, and pickles. See DIET.

**Condition** means in law a declaration or provision that upon the occurrence of an uncertain event a right shall arise or cease to exist. A condition on the occurrence of which a right is to arise is a condition precedent or suspensive. A condition on the occurrence of which a right is to cease to exist is a condition subsequent or resolutive. In the English law of contract a condition is to be distinguished from a warranty. A condition is a term in a contract, the breach of which gives the other party a right to treat the contract as at an end; a warranty, on the other hand, is a collateral agreement, breach of which merely entitles the other party to damages. Physically impossible and unlawful conditions in matters of contract annul the obligation to which they are annexed, but in questions under settlements and wills the opposite rule holds, and such conditions are ignored. Conditions in restraint of marriage are considered unlawful where they are absolute; but where, for example, a legacy is given on the condition that the legatee shall not marry a particular person or a person of a particular class, the condition is effectual. A potestative condition is the technical name for a condition in the power of one of the parties. It is an important doctrine of contract law that if a debtor does anything to prevent the accomplishment of such a condition, he becomes liable as if the condition had occurred. Many most important conditions are implied—e.g. in a marine policy that the ship is seaworthy. Similarly in contracts of sale, of lease, of employment, many

conditions are implied by law. Thus in a contract of sale it is an implied condition that the seller has a right to sell; in a sale of goods by description, that the goods shall correspond with the description; and in a sale by sample, that the bulk shall correspond with the sample in quality. Many questions have arisen as to the effect of conditions expressed, or referred to, on tickets issued by railway companies and other carriers. These questions for the most part turn on whether the party issuing the ticket has sufficiently brought its conditions to the knowledge of the person who took the ticket. In bankruptcy, dividends are set aside to meet conditional obligations.

Conditions of sale is the name used in England for what are called articles of roup in Scotland. These are generally printed along with the particulars of sale. Similarly, conditions are prefixed to catalogues of sales of furniture, books, or other articles.

**Condition**, in Logic, denotes that which must precede the operation of a cause. It is not regarded as that which produces an effect, but as that which renders the production of one possible—to some logicians, however, a distinction without a difference. For instance, when an impression is made on wax by a seal, the seal is said to be the *cause*; the softness or fluidity of the wax, a *condition*.

*The Philosophy of the Conditioned* was a phrase brought into use by Sir W. Hamilton to express the inability of the human mind to conceive or reason respecting the Absolute and the Infinite. Our thought, according to him, can only be of the *relative* and the *finite*, of which these terms are but the negations; relativity and finitude are the conditions under which the human intelligence operates. In one of his dissertations on this, he criticised and endeavoured to refute the opposite position as maintained by Cousin—a modification of the previous doctrine of Schelling—that 'the Unconditioned, the Absolute, the Infinite, is immediately known in consciousness, and this by difference, plurality, and relation.' Dean Mansel, in his Bampton Lectures (1858), brought Hamilton's doctrine into special prominence, and dwelt on the Relativity of Knowledge (q.v.) as a great fundamental law of the human mind.

**Conditional Immortality** is a tenet held by a theological school which denies the inherent immortality of the soul, and the consequent doctrines both of eternal misery and of Universalism (q.v.), as contrary to the teachings both of nature and revelation. Its advocates maintain that the Bible sets immortality before men as something to be sought after (Rom. ii. 7), as a divine gift offered on certain conditions (Rom. vi. 23; John, iii. 15, 16), and as a matter of hope and promise in the present life (Titus, i. 2); that this immortality is not a present possession (Mark, x. 30), and is to be realised by the assumption of a spiritual body at the resurrection of regenerate men from the dead (Luke, xx. 35, 36), an event synchronous with the second coming of Christ (1 Cor. xv. 51, 52). Divine testimony, no less than experience, they say, declares unequivocally that man has the same natural life as all other animals (Eccles. iii. 19), and only those who by faith and obedience are united to Christ have the promise of immortality. The Calvinistic doctrine of eternal misery is untenable, the punishment of sin being death or everlasting destruction, to be inflicted subsequent to a judgment after the Lord returns (2 Thess. i. 9, 10). The dogma of Universalism, the only alternative to endless torment if the soul *must* live for ever, is also, they maintain, unfounded, since the punishment of sin (death) is said to be everlasting, like the life which is the reward of the righteous (Matt. xxv. 46). It

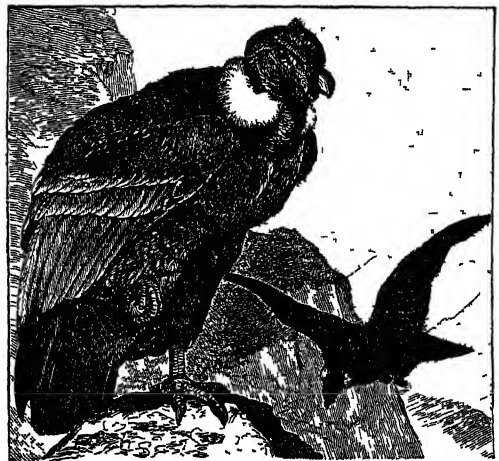
is claimed that a succession of eminent and pious men have upheld this doctrine from apostolic times, among whom may be mentioned Justin Martyr, Clement of Alexandria, Irenæus, &c.

Conditional immortality has received considerable impulse in recent years from many able and zealous advocates, notably the late William Leask, D.D., editor of the *Rainbow*, and Rev. Edward White. The Conditional Immortality Mission started in Britain in 1878 did much for the cause by means of lectures, publications, annual conferences, and a monthly organ. Many churches have been organised in Great Britain and America having conditional immortality as part of their doctrinal basis. Works on the doctrine—known also, especially in America, as annihilationism—are *Life in Christ* (1875), by Edward White; *The Life Everlasting and The Unspeakable Gift*, by J. H. Pettingell; *Hades and The Duration and Nature of Future Punishment*, by Henry Constable; *The Evolution of Immortality*, by S. D. McConnell (New York, 1901), expounds a cognate theory.

**Condom**, a town in the French department of Gers, pleasantly situated on a height above the confluence of the Baise and the Gèle, 20 miles SW. of Agen by rail. It has one fine church, once a cathedral; and was formerly the capital of the extensive Gascon district of *Condomois*, now included in the departments of Landes and Lot-et-Garonne. Bossuet was Bishop of Condom for a year (1669). Pop. 6000.

**Condonation**, in the legal phraseology both of Great Britain and the United States, means forgiveness granted by the injured party, and may be urged by the guilty party as a defence against an action of divorce on the ground of adultery. See DIVORCE.

**Condor** (*Sarcorhamphus condor* or *gryphus*), the great vulture of the Andes, one of the largest and most remarkable birds. Among the wide order of Accipitres, or Birds of Prey, the condor is the grandest representative of the family Cathartidæ,



Condor.

or New-World Vultures. These may be at once distinguished from Old-World forms by the incompleteness of the partition between the nostrils, by having, to put it more plainly, 'a hole through their nose.' The beak is also constricted at the end of the 'cere,' and the feathers have no 'after-shaft.'

Among these New-World vultures, the condor is chief. Though its size and strength have been often exaggerated, this magnificent bird is probably

the largest of the vultures. The only rival which could dispute this claim is the famous Lämmergeiger (*Gypactus barbatus*) of the Alps. The male condor may measure about 3½ feet in length; the female is slightly smaller. The expanse of each wing (said to be 15 feet from tip to tip) is more than twice the length. The general colour is black with a steel-blue sheen, and some of the feathers verge into gray; there is a downy white ruff round the dull-red naked neck. The young birds are covered with whitish down. The beak is long, hooked at the apex, black at the root, yellow at the point and on the sides. The head is naked, and in the male bird bears a large fleshy comb. The eyes look sideways; the 'perforated' nose is characteristic of the family. The voice is limited to a weak sort of snorting. The feet are not well suited for grasping, the hind-toe being very small and hardly reaching the ground. The stories about condors lifting their prey in their feet from the ground are mythical. These birds have their central home in the Andes, but extend to some other mountainous parts of South America. They breed on the heights, laying their two eggs on bare ledges in the months of November and December; the young are unable to fly for a whole year. They descend to the plains to feed on carrion, tearing carcasses with their strong bills; they may also attack lambs and calves, or several together may venture on an adult animal. Their boldness and voracity seem to have been exaggerated. Their voracity is, however, great: Tschudi mentions one in confinement at Valparaiso, which ate 18 lb. of meat in a single day, and seemed on the morrow to have as good an appetite as usual. The condors have great powers of flight, and can soar to immense heights, till, in fact, they are lost in or far above the clouds. They are readily kept in confinement, and may be seen in many zoological gardens.

In the same genus is the rarer King of the Vultures (*S. papa*), inhabiting the wooded plains of South and Central America. It is a smaller bird, reddish-yellow above, white beneath, with bluish-gray ruff, black quills and tail. Its head and neck are covered with variously coloured roughnesses. It owes its name to the way in which it bullies other vultures. Closely allied is the Turkey Vulture (*Cathartes aura*) of North America. This bird, useful as a carrion destroyer, is about 2½ feet in length, black in colour with a purplish sheen, well marked by its carmine and bluish-red head, fleshy neck, and white feet. *C. atratus* is another species from South America.

**Condorcet**, JEAN ANTOINE NICOLAS DE CARITAT, MARQUIS DE, an eminent French author, was born, the son of a cavalry officer, in Ribemont, near St Quentin, in the department of Aisne, on 17th September 1743. In childhood he breathed the closest atmosphere of clerical and aristocratic exclusiveness, with the result of making him in after-years the enemy of all privilege and a thoroughgoing sceptic. Condorcet, after distinguishing himself in the Jesuit school at Reims, began his mathematical studies at the age of thirteen, at the College of Navarre in Paris. His success was rapid and brilliant, and the high approval of Clairaut and D'Alembert determined his future. His *Essai sur le Calcul Intégral* (1765) won him a seat in the Académie des Sciences; he entered the French Academy in 1781. He took an active part in the work of the *Encyclopédie*. On the outbreak of the Revolution he made eloquent speeches and wrote famous pamphlets on the popular side, was sent by Paris to the Legislative Assembly in 1791, and in 1792 became president of the Assembly. He voted that the king should receive the most severe punishment except death, and as deputy for Aisne in the National Con-

vention, he voted usually with the Girondists. Accused and condemned by the extreme party, he found refuge in the house of a generous lady, Madame Vernet, for eight months; but driven to change his place of concealment, he was recognised and arrested. Imprisoned in the gaol of Bourg-la-Reine on the 7th April 1794, he was found dead the next morning, whether by disease or poison was never known.

His profession of faith, in a letter to 'Turgot, which was written when he left college at seventeen years of age, lays stress on moral sympathy as the source of all virtue. His constancy in moral principle was fitly associated with perfect consistency in politics. He raised a great commotion by his attempt to apply the calculus of probabilities in the domain of jurisprudence, and of the moral and political sciences. In his *Progrès de l'Esprit Humain*, written in hiding, he insisted on the justice and necessity of establishing a perfect equality of civil and political rights between the individuals of both sexes, and proclaimed the indefinite perfectibility of the human race.

See the biography by Arago prefixed to the complete edition of his works (1847-49, 12 vols.), books on him by Robinet (1895) and Cahen (1904), Morley's *Critical Miscellanies*, Comte's *Philosophie Positive*, Flint's *History of the Philosophy of History*.

**Condottieri** (Lat. *conducti*, 'hired'), the name given in the 14th and 15th centuries to the leaders of certain bands of 'free lances' or military adventurers who, for booty, offered their services to any party in any contest, and often practised warfare on their own account purely for the sake of plunder. These mercenaries were called into action by the endless feuds of the Italian states during the middle ages. Among the most celebrated of their leaders were Sir John Hawkwood at Florence (1390, originally an Essex tailor); Francis of Carmagnola (about 1412); and Francis Sforza, who in 1450 became Duke of Milan. The *Compagnies Grandes* in France, during the 14th century, resembled the bands led by the Italian condottieri. They originated in the long bloody wars between France and England, did enormous mischief, and became powerful enough to rout the king's forces in 1361; but ultimately Du Guesclin persuaded them to seek their fortune in the Spanish service. See O. Browning, *The Age of the Condottieri* (1895).

**Conductivity**. See HEAT, ELECTRICITY.

**Conductor**, the director of the modern orchestra. Though from the earliest days of the orchestra abroad he has always performed his duty by beating time with the baton, the practice was unknown in this country till introduced by Spohr in 1820, at a concert of the Philharmonic Society of London. Previously the orchestra was kept together by the leader of the violins, the conductor simply sitting at the harpsichord or piano with the score before him, occasionally putting in a few chords, or accompanying; but the result was clearly unsatisfactory, and the conducting stick had only to be introduced to gain general acceptance at once. The art of conducting as now practised requires so many qualifications that it may be considered rather as a special gift than an acquirement to be learnt. But few eminent composers have also distinguished themselves as conductors. Great recent conductors are Costa, Von Bülow, Richter, and Nikisch.

**Conductors and Non-conductors of Electricity**. When an electrified body is placed upon a metallic stand, so that it is in metallic connection with the earth, all traces of electrification disappear; but if placed upon supports of glass or ebonite, its charge is still retained, the body then being said to be *insulated*. In the former case, the electric charge having passed to the ground through

the metallic support, the metal is termed a *conductor* of electricity; in the latter, the glass or ebonite is termed a *non-conductor* or *insulator*, since by its means the charge is prevented from leaving the body. This distinction is somewhat artificial, since no substance is known to be either a perfect conductor or an absolute insulator. The substances in frequent use as conductors and non-conductors may be arranged in the following order of their conductivity, beginning with the best: Silver, copper, gold, brass, zinc, platinum, iron, tin, lead, mercury, German-silver, graphite, red phosphorus, mineral acids, saline solutions, seawater, pure water, alcohol, wood, ice, vegetable oils, lime, chalk, camphor, porcelain, wool, hair, silk, glass, wax, sulphur, resin, amber, gutta-percha, shellac, paraffin, ebonite, air and other gases.

It is found that the efficiency of a non-conductor, when used as an insulator in electrostatic experiments, depends very largely on the state of its surface. In a damp atmosphere, glass becomes coated with a thin film of moisture which considerably lessens its insulating power. Hence these experiments succeed better in dry weather; otherwise the apparatus requires to be heated, or the glass insulators employed to be coated with shellac varnish, upon which moisture does not so readily deposit. In metals, conducting power decreases when the temperature is raised; on the other hand, glass, wax, sulphur, and some other bodies which are extremely bad conductors at ordinary temperatures, conduct very much better when raised to a sufficiently high temperature. It has been observed that a series of metals arranged in order of their electrical conducting powers, exhibits the same order as when similarly arranged for their thermal conducting powers; in other words, metals which conduct electricity well, conduct heat well. Also, that when two specimens of the same metal differ in electric conductivity, they differ in thermal conductivity, and in the same way. See **LIGHTNING CONDUCTOR, ELECTRICITY.**

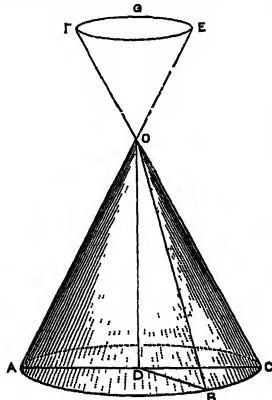
**Condurango** is the name of several South American *Asclepiadaceæ* (q.v.), whose bark affords a drug used as a remedy for venomous bites.

**Condyle**, a protuberance on the end of a bone, serving for articulation with another bone; especially that by which the occipital bone of the skull is articulated to the spine.

**Condy's Fluid.** See **MANGANESE.**

**Cone.** In general, the term *cone* is applied to any surface described by the motion of a straight line which always passes through a fixed point and

also intersects some curve in space. But more particularly, the word is used to denote a *right circular cone*—i.e. the solid produced by the revolution of a right-angled triangle round one of the sides containing the right angle. Thus (see fig.), let ODC be a triangle with a right angle at D; if it revolve round OD, then in moving through successive positions, OC will trace out the cone, OABC. The point,



O, is termed the *vertex*; the height, OD, the *altitude*; the line, OD, the *axis*; and the circle, ABC, the *base* of the cone. The line, OC, by whose

motion the cone is produced, is termed a *generating line*, or *generator*. In the *oblique* cone, the axis is inclined to the base at an angle other than a right angle. A *truncated* cone is the lower part of a cone cut by a plane parallel to the base.

The lateral surface of a right circular cone is obtained by multiplying half the circumference of the base into the slant height of the cone; the solid content, or volume, is equal to one-third of the area of the base multiplied by the altitude.

In considering the different possible sections of a cone by a plane, it is necessary to remember (as is indicated in the figure) that a cone is really produced in duplicate; that the generators, after passing through the fixed point, O, form another cone, such as OEGF. Different positions of the sectional plane produce different curves, according as it is parallel to the base, a generator, the axis, or parallel to none of these; so, consequently, we have a circle, parabola, hyperbola or ellipse, respectively. For the conic sections, see **CIRCLE, ELLIPSE, HYPERBOLA, PARABOLA.**

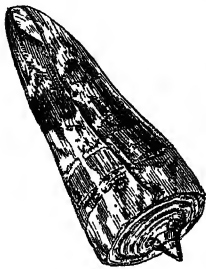
**Cone** is a term used in Botany, with considerable latitude and variety of application. The growing point or bud of any ordinary higher plant is of more or less acutely conical shape, and the young leaves at first arise in close succession upon it. But while in vegetative growth the axis usually lengthens and the leaves develop and expand, the onset of reproductive functions may check these changes. In the simplest cases the leaves may become partially modified for pollen or ovule bearing, as stamens or carpels, while the leaf apices do not wholly lose their leafy character and arrangement; thus we have the cone-like male and female flowers of Cycads (q.v.). In the allied conifers, which include the most characteristic cone-bearing trees, the leafy character of the crowded stamens composing the male flower may be almost entirely lost; but in the female the structure of the familiar cones (e.g. Scots pine, spruce, larch) has been the subject of enormous controversy; since from one point of view it is regarded as a single flower composed of many carpellary leaves (each bearing a biovular placenta on its upper surface); while from the other it must be viewed as an inflorescence of which the crowded bracts bear axillary biovular branches (see **GYMNOSPERMS**). The cones of Coniferæ may vary greatly from their typical shape, witness the almost spheroidal cones of *Araucarias*; while the number and crowded succession of the leaves may be much reduced and simplified, as in cypress. The apparent cones which occur in some orders of dicotyledonous plants are always due to a crowding of the inflorescence.

**Conecte**, THOMAS, a Carmelite friar born in Rennes, who both in France and Italy anticipated Savonarola by preaching a crusade in favour of reforms and against vanities, and at Rome in 1434 was condemned for heresy and burnt.

**Coneglia'no**, a town (pop. 6000) of northern Italy, 31 miles N.E. of Venice, the birthplace of the painter Giambattista Cima, called often Conegliano (1460?-1518), a pupil of Gian Bellini, whom he resembles in serenity of religious feeling. See the book on him by Burckhardt (1905).

**Cone-shell** (*Conidae*), a family of Gasteropod molluscs, with substantial conical shells. The last whorl of the spiral is much larger than those which precede it and simply form the apex of the cone. The aperture is long and narrow, with a sharp-edged outer lip. The head of the animal has a long proboscis; the 'foot' is long and narrow as the aperture suggests; the respiratory siphon is short and thick. In the living state the shell is covered by a yellowish epidermis, and it is only when this is rubbed off that the great beauty

of the colour and marking is disclosed. During life the inner layer of the shell and the internal partition of the second last whorl undergo more or less absorption. The principal genus, *Conus*, includes some 500 living species, ranging from the



Cone-shell.

Mediterranean to the Cape, but especially at home in the eastern equatorial seas. They creep in relatively shallow water among the rocks and coral reefs, and prey upon other molluscs. Among the numerous species, some are rare, and have been favourite objects of collectors' mania. Many pounds have been paid for single specimens, and *Conus gloria-maris* is said to be 'worth ten times its weight in gold'. *C. cedo nulli* is in its finer varieties a much prized treasure, and *C. ammiratus* is another favourite, though much commoner form. Numerous fossil species are known from the chalk onwards. Some of the animals are eaten, and the shells often form ornaments, or are worn down into rings and the like. The augur-shell (*Terebra*), the latticed shell (*Cancellaria*), the tower-shell (*Pleurotoma*) are nearly allied genera, often regarded as types of separate families.

**Coney.** See FURS, HYRAX, RABBIT.

**Coney Island,** part of New York City, barely separated from the south-west angle of Long Island, is a strip of sand, 5 miles by  $\frac{1}{2}$  mile, with a fine beach; a crowded summer resort.

**Confarreation,** a peculiar mode of marriage in use among the Romans, which consisted in the employment of certain words in the presence of ten witnesses, and in the performance of a religious ceremony in which *panis farreus* ('bread made of spelt') was partaken. Various priestly offices, such as that of the *Flamen Dialis*, were open only to those who were born of parents thus married.

**Confederate States,** the name adopted by the confederacy formed by the eleven southern and slave-holding states which seceded from the American Union in 1860-61, and established a government which lasted till the close of the great civil war in 1865. See UNITED STATES. The Confederate States were South Carolina, Alabama, Florida, Mississippi, Georgia, Louisiana, Texas, Virginia (without West Virginia), Arkansas, Tennessee, and North Carolina.

**Confederation.** See FEDERATIONS AND UNIONS; also UNITED STATES, GERMANY, AUSTRIA, SWITZERLAND, &c.

**Confederation of the Rhine** dates from the war of 1805, so disastrous for Austria, when several minor German princes were forced to ally themselves with France. The first to do so were the Electors of Bavaria and Württemberg, who, in recompense of their services, were elevated to the dignity of kings by the peace of Presburg, 26th December 1805. Finally, at Paris, on the 12th July 1806, 16 German princes formally signed an act of confederation, dissolving their connection with the Germanic empire, and allying themselves with France, under the protectorate of Napoleon. The more important of these 16 princes were the kings of Bavaria and Württemberg, the arch-chancellor, the Elector of Baden, the new Duke of Cleves and Berg (Joachim Murat), and the Landgraf of Hesse-Darmstadt; later other princes followed their example, including the king of Saxony, the new king of Westphalia, and the Elector of Würzburg. In 1811 the unpatriotic confederation comprised

4 kingdoms, 5 grand-duchies, 11 duchies, and 16 principalities, covering an area of 125,000 sq. m., with a population of 14,608,877, and an army of 119,180 men. The utter ruin which overtook the French army in the Russian campaign acted like a solvent on the confederation, and the year 1813 saw it vanish like mist in the sudden outburst of German patriotism. See GERMANY.

**Conference,** a meeting of the representatives of a number of states for political or diplomatic purposes, usually distinguished from a Congress (q.v.) as having only power to discuss and prepare arrangements, not to decide and conclude. But the distinction is not consistently observed. —Conference is also the name of the supreme synod of the Methodists (q.v.).

**Conference, IMPERIAL,** a meeting of premiers and other representatives of the United Kingdom and the British self-governing dominions, to discuss matters of joint interest. Colonial Conferences were held in 1887, when colonial premiers were in London for Queen Victoria's jubilee celebrations, in 1902 and in 1907, when the name Imperial Conference was adopted, and a period (subject to variations) of four years. None was held in 1915; but an 'Imperial War Conference' met in 1917 and in 1918. India has been represented since 1917. The British prime-minister presides, or in his absence the colonial secretary.

**Conferva,** a genus of fresh-water Algae (q.v.), forming slimy masses or tufts in ponds and stagnant pools, easily recognised by their unbranched filaments, each consisting of a simple row of cells, destitute of spiral bands or the like. The filaments do not conjugate; multiplication is by swarm-spores, or by thick-walled aplanospores.

**Confession, in Roman Catholic theology,** means a declaration of sins to a priest in order to obtain absolution. The word, however, has borne very different meanings at different times, and the changes in sense mark important stages in the development of discipline and doctrine. St James (v. 16) speaks of that spontaneous confession which Christians make 'one to another' out of humility and brotherly love; and, much in the same spirit, Origen (Hom. in Ps. xxxvii.) recommends the sinner to seek out a physician 'learned and merciful,' to whom he may disclose his wounds, and from whom he may get advice. In all this there is no question of strict obligation on the one hand, or of priestly power upon the other. Still, even before Origen's time, the word had acquired a new signification. From the close of the 2d century at latest the church marked out for special reprobation those sins which were called 'mortal'—viz. murder, idolatry, and adultery. The guilty person was required to make public confession, he was subjected to penitential exercises, and was either excluded during life from the communion of the church, or readmitted, after long discipline, by the bishop, who imposed his hands upon him. The list of 'mortal offences' was extended during the 5th and the following centuries to all crimes which the Roman law punished with death, exile, or grave corporal penalty, and Leo I. (440-461 A.D.), in a famous letter to the Bishops of Apulia (Ep. 168), substituted private confession to the priest for public confession to the congregation. But the essential points of difference between ancient and modern or sacramental confession remained. In the former, the church only required confession to man of certain enormous offences, and left the mass of sins which are now called mortal to the judgment of God; and she exercised the power of 'binding and loosing' by excluding sinners from, and readmitting them to, her communion. Such power is really inherent in every society, though

of course the church claimed to hold it by divine commission (Matt. xvi. 19, xviii. 18; John, xx. 22, 23), and insisted on the serious consequences which it involved. We can trace the faint beginnings of the modern system in the practice which prevailed in monasteries and nunneries of confessing breaches of the rule to the superiors (Jerome, *De Reg. Monachorum*, Basil, *Reg. Brev.*), and in the growing habit of seeking advice from priests by secret confession. The thirty-third canon of the Council of Châlons, which was held 813 A.D., throws great light on the state of things then existing. Some, the council says, maintain that 'sins should be confessed to God alone,' others to God and to the priest. The council finds no fault with either view, and remarks that confession to God purges the conscience from sin, while confession to the priest teaches the penitent 'how his sins are to be purged.' Even Peter Lombard, the great theological authority of the 12th century (*In Sentent. lib. iv.*), occupies the same ground as the Council of Châlons; and Aquinas (*Supplement to the Summa*) admits that in Lombard's time the necessity of confessing all mortal sins to the priest was an open question. Meantime, the fourth Lateran Council in 1215 (can. xxi.) had required all the faithful who have come to the years of discretion to confess their sins at least once a year to their parish priest, or with his leave to another priest. The doctrine received its final form in the Council of Trent (Sess. xiv.). The council explains 'mortal sins' to mean all sins, 'even sins of thought', which separate the soul from God. It declares that for mortal sin after baptism, confession to an approved priest, in act if possible, in desire if a priest cannot be had, is by divine institution the one and only remedy. This confession must embrace every mortal sin which can be recalled after careful self-examination. Further, it declares that the secret confession of mortal sins has always been practised in the church, and whereas in Peter Lombard's time Roman Catholics were free to hold that absolution was no more than a declaration of forgiveness by God, the council condemns this opinion under anathema. But it is careful to add that confession and absolution, in order to avail, must be accompanied by sincere sorrow before God for sin past, and a firm purpose of amendment. By the present canon law, Roman Catholics living in the world may choose any priest approved by the bishop as their confessor. The confession of slight or venial sins remains a matter of counsel and not of precept.

Confession to a priest is prescribed by the Greek and most of the Oriental churches, and the Church of England recommends private confession in the case of the sick, though it has never enforced the use of it. In 1873, 483 Anglican clergymen presented a petition to Convocation for the education, selection, and licensing of duly qualified confessors. That petition fell flat; but confession is regularly practised among a considerable section of the English communion. The Lutherans at first were inclined to retain some sort of private confession, but they were content with confession of a general kind, and have allowed it to fall into disuse. It is entirely rejected by Presbyterians, Methodists, Congregationalists, Baptists, &c.

The 'seal of confession' is the obligation which binds the priest to make no use whatever outside of the confessional of the knowledge acquired there. It is imposed under severe penalties by the fourth Lateran Council. See CONFIDENTIALITY, and Lea's *History of Auricular Confession* (3 vols. 1896).

**Confession**, in civil procedure by English law, is a formal admission or avowal of a fact, as when a defendant alleges a ground of defence which has arisen since the commencement of an action, and the plaintiff confesses the defence—i.e. admits the

truth of the defendant's allegation. In Scotland, a party to an ordinary civil action may be called on to confess or deny any relevant matter of fact, and if he refuse, he will be held as confessed. Where a statement within the opposite party's knowledge is averred upon one side, it is held as confessed by the other unless specifically denied. In criminal law, a confession is an admission of guilt. In England, a confession by a criminal made in the course of a judicial proceeding is sufficient, if plenary, to found a conviction, as where a prisoner pleads guilty. An extra-judicial confession, if freely made, may be admitted as evidence. In Scotland, a confession made by a criminal in presence of a judge will be admitted as evidence; but is not held as equivalent to a confession by the panel in presence of a jury, which is conclusive evidence against him. In the United States also confession is evidence, if voluntary and made without promise of reward or threat of punishment, and that whether made before or after apprehension and commitment; generally confession without corroboration is insufficient, but in one or two states the jury may convict without corroboration. As to confession on trial, see CRIMINAL LAW; as to confession before the examining magistrate, see DECLARATION; and for Judgment by Confession, see COGNOVIT.

CONFESSION AND AVOIDANCE, in pleading at common law, in England, is the admission of the allegation of the opposite party, but with the addition of some circumstance which deprives it of legal effect, as, for instance, the admitting that an assault was committed in self-defence. Since the passing of the Judicature Acts of 1873 and 1875, pleas in confession and avoidance have technically fallen into desuetude.

**Confessional**, the seat or recess in which the priest sits to hear confession in a Roman Catholic church. It is probable that the confessionals in English churches, previous to the Reformation, like those still often found in Catholic use, were slight wooden erections, because they have so entirely disappeared that their form is a matter of dispute among ecclesiologists. It would seem that confessionals were not always used, as in an old painting on the walls of St Mary's Chapel, Winchester, a woman is represented kneeling to a priest, who is seated in his stall. The confessional commonly has a door in front for the priest to enter by, and an opening on one or both sides, like a small window, with a grating of wire or zinc, for the penitents to speak through.

**Confessions of Faith** are generically identical with Creeds (q.v.). If any distinction be made, it is the merely accidental differentiation that creeds are shorter, and that confessions of faith are generally polemical as well as didactic in their character and aim. Such a distinction, it is found, actually obtains in practice, and confessions of faith, as thus distinguished from creeds, are so numerous and varied as to call for separate attention.

Confessions of faith may be defined as authorised summaries of a church's belief, and standards of its faith and doctrine. In all Protestant churches, however, they are regarded as subordinate standards, ranking under the Scriptures, which are recognised as the only supreme 'rule of faith and life.' Their object is to present the cardinal truths of revelation in a connected and logical form, especially if these be controverted; while at the same time they afford a basis of association and a bond of unity for Christians. As they are the result of the conflicts of a church with error, confessions of faith vary in their doctrinal comprehensiveness, are more or less gradual in their

growth, and are significant and important features in its history.

Prior to the era of the Reformation in Europe, the public formularies of the Christian church were generally termed creeds. It was the rise of Protestantism that evoked confessions of faith as we now understand the name. Among the first to formulate these were the Swiss at Zurich, where, in 1523, Zwingli wrote his *Sixty-seven Articles or Conclusions*. To Luther and Philip Melancthon, however, is due the honour of drawing up the first authoritative evangelical formulary, the *Augsburg Confession* (q.v.), by the adoption of which the Lutheran princes, with their states, in 1530, finally broke with Rome. It was followed by the *Apology of the Augsburg Confession*, drawn up by Melancthon, and recognised as a confession in 1532. Later confessions of that church are the *Articles of Smalcald*, prepared in 1537, the *Saxon Confession*, and the *Wurtemberg Confession*, both published in 1551. But these were superseded in 1580 on the adoption of the *Form of Concord* (*Formula Concordiæ*), which is the most representative symbol of the Lutheran Church.

The German Reformed Church, which sprang up side by side with the Lutheran, and stood midway between it and the Calvinistic bodies, issued in 1530 the *Tetrapolitan Confession*, so called because sent forth in name of the four cities of Strasburg, Constance, Memmingen, and Lindau. It was written chiefly by Bucer. Among other confessions officially recognised by this church, or local portions of it, were the Confession of Anhalt (1581); the Confession of Nassau (1578); the *Consensus of the Ministry of Bremen* (1598); the *Hessian and Heidelberg Confessions* (1607); and the *Declaration of Thorn* (1645).

In Switzerland, the labours of Zwingli were followed by the publication in 1534 of the *First Confession of Basel*, prepared by Ecclampadius and Myconius. To it succeeded in 1536 the *Second Confession of Basel*, better known as the *First Helvetic Confession*. It was superseded in 1566 by the more comprehensive *Second Helvetic Confession*, which was written by Bullinger, and obtained official sanction in Scotland, Hungary, France, and Poland. Calvin left his mark on confessional literature in, among others, the *Consensus of Zurich* (1549); in the *Consensus of Geneva* (1552), which is a treatise written mainly in defence of the doctrine of predestination; and in the *Gallican Confession*, which he prepared in conjunction with his pupil, Antoine de la Roche Chandieu (Sadeel). The latest Swiss confession is the *Helvetic Consensus Formula*, written in 1675, by Heidegger of Zurich. It is thoroughly Calvinistic, and was drawn up in defence of the conclusions of the Synod of Dort.

The *Gallican Confession*, was adopted by the French Reformed Church in 1559, and after revision was ratified at the Synod of Rochelle in 1571, whence it is sometimes called the *Confession of Rochelle*.

The *Belgic Confession*, drawn up principally by Guido de Brès in 1561, has since then been, and still is, the authoritative standard of the Dutch and Belgian Reformed churches. The Arminian controversy occasioned the meeting of the Synod of Dort in 1618, and the issuing of the *Canons of Dort* in the following year. These canons were adopted as symbolical by the Dutch and French Reformed churches.

But confessions have not been peculiar to the Protestant Church. Influenced by the Reformation, the Greek Church adopted the *Orthodox Confession of Mogilas*, the metropolitan of Kiev (died 1647), who drew it up in a catechetical form as a protective measure against both Protestant and Roman Catholic churches. Recast by Syriga, the

metropolitan of Nicæa, it became in 1672 the confession of the whole Greek Church. At the same time the anti-Calvinistic *Confession of Dosithæus* was promulgated by the Synod of Jerusalem. Similarly, the Roman Catholic Church published the *Canons and Decrees of the Council of Trent* in 1564, to which were added in 1854 the decree of Pius IX. on the Immaculate Conception, and in 1870 the Vatican Decrees. See ROMAN CATHOLIC CHURCH.

In Britain the chief confessions are the *Scots Confession*, consisting of twenty-five articles, drawn up by John Knox in 1560, and adopted by the Church and kingdom of Scotland; the *Thirty-nine Articles of the Church of England*, adopted in 1562; the Irish Articles, one hundred and four in number, prepared by Archbishop Usher, and adopted by the Irish Church in convocation at Dublin in 1615, but superseded by the *Thirty-nine Articles of the Church of England* in 1635 (see ARTICLES); and the *Westminster Confession of Faith*, emitted in 1647 by the Westminster Assembly of Divines (see WESTMINSTER). This confession has become identified with Presbyterianism among all the English-speaking populations of the globe. Its theology was also adopted with some modifications by the Congregationalists and a section of the Baptists. It was ratified by the English parliament in 1647, but in England its influence waned with the decline of Presbyterianism during the Commonwealth and the reign of Charles II. By Scotland, in furtherance of the uniformity agreed upon in the Solemn League and Covenant, the Westminster Confession was cordially received and adopted in place of that of 1560. It was approved by the General Assembly in 1647, with the modification of but one section regarding the magistrate's power *circa sacra*, was ratified by parliament in 1649 and again in 1690, and continues to be the common symbol of the Church of Scotland and most of the churches which have seceded from her communion, save in so far as the two churches now forming the United Free Church modified their acceptance of the Confession by a Declaratory Statement on certain doctrines.

The Westminster Confession consists of thirty-three chapters, is thoroughly Calvinistic in its teaching, and is in many parts stated in terms designed to counteract the principal errors of the time. Beginning with the canon of Scripture, it surveys the entire field of theology, deals also with the relations of the state to the church, the constitution of the church itself, and concludes with the topics of death, the resurrection, and the last judgment. Its precise logic, its clear, dignified and powerful diction, and its constant reference to Scripture in proof of its statements, tended greatly to beget that influence to which it attained.

See CREEDS; also two works by Philip Schaff (1877, 1878), and *A History of Creeds and Confessions of Faith* by Dr William A. Curtis (1912), based on his article in the *Encyclopedia of Religion and Ethics*.

**Confessor.** See CANONISATION.

**Confidentiality**, in Law. The most common instance of confidentiality is in the case of communications between a client and his legal adviser. A client cannot be compelled, and a legal adviser (whether barrister or solicitor) is not allowed, without the express consent of his client, to disclose communications, or to produce documents, passing between them in the ordinary course of professional employment. In England the rule is not qualified by reference to impending litigation; but the privilege does not extend to communications passing before the professional employment commenced or after it ceased. A communication or document when 'once privileged is always

privileged.' Thus it does not cease to be privileged on the death of the client or on the client changing his solicitor. The privilege may be waived by the client, but cannot be waived by the solicitor. On the same principle, in the law of libel and slander, communications between solicitor and client and communications made by a solicitor in defence of his client's rights, although they are defamatory of a third person, are *prima facie* privileged; so that no action of damages lies in respect of the defamatory words, except on proof of malice.

The old rules of evidence, which excluded persons from giving evidence on the ground of near relationship or of personal interest in the case, have been removed by a series of statutes culminating in the Evidence Act, 1898. In civil cases all persons, including the parties to the case, are now competent witnesses, provided they are able to understand the nature of an oath and to give rational testimony. In criminal proceedings, the accused and the wife or husband of the accused (except in certain cases where she or he is the person injured by the crime) are incompetent as witnesses for the prosecution; but the accused, and the wife or husband of the accused, are competent as witnesses for the defence. On the ground of confidentiality, however, certain matters are protected from disclosure, and a witness is legally entitled to refuse to answer questions on these matters. In particular, owing to the importance of preserving the confidences of married life, a husband or wife cannot be compelled to disclose any communications made to him or her, during the marriage, by his or her wife or husband. Again, a witness, if he is not himself a party to the litigation, cannot be compelled to produce the title-deeds of his property for inspection. It is also a recognised privilege that a witness cannot be compelled to answer any question, or produce any document, which tends to expose the witness, or the wife or husband of the witness, to a criminal charge. An exception to this rule is made in the case of an accused person giving evidence, for, under the Criminal Evidence Act, 1898, he may in cross-examination be asked questions tending to criminate him of the offence wherewith he is then charged.

From the 4th and 5th centuries the 'Seal of Confession' was held to be inviolable, and no priest could be called upon, under any circumstances, to reveal facts which had been confided to him under its sanction. To this the case of treason was an exception in England, even in Roman Catholic times. The capitularies of the French kings and some other continental codes of the middle ages prohibited the attendance of clergy as witnesses in court. In Roman Catholic countries the privileges of the confessional remain unaltered, although a priest may state that the accused has submitted to penance. The duty of disclosure, however, is enforced in all cases in which the confession has reference to a future crime. In England no special privilege whatever is extended to the Roman Catholic confessional; and the question as to how far a confession made to a clergyman for the purpose of obtaining spiritual comfort and consolation is protected was long considered doubtful. The rule has, however, been settled for some time that clergymen are not entitled to the same privilege as legal advisers; though it has often been advocated as advisable to extend the rule to clergymen, including Roman Catholic priests. In Scotland the point has never been decided, evidence of the kind in question, when not indispensable for the ends of justice, being generally either withheld or withdrawn. It has been decided in England that communications to a medical man,

even in the strictest professional confidence, are not protected from disclosure; and the same is the case in Scotland. Factors, bankers, and intimate friends are certainly not within the protection of the rule. Confidentiality exists as to official reports and state papers, the disclosure of which would be contrary to public policy.

In the United States members of the legal profession are privileged, and, as a rule, what a client says to them cannot be disclosed except the right of confidentiality be waived. Interpreters stand in the same relation as attorneys. The privilege of confidentiality does not at common law extend to confessions made to priests or clergymen; but in several states confessions to them in their professional character are privileged by statute. Communications made to a physician are not as a rule privileged, but in some states confidentiality is recognised by statute. Communications between a husband and wife are privileged from disclosure, on the grounds of public policy and the good order of society. See **LIBEL**.

**Confirmation**, a Latin word which signifies 'strengthening.' In the ancient church, the rite so named was administered immediately after baptism, if the bishop happened to be present at the solemnity; and in the Greek Church it is still made part of the baptismal rite, being administered then by the priest by means of unction with chrism pre consecrated by a bishop. In the Roman Catholic Church, for the last 300 or 400 years, the bishops have interposed a delay of seven years after infant baptism; in the Lutheran Church, the rite is usually delayed for from thirteen to sixteen years; and in the English Church, from fourteen to eighteen years. There is, however, in the latter church no limitation of age, other than such as is indirectly implied by the exaction of a specified amount of religious knowledge as a qualification for the rite. Confirmation may be administered at an earlier period, if a family is about to emigrate; and persons are confirmed up to sixty or seventy, if they choose. The ceremony consists in the imposition of hands by the bishop, accompanied by an invocation of the Holy Ghost as the comforter and strengthener. But both in the Lutheran and in the English Church, the ceremony is made the occasion of requiring from those who have been baptised in infancy, a renewal in their own persons of the baptismal vow made for them by their godfathers and godmothers, who are thereby released from their responsibility. Properly, none can partake of the Lord's Supper, in these churches, unless they have been confirmed. In the Roman Catholic Church, confirmation is held to be one of the seven sacraments, and in its administration chrism and the sign of the cross are used; and instead of the imposition of hands, the person confirmed receives a slight blow on the cheek, to remind him that he must in future suffer affronts for the name of Christ. Catholics usually take a new name at confirmation, which should be the name of some saint whom they choose for their special patron. In the Thirty-nine Articles of the Church of England, confirmation is declared not to be one of the sacraments, and the above ceremonies have been discontinued since the Reformation.

**Confiscation**, in Scottish law, has been applied to the forfeiture of lands or goods to the crown, as part of the punishment for certain crimes, such as murder and treason. But more commonly the word is used in international law to signify the appropriation of goods or ships belonging to a hostile state, or its subjects, generally as a punishment for an attempted breach of blockade. See **ESCHEAT**.

**Conflict of Laws.** On the breaking up of the Roman empire into separate kingdoms, many systems of jurisprudence, more or less dissimilar, arose, and were administered side by side. In these new kingdoms the system of law under which an individual lived depended on his nationality, the Roman and the Goth, though living in the same territory, each being governed by his own system of law. This system of 'personal laws,' as distinguished from territorial laws, held sway till a comparatively late period in European history. When the parties to a case or in any legal relation lived under different personal laws, there arose what was called a 'conflict of laws,' and a body of rules was developed to determine such conflicts. Later, when the basis of jurisdiction in European states became territorial, the elaboration of these rules constituted a new branch of jurisprudence, to which the title of Private International Law has been given. Many of the classical treatises on the subject—e.g. Huber, Story, and Dicey—are entitled the *Conflict of Laws*. Other writers, such as Savigny, Bar, and Foelix, use the term 'Private International Law.' The two terms are now synonymous, both meaning that department of law—rendered necessary by the fact that there are different territorial jurisdictions possessing different laws—which determines in what national jurisdiction an action ought to be brought and by what national law it ought to be decided. See INTERNATIONAL LAW.

**Conformable Strata** are beds which lie parallel to each other, the accumulation of the upper strata having followed the deposition of the underlying beds without any break or prolonged interruption. Conformity thus points to a continuity of the same physical conditions.

**Confraternities.** See BROTHERHOODS and GUILDS.

**Confronté**, in Heraldry, is a term applied to two animals facing or fronting one another.

**Confucius**, the name by which the great Chinese sage is known, is a Latinised form of the Chinese *K'ung Fū-tszé* (孔夫子) or 'the Master K'ung,' K'ung being his clan or family name, and Fū-tszé the denomination applied to him by his disciples after he had become a teacher, and gathered around him a school of ardent and inquiring spirits, to whom he communicated his views on the ancient literature and history of their country, and on the principles of human duty. As a child, he received the *postnomen* Ch'ü, and when grown up he was called *Chung-ni*, marking his place in the household. His birth took place, according to the most authoritative account, in 551 B.C., in the village of Ch'ieh, in the state of Lû, a part of the present province of Shantung.

The K'ung family had migrated to Lû from the dukedom of Sung, and were a branch of the ruling house of Sung. The lineage of Confucius is thus traced through the dukes of Sung to the kings of the Shang or Yin dynasty, and through them again, up among the mists of antiquity, to the sovereign Hwang Ti, whose reign is said to have commenced in 2697 B.C. His father, known to us by the name of Shü Liang-heh, was commandant of Tsâu, and a soldier distinguished for his strength and daring. In his old age he contracted a second marriage with a young lady of the Yen family, and of her was born the sage in 551.

Liang-heh died in the child's third year, leaving his mother and him in straitened circumstances. He has described his own mental growth till he was seventy, when he 'could do whatever his

heart prompted, without transgressing what was right,' and tells us that 'at fifteen his mind was set on learning, and at thirty he stood firm in his convictions.'

At nineteen he married, going for his wife to the Chien-kwan family in his ancestral state of Sung, and in the year after, his son Lî was born. Besides this son Lî, Confucius had two daughters.



Confucius.

(Reduced fac-simile of a rubbing from a marble slab behind his temple at Kio-foo-hien).

About the time of his marriage we find him in humble offices, in charge of the public stores of grain, and of the public herds, performing efficiently his functions, and allowing nothing beyond or higher than them to occupy his attention. In 531 B.C., when he was in his twenty-second year, he commenced in Ch'ueh-lî his career as a teacher. He continued in his native state till 517 B.C., with the exception of a short visit to the capital at Loh, where he is said to have met with Láo-tsze (q.v.). In 517 Lû fell into great disorder. The Duke Cháu being worsted in the struggle, fled to the neighbouring state of Ch'í, and thither Confucius also for a time repaired.

Returning to Lû, he remained there for sixteen more years without being called to any official employment. Duke Cháu died in exile in 510 B.C.; and his younger brother and successor, Duke Ting, in 501 B.C. appointed Confucius governor of the town of Chung-tú, where a marvellous reformation in the manners of the people speedily took place. The next year saw him first minister of works for the state, and next minister of crime. The government was now conducted for three years according to his counsel. 'He strengthened,' we are told, 'the ruling house, and weakened the ministers and chiefs. A transforming government went abroad. Dishonesty and dissoluteness were ashamed, and hid their heads. Loyalty and good faith became the characteristics of the men, and chastity and docility those of the women. Strangers flocked to Lû from other states.' Confucius was the idol of the people.

But this success did not last long. The prosperity of the state awakened the jealousy and fears of its neighbours. The marquis of Ch'í cunningly sent to Duke Ting a present of beautiful courtesans and fine horses, and a breach was made between Confucius and his ruler. His counsels were no longer sought. He determined to leave Lû and visit other states. Accordingly in 497 B.C., when he was now

in his fifty-fifth year, he went forth from Lû, nor did he return to it till 485 or 484 B.C.

During this long period he visited many states, attended always by a company of his disciples. His fame had gone before him, and many of the princes would have received and supported him, but he would not settle where he could not obtain free course in carrying out his principles. Repeatedly he and his companions were in straits, and even in peril of their lives. Once they were assailed by a mob, who mistook him for an officer by whom they had been oppressed. But while the others were alarmed, he calmly said: 'After the death of king Wân, was not the cause of the right way lodged in me? While Heaven does not wish this cause to perish, what can the people of K'wang do for me?' Another time, in somewhat similar circumstances, he said: 'Heaven has produced the virtue that is in me; what can any man do to me?' Such was his belief concerning himself and his mission. He never pretended to be anything more than man, but *he knew the right way*, the way for the individual to perfect himself, and the way for the highest ruler to rule, so as to make men happy and good. One of the princelets through whose territory they passed asked his disciple Tsze-lû how he would describe the Master, and the disciple gave him no reply. When he told the Master of the question, Confucius said: 'Why did you not tell him that I am a man who in his eager pursuit of knowledge forgets his food, and in the joy of its attainment forgets his sorrows, and who does not perceive that old age is coming on!' He was then probably in his sixty-fifth year.

Duke Ting of Lû died in 495 B.C., and was succeeded by his son Duke Ai, who in his tenth year sent a message of recall to the sage in Wei. The ruler and his ministers received him respectfully, but he can hardly be said to have re-entered political life. Only a few more years remained to him, during which he is said to have put the finishing hand to his labours on the ancient writings, and been specially assiduous in the study of the *Yi-king*. He tells us himself that he reformed the music to which the ancient odes were sung, and digested the odes themselves, giving to the pieces in the principal parts of the collection their proper places. He must have occupied himself also with the composition of the only classical work which is assigned to his own pencil—the *Ch'un Ch'ü*, embracing the events in the history of Lû from 722–481 B.C. The latest entry in the work is that in Duke Ai's fourteenth year (481 B.C.). He died on the 11th day of the 4th month in 479 B.C.

In the *Confucian Analects*, or memorabilia compiled soon after his death from the reminiscences of his disciples, we have abundant information of the Master's Sayings and Doings, and they can be added to from the supplements to the *Ch'un Ch'ü*, the *Narratives of the School*, portions of the *Books of Ritual Usages*, and the memoir by Sze-ma Ch'ien. There are other works about him, but all containing more or less of the legendary element, evidently introduced after the Buddhistic literature became known to the Chinese. Of no ancient personage do we have fuller information than we possess of Confucius, and no other can we fashion more completely to ourselves. One whole book of the *Analects* is occupied with his personal characteristics, his deportment, his eating, his dress. It shows him to us at his ruler's court, in his intercourse with his disciples, in his carriage, at his table, in his bed. The disciples tell us that there were four things from which he was free—foregone conclusions, arbitrary determinations, obstinacy, and egoism; that there were four subjects which he avoided in talking with them—extraordinary things, feats of strength, rebellious

disorder, and spirits; that there were four things which he taught them—letters, ethics, leal-heartedness, and truthfulness; that there were three things of which he seldom spoke—profitableness, the appointments (of Heaven), and perfect virtue; and that there were three things in regard to which he thought the greatest caution should be exercised—fasting (as preliminary to sacrifice), (going to) war, and (the treatment of) disease.

It is often said that Confucianism is a system of morality without religion. That he was emphatically a moral teacher is indeed true; and his greatest achievement as such was his formulating the golden rule, 'What you do not wish done to yourself, do not do to others.' He acknowledges in one passage that he himself failed in taking the initiative in obeying it. But this high morality was not without a religious sanction. If it be the requirement of man's nature on a correct analysis, yet that nature is the distinguishing endowment conferred on man by Heaven or God, and obedience to its requirements is obedience to the will of God. The first sentence of the *Chung Yung*, the treatise written by Confucius' grandson, is this: 'What Heaven has conferred is *the Nature*; an accordance with this nature is what is called *the Path*; the regulation of this path is what is called *the Teaching*.'

But how is it that we do not find in the utterances of Confucius the expressions of a fervent piety, and that in his many exhibitions of the character of the *Chun-tsz*, his superior, model, or ideal man, he does not show him to us communing with God, confessing his own unworthiness, and imploring his forgiveness? These defects in his teaching we must admit. The explanation of them lies probably in this, that the direct worship of God was confined in the ancient religion of China, as it still is, to the sovereign as the parent and priest of the people. Speaking of the greatest religious services of the ancient sovereigns, Confucius, as is recorded also by his grandson, delivered the important judgment that in those services, 'in the ceremonies of the sacrifices to heaven and earth, they served God.' He probably thought that it was not for him as a subject to be taking on his lips the Great Name; he was, as he said, merely a 'transmitter and not a maker.'

It has been said that Confucius discountenanced prayer; but the passage referred to in support of the charge is not sufficient to bear it out. Equally reticent and enigmatic were his replies to the well-known question of the same disciple about the services offered to the spirits of the departed, and about death itself. He did not rise to the acknowledgment of the principle enunciated by Lâo-tsz, that kindness is to be returned for injury, and evil overcome with good, but laid down to his disciples the dictum that they should 'recompense injury with justice, and return good for good.' And his own special work, the *Ch'un Ch'ü*, is evasive and deceptive; according to Kung-yang it often 'conceals (the true nature of events) out of regard to the high in rank, to kinship, and to men of worth.' The person in the past to whom he looked back with the greatest reverence was the Duke of Chän, the legislator and consolidator of the dynasty of Chau (died 1105 B.C.).

He died lamenting the failure of his life; but he was hardly gone when his merit began to be acknowledged. Duke Ai, who had been unable to follow his counsels, caused a temple to be built, where sacrifices, or offerings, should be presented to the sage from generation to generation. In one aspect of it, the brief reign of Shih Hwang-ti, the first imperial sovereign of China, was a contest between him and Confucius, in which the latter prevailed. The first emperor of the Han dynasty,

in 197 B.C., in passing through Lû presented to him 'a great offering.' Succeeding dynasties did honour to him by titles and offerings; and by none was this done so much as by the Manchû-Tatar dynasty, intending thereby, it is believed, to reconcile the Chinese people to their sway. The Khang-hsi emperor, the greatest of its monarchs, after visiting his temple, and presenting the offerings, prostrated himself three times before the sage's image, bowing his head each time thrice to the ground. The law requires that there shall be a temple to Confucius in every prefecture, sub-prefecture, district, and market-town in the empire. These temples are not to Confucius alone. They are not *pantheons*, for he has never been deified; but the worship paid to him in them is extended to several of his disciples and a crowd of his most distinguished followers, amounting to more than one hundred and fifty names in all, selected from the literati and officers in all the course of time.

Twice a year, on a certain fixed day, the emperor went to the imperial college in Peking, and did homage to Confucius. The words of the principal prayer or address on the occasion were the following: 'On this month of this year, I, the emperor, offer sacrifice to the philosopher K'ung, the ancient Teacher, the Perfect Sage, and say, O Teacher, in virtue equal to heaven and earth, whose doctrines embrace both time past and present, thou didst digest and transmit the six classics, and didst hand down lessons for all generations! Now in the second month of spring (or autumn), in reverent observance of the old statutes, with victims, silks, spirits, and fruits, I offer sacrifice to thee. With thee are associated the philosopher Yen, Continuator of thee; the philosopher Ts'ang, Exhibitor of thy fundamental principles; the philosopher Tsze-sze, Transmitter of thee; and the philosopher M'ang, second to thee. Mayest thou enjoy the offerings!' Confucius' descendants are many. His lineal representative has the title of *k'ung* or duke, and large landed property. Under the republic it was decided that Confucianism should be the basis of national ethical teaching.

See *Mémoires concernant l'Histoire et les Sciences des Chinois* (Paris, 1776-1814); Legge's *Chinese Classics*, vol. i. (1861), and *Confucius' Life and Teaching* (6th ed. 1887); Plath's *Confucius und seine Schüler* (1867); Alexander's *Confucius the Great Teacher* (1891); and Giles's *Confucianism and its Rivals* (1915).

**Congé d'élire** (Norman-French), the name given in England to the king's warrant or permission to a dean and chapter to proceed to the election of a bishop to a vacant see. Since the act of Henry VIII. in 1534, the *congé d'élire* has always been accompanied by a letter-missive from the sovereign, mentioning the person to be elected by name, so that in reality it is a nomination by the crown. If the dean and chapter delay the election beyond twelve days, the nomination is effected by letters-patent from the crown; if they delay beyond twenty days, or elect another than the person named, they incur the penalties of a *Præmunare* (q.v.). See BISHOP.

**Conger**, or CONGER-EEL, a marine bony fish in the eel family (Murænidæ). The body is eel-like, without pelvic fins, with a continuous dorsal fin beginning very far forward, and without scales. The length varies from 3 to 6 feet, or even more; the colour is dark gray or bluish above, whitish below; the mouth is wide; the tongue free; the teeth in rows, one closely packed series forming a sharp edge. Four species occur widely distributed in temperate and tropical seas. *Conger vulgaris* is common on the British coasts, especially off Cornwall. Giant specimens, 10 feet in length, 18 inches in girth, over 100 lb. in weight, are recorded; and

even ordinary specimens left aground among the rocks, or landed unexpectedly on board a boat, are awkward customers to deal with. They are very muscular and voracious fishes, feeding on comparatively large prey, and have remarkably strong biting powers. They often rotate rapidly on their



Conger-eel.

own axis, and have a certain degree of grasping power with their tails. The colour seems to vary with habitat, since those from rocks are blacker than those from sand-banks. They occur from the shore down to about 50 fathoms, and are extremely prolific. The flesh is coarse, but is often enough eaten. What is called turtle soup is believed to be often made mainly of conger-eel.

**Congested Districts Board.** See CROFTER.

**Congestion** may be defined to be excess of blood in the vessels of a part, and is to be regarded not as an independent disease, except in a very small proportion of cases, but as one stage or one manifestation of some other disease. It is, however, of such importance and of so frequent occurrence as to require a separate notice. Congestions are divided into two groups—viz. *active*, due to dilatation of the arteries of the affected part; and *passive*, due to some cause interfering with the return of blood by the veins. In active congestion the flow of blood is usually increased, and the excess is chiefly in the arteries. Familiar instances are the phenomenon of Blushing (q.v.) and the effect of heat, especially moist heat, in increasing the redness of any part to which it may be applied. But the most important active congestions are those which occur in connection with Inflammation (q.v.), of which they constitute the first stage. In passive congestion the flow of blood is always diminished, and the excess is chiefly in the veins. It may be due either to direct obstruction to the return of blood through the veins, or to general enfeeblement of the circulation.

*Congestion from venous obstruction* is easily illustrated by tying up the arm, as is done before opening a vein, when the veins are compressed more than the arteries. If the ligature is kept on for a sufficient time, the veins swell, the fingers become red, and then livid, and the whole limb is swollen. Cold applied to the surface of the body acts similarly on it, and contracts the veins more rapidly than the arteries, which lie deeper; and the purple colour of the hands and face after exposure to cold shows the congested state of the capillaries. Congestions, with stagnation of the blood, are caused in internal organs by an obstruction of the veins leading from them. Thus, congestion of the brain may be produced by a tight cravat or by a tumour pressing on the jugular veins. Efforts of straining, coughing, holding the breath, and asthmatic paroxysms which impede the flow of

blood through the lungs, cause congestion in various parts. Tubercles in the lungs cause congestion of that organ. Obstruction to the transit of blood through the liver causes congestion in the abdomen, hemorrhoids, &c.

*Congestion from weakness of the circulation* includes a numerous class of cases. Here gravitation comes into play very much more forcibly than in the healthy body in determining the distribution of the blood to different parts and organs, though it always produces some effect. Diseases of the valves of the heart are almost always accompanied by congestion of other internal organs at some stage of their progress. In extreme debility, certain fevers, &c., there is general congestion of the parenchymatous organs—the lungs, liver, &c.—and the blood gravitates to the lowest parts, giving rise to what is termed *hypostatic* congestion of the posterior parts of the lungs, the skin of the back, &c. In other cases the effect is more local, as when the feet swell after long standing, in consequence of over-distension of the veins. Congestive affections of this kind are often mistaken for inflammation.

Active congestion, when it requires treatment, must be dealt with in the same manner as inflammation. With regard to passive congestion, the end to which treatment must be directed is the removal of its cause. This can be effected in some cases by measures having a local effect, either completely, as by the loosening of a ligature, the disuse of too tight articles of clothing, or by the removal of a tumour compressing veins, or partially, as by elevation of the head in affected brain, and the recumbent position in congestion of the hemorrhoidal or uterine vessels. Uniform gentle pressure, by supporting the weak vessels, and friction, by increasing the onward movement of the blood in the veins, are often of great use in superficial parts. Similarly the application of astringents, such as adrenal extract, greatly diminishes congestion in parts for which it can be used. Where the heart-power is at fault, strengthening remedies must be given—ammonia, strychnine, digitalis, &c. The American Witch-hazel (q.v.) when administered internally seems to have the power of diminishing the size of dilated veins, and is sometimes useful in varicose veins, hemorrhoids, &c. Various remedies are supposed to have a special power of removing the congestion of certain organs; thus, mercurials are recommended for congestion of the liver; digitalis for congestion of the kidneys; menthol, benzoin, and the balsams for bronchial congestion.

**Congleton**, an ancient municipal borough in the east of Cheshire, picturesquely situated in a deep valley on the banks of the Dane, an affluent of the Weaver, 26 miles S of Manchester. It has a handsome town-hall (1864), manufactures of silk, and neighbouring coal-mines. Pop. 13,000. See book by R. Head (1887).

**Conglomerate**, or **PLUMPUDDING-STONE**, a rock consisting of various-sized, round, water-worn stones cemented together, the binding material being generally of a calcareous, siliceous, or ferruginous character. Now and again the stones are held together by simple compression without any cement. Conglomerate is evidently gravel compacted into a more or less coherent mass. Like coarse gravel and shingle, some conglomerates are very tumultuous in appearance, and show no lines or planes of deposition. Generally, however, rocks of this kind exhibit rudely alternating layers of finer and coarser materials. The included stones may consist of any kind of rock or mineral, but the harder species, such as quartz-rock and quartz, are apt to preponderate. Conglomerates are generally

beach-deposits, either marine or lacustrine; sometimes they are of fluvial origin.

**Congo**, the great equatorial river of Central Africa, has its reservoir in Lake Bangweolo, of which the Chambezi is the largest feeder. From Bangweolo the great river issues under the name of the Luapula; and turning in a northerly direction, it expands into Lake Moero, on leaving which it is called, as far as Nyangwe, the Lualaba. Its length has been calculated variously at a little under and a little over 3000 miles, it drains an area of more than 1,300,000 sq. m., and it discharges a body of water into the ocean second only to the Amazon. The two largest tributaries of the Congo are the Kasai S., and the Mobangi N. The lower river extends from the Banana mouth to the first rapids, 110 miles, navigable for steamers drawing 18 feet. The middle or cataract region extends from Vivi to Stanley Pool, 235 miles. The upper river from Stanley Pool to Stanley Falls, 1068 miles, is navigable for steamers drawing 4 feet, besides over 3000 miles of navigable tributaries. A railway of 250 miles, running some 20 miles south of the river, connects Matadi with Stanley Pool. The river, whose mouth was discovered in 1482 by Diogo Cam, was known to the Portuguese as the Zaïre. In 1818 Tuckey explored 118 miles. In 1867-71 Livingstone discovered the Luapula and Lualaba, which he supposed to be the head-waters of the Nile, but which, by following the course to the sea in 1876-77, Stanley proved to be the upper Congo.

**FRENCH CONGO**, officially French Equatorial Africa, lies between Cameroon and Belgian Congo, the Congo and the Ubangi being the south-eastern boundary, and to the N., beyond Lake Chad and the Bahr-el-Ghazal, includes Kanem, Tibbu, Borku, Ennedi, and Tibesti. It falls into four 'colonies': Gabun, capital Libreville; Middle-Congo, capital Brazzaville; Ubangi-Shari, capital Bangui; and Chad. Area (with territories ceded to Germany in 1911, recovered 1919), 1,000,000 sq. m.; pop. 3,000,000.

**BELGIAN CONGO**, from being a trading association founded by Stanley and Leopold II. of Belgium, was recognised as the Congo Free State by the European powers in conference at Berlin in 1885. It contains an area estimated at 900,000 sq. m., and lies between French Congo (NW.), Portuguese West Africa (SW.), Rhodesia (S. and SE.), Tanganyika territory and Uganda (E.), Anglo-Egyptian Sudan (NE.). It has a coast-line of only about 35 miles north of the mouth of the Congo River. The country is drained almost exclusively by the Congo and its many tributaries. In the east it touches Lakes Bangweolo, Moero, Tanganyika, and Edward; while wholly within its borders are Kivu, as well as Lake Leopold II. discharging into the Mfiri, numerous lakes connected with the river Lualaba, and others. On the whole, the country is not mountainous, but forms a depressed and inclined plateau, rising round its rim to heights of about 6000 feet, and on its eastern border touching much higher elevations on the flanks of the Ruwenzori and Mfumbiro ranges. In the west, where the Congo escapes from the depression, the escarpment of the plateau is cut back to Livingstone Falls. Much of the surface of Belgian Congo is composed of savannas and arable lands, but more is under dense and dark forest, in which rubber-trees are abundant, and many strange forms of animal life are found. Gold, diamonds, copper, tin, and other minerals occur. The people are varied in race, but (except in the NE.) are generally Bantu in speech. In several regions pygmy tribes inhabit the forests. The government is centred at Brussels, and a governor-general administers the territories. Kinshasa was selected in 1921 to supersede Boma as capital. Ruanda and Urundi, from German

East Africa, are held by League of Nations mandate. The chief products are rubber, palm-nuts and oils, copal, cocoa, ivory, coffee, gold, copper, diamonds, and tobacco, while the country is the world's chief source of radium and cobalt. The bulk of the trade is with Belgium. The ports are Banana, at the mouth of the Congo; and Boma, 60 miles up. Where the navigation of the Congo is stopped by falls and rapids, railways have been built. Thus the line from Kabalo on the Congo to Albertville on Lake Tanganyika (1915) and the Ujiji-Dar-es-Salaam line enable one to cross Africa by rail and steamer. The Cape to Cairo line enters Katanga province from the south, and reaches the Congo at Bukama (1918); its northward continuation is probable. Lines connecting Katanga with Boma and with Lobito Bay (Portuguese West Africa) are under construction. Pop. about 8,500,000 (8000 Europeans).

**THE CONGO QUESTION.**—In 1885, before the signature of the Berlin Act, a treaty had been concluded between King Leopold and the United States, in which the flag of the Congo State was recognised, though no boundaries were named. But the American Government was not a signatory of the Berlin Act itself. The British treaty, also signed before the United Kingdom joined in the collective action of the Powers, was couched in somewhat similar terms. Great Britain and the United States were specially responsible for the conversion of a private philanthropic enterprise into that which was intended by Europe to form a model tropical State. While King Leopold was wont to point to American action as first in date, Great Britain made possible the foundation of the Leopoldian dominion by waiving her own earlier treaties with the native chiefs of the upper valley, and using her influence to obtain the renunciation by Portugal of the sovereignty of those coast territories to which a Portuguese claim had been recognised.

When, about 1890, secrecy succeeded publicity in Congolese affairs, the writings of some Englishmen who accompanied the Congo troops in war, as well as of Swedish, American, and British missionaries labouring in the Congo region, caused much alarm among the earlier friends of King Leopold's enterprise. Those originally associated by the King of the Belgians with his Committee of Exploration had included representatives of English commercial and missionary bodies. Sir John Kennaway, for example, had been present at the first meeting of the Comité d'Études du Haut Congo, and he lived to express, as father of the House of Commons, the consternation with which the history of the Congo filled those who had placed in it their hopes for the future of the African native races. For many years, however, while decrees confiscating the natural products of the soil, and giving official sanction to forced labour, were concealed, the reports of atrocious cruelty were fiercely contradicted by the rulers of the State.

Since 1909 there has been little difference of opinion as to the character of the late King Leopold's system. Those among his co-religionists who at one time were inclined to ascribe to Protestant prejudice accounts of cruelties thought to be exaggerated, yielded, in 1910, to the general view. Under acceptance of responsibility by the Belgian Parliament, it is not necessary to reopen the closed pages of Congo history, except for the purpose of noting the fatal blot in the economic system established by decrees, leading as it did to the reversal of the conditions laid down in the treaties and in the Berlin Act, and making reform difficult. The State was founded in the name of God for the regeneration of the native races inhabiting the largest river system of Central Africa.

The contention of Congo reformers, afterwards accepted by Belgian statesmen long at variance with them, was that there could be no future for a rule based on the forcible collection, under rigid monopoly, of the whole produce of the soil.

The Belgian decree which formed the basis for improved government in the Congo Colony bore date 22d March 1910. Nominally accepting the substance of the demand of the British Government and of Belgian reformers representing nearly half of the Belgian Chambers, by reversing the State monopoly on which the Leopoldian system had been based, the decree admitted the right to trade in the natural products of the soil, including rubber. The exceptions and the reservations were considerable, and it was first doubtful whether much had been gained. Pressure of opinion was continued and the position of the Belgian ministry, attacked by M. Vandervelde, with the support of most Belgian Liberals, forced further concession from their moral weakness. The companies with whom King Leopold had financial arrangements ousting the native inhabitants of all the rights, had in some cases exhausted the territories they misgoverned, and in others could look forward only to a few years of continued profitable exaction. As a consequence the Colonial Minister announced that the territory of the Congo would be thrown open to European competition in steps extending over a few years from the date of commencement in July 1910.

Both as to the political and economic situation, the prospect had by the end of the year become more favourable than it had been before or immediately after the issue of the 1910 decree. The harm, however, that had been wrought by the hostage and sentry system involved in the collection of rubber for the State could not be easily undone. To the remonstrances of Great Britain and of the United States the Belgian Colonial Office had replied by a partial repudiation of responsibility, expressed in Brussels by language in the nature of 'hands off.' Recognition, too lightly given to Belgian annexation of the new colony by Germany and France, was long delayed by the British and American Governments on the ground that treaty obligations, although not denounced, were far from having been fulfilled. Apart from general sympathy with the oppressed, the definite responsibilities incurred by the two Governments, and in a less degree by all the Powers, in 1885, justified, as they had inevitably produced, this diplomatic pressure.

In the decree of 1910 there had been no security against the grant of fresh monopoly and no guarantee for the distant future. While the treaty of transfer remained in force and bound Belgium to continue the agreements of King Leopold with his *compagnies concessionnaires*, yet, by her treaty with Great Britain, Belgium had no right to close any part of Congo territory for a single day. However grudging the admission of previous breach of treaty and of the Berlin Act, the announcement that the whole country was to be thrown open disposed opinion in America and England to hope for the continuation of improvement. After a period of incredible horror, the promise of the abolition of forced labour for revenue purposes, and ultimate restoration of freedom of commerce, was widely accepted as a declaration of intention to mitigate abuse as rapidly as possible.

In 1910 the railway from South Africa crossed the Congo frontier and reached the heart of the newly discovered mining territory of the Katanga Province. The inflow of white settlers proclaimed the end of monopoly in the south-western portions of the Congo territory; and the Union Government of South Africa came upon the scene as assailants of monopoly, though not as champions of the native. It was soon the accepted belief abroad that

the opening of the sealed State was likely to aid the restoration to the native population of its economic rights, while the high pay necessarily given to attract labour to the less populous districts seemed certain further to discourage the old methods of oppression in those provinces from which labour would be drawn. In large parts of the territory, well watched by the consular representatives of Great Britain and the United States, pressure upon the natives was relaxed; and favourable reports reconciled many of the severest critics.

See Fox-Bourne, *Civilisation in CongoLand* (1903); several works by Mr E. D. Morel, such as *Red Rubber*; *Great Britain and the Congo* (1909); A. B. Keith, *The Belgian Congo and the Berlin Act* (1919); publications of the Congo Reform Association, which contain an important despatch from the Government of the United States, the famous Report to the British Government by their agent Roger Casement, and the more important Belgian official papers; and Blue-books.

**Congregation** (Lat. *con*, 'together'; *grex*, 'a flock'), an assembly, generally a religious assembly; in its most ordinary use, an assembly of Christians met in one place for worship (see CHURCH).—In the Roman Catholic Church, it often designates a sort of board of cardinals, prelates, and divines, to which is intrusted the management of some important branch of the affairs of the church. Thus the *Congregation of the Index* examines books and decides on their fitness for general perusal (see INDEX). The *Congregation de Propaganda Fide* is instituted for the propagation of the Roman Catholic faith and the government of the church in non-Catholic countries (see PROPAGANDA). The *Congregation of Relics* inquires into the genuineness of supposed relics. The *Congregation of the Holy Office* takes cognisance of heresies, &c. (see INQUISITION). The *Congregation of Rites* regulates the festivals and offices of new saints. There are numerous other congregations. The word is also used in the Church of Rome to describe communities of ecclesiastics who live together under rule, but without being bound by vow, or at least by solemn vow. Such are the *Congregation of the Oratory*, the *Congregation of the most Holy Redeemer*, usually called Redemptorists, &c.

**Congregationalists.** See INDEPENDENTS.

**Congress**, an assembly either of sovereign princes, or of the delegated representatives of sovereign states, for the purpose of considering matters of international interest. Even in America, though the term has now a different meaning, it had a similar origin, the first congress being that of the delegates from the various British colonies, who met on the 7th October 1765, for the purpose of considering their grievances. Previous to signing a treaty of peace, a meeting of plenipotentiaries usually takes place, to which the name of a congress is sometimes applied, though it seems more properly to be reserved for those more important meetings at which extensive schemes of future policy are determined on, and the balance of power amongst the various European states readjusted. To this class belonged the famous Congress of Vienna in 1815; that of Carlsbad in 1819, for regulating the affairs of Germany; that of Paris at the end of the Russian war of 1854-56; that at Berlin after the Russo-Turkish war of 1877-78; and the conference on Morocco at Algeiras in 1906. There is scarcely any difference between a congress and a diplomatic Conference (q.v.).

**Congress of the United States.** The legislative body of the United States is called the Congress of the United States, and consists of a senate, elected by the legislatures of the several states, and a House of Representatives, elected by the

direct votes of the people. It is supreme within its constitutional limits, deriving its powers directly from the people. By constitutional provision congress has certain direct, express powers, and such implied powers as are necessary to carry these into effect. It convenes at least once in each year (on the first Monday in December), and receives the president's annual message, giving information of the state of the Union, and suggesting desirable legislation. The president may call it into extra session at other dates for special legislation.

**Express Powers.**—Congress has power to impose and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defence and general welfare of the United States. This grant of sovereign power is independent of state control, and is limited only by the provision in the constitution that the duties, imposts, and excises shall be uniform throughout. See INCOME-TAX.

Congress has power to borrow money on the credit of the United States, to regulate commerce with foreign nations, and among the several states and with the Indian tribes. It has the exclusive power to establish a uniform rule of naturalisation, and uniform laws on the subject of bankruptcies throughout the United States; to coin money, regulate the value thereof and of foreign coin, and fix the standard of weights and measures; to provide for the punishment of counterfeiting the securities and current coin of the United States; and to establish post-offices and post-roads. Congress has power to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries; to constitute tribunals inferior to the Supreme Court; to define and punish piracies and felonies committed on the high seas, and offences against the law of nations.

Congress alone has power to declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water. It can raise and support armies, may provide and maintain a navy, and make rules for the government of the land and naval forces. Congress has power to provide for calling forth the militia of the several states for the purpose of executing the United States laws, to suppress insurrections, and repel invasions, and to provide for organising, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States; reserving to the states respectively the appointment of the officers, and the authority of training the militia, according to the discipline prescribed by congress.

Congress exercises exclusive legislative control in all cases whatsoever over the District of Columbia (the seat of government of the United States), and over all places purchased for the erection of forts, magazines, arsenals, dockyards, and other needful buildings. Congress has power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States, and to make all laws which shall be necessary and proper for carrying into execution all powers vested by the constitution in the government of the United States, or in any department or offices thereof.

**Constitutional Limitations.**—Congress cannot pass a bill of attainder or any *ex post facto* law. Neither can it lay any tax or duty upon articles exported from any state, or give preference to the ports of one state over those of another, by any regulation of commerce or revenue; nor can it compel vessels bound to or from one state to enter, clear, or pay duties in another. It cannot enact a law taking from the citizen his private property for public use without compensation therefor.

Congress cannot make any law respecting an

establishment of religion, or prohibiting the free exercise thereof, or abridging the freedom of speech or of the press, or denying the right of the people peaceably to assemble, and to petition the government for a redress of grievances. Congress cannot enact any law that will render the people insecure in their persons, houses, papers, and effects from unreasonable searches and seizures; or authorise any warrants to issue but upon probable cause supported by oath or affirmation, particularly describing the place to be searched, and the persons or things to be seized. Congress has no power to take from a person accused of crime his right to a speedy and public trial, by an impartial jury of the state or district wherein the crime was committed; or his right to be informed of the nature and cause of the accusation, to be confronted with the witnesses against him, and to have compulsory process for obtaining witnesses in his favour; or his right to be defended by counsel. It cannot enact a law requiring excessive bail, imposing excessive fines, or inflicting cruel and unusual punishments.

*Senate.*—The senate is composed of two senators from each state, formerly chosen by the legislature thereof, but since 1913 by direct popular vote, for a term of six years, so arranged that one-third of all the senators shall go out every two years. No person is eligible for the office of senator unless he is thirty years of age, has been a citizen of the United States nine years, and is an inhabitant of the state for which he is chosen. The senate is presided over by the vice-president of the United States, but in case that officer is acting president of the United States, or is unable to preside, the senate elects a presiding officer *pro tempore*. It chooses all its other officers. The senate has the sole power to try impeachments presented by the House of Representatives, and when sitting in that capacity the senators are sworn or affirmed. Should the president of the United States be on trial, the chief-justice of the Supreme Court of the United States presides. For conviction in impeachments concurrence of two-thirds of the senate is necessary; and judgment cannot extend beyond removal from office and disqualification to hold any office of honour, trust, or profit under the United States.

*House of Representatives.*—The House of Representatives is composed of members chosen every second year by the people of the several states. It elects a Speaker to preside over its deliberations, and all its other officers. No person can be a representative in congress who has not attained the age of twenty-five years and been seven years a citizen of the United States, and he must be an inhabitant of the state in which he is chosen.

The representatives are apportioned among the several states according to the number of their inhabitants respectively, counting the whole number of persons in each state, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for president and vice-president of the United States, representatives in congress, the executive and judicial officers of a state, or the members of the legislature thereof, is denied to citizens of the United States, being twenty-one years of age, or is in any way abridged, except for participation in rebellion or other crime, by constitutional provision the basis of representation is proportionally reduced. The first article of the United States Constitution provides that there shall not be more than one representative to every 30,000 inhabitants, but the increase of population necessitated an increase in the unit of representation, to prevent the house becoming unwieldy, and the apportionment after the census of 1910 gave 210,415 inhabitants as the unit, or 435 members in all. Each organised territory sends one delegate to the House of Representatives, who may debate,

but cannot vote. The nineteenth amendment to the Constitution (1920) admitted women to the national franchise on the same terms as men. Already in some states the right had been conceded for presidential and vice-presidential elections.

The House of Representatives has the sole power of impeachment of the executive and judicial officers of the United States, and must present the charges on which it rests to the senate for trial. Each house is judge of the elections, returns, and qualifications of its own members, and a majority constitute a quorum; but a less number may adjourn from day to day, and may be authorised to compel the attendance of absent members.

Each house determines the rules of its own procedure, and may punish its members for disorderly behaviour, and also may compel the attendance of witnesses before its committees, and inflict punishment for contempt of its authority.

Each house must keep a journal of its proceedings, and must publish the same (excepting such parts as may in their judgment require secrecy), and at the desire of one-fifth of the members present, the yeas and nays of the members voting on any question must be entered on the journal. But neither house, during the session of congress, without the consent of the other, can adjourn for more than three days, nor to any other place than that in which the two houses shall be sitting.

No senator or representative may be appointed to any civil office under the authority of the United States which shall have been created during the time for which he was elected, and no person holding any office under the United States can, during his continuance in office, be a member of either house of congress.

Members of congress are privileged from arrest, except for treason, felony, and breach of the peace, during their attendance upon their public duties.

Two-thirds of the senators present must concur in any treaty which may be made, and in all appointments by the president of ambassadors, or other public ministers and consuls, judges of the Supreme Court of the United States, and such other officers whose appointments are not otherwise provided for.

By the amendments to the Constitution abolishing slavery, guaranteeing civil rights, asserting the validity of the public debt, forbidding the denial or abridgment of the United States citizen's right to vote on account of race, colour, previous condition of servitude, or sex, and prohibiting the manufacture, sale, import, or export of intoxicating liquors, congress is empowered to enforce these provisions by legislation.

When any person, having taken an oath to support the constitution of the United States, as an executive or judicial officer of the United States or of any state, or as a member of congress or state legislature, is, by article xiv. of the United States constitution, ineligible to the position of senator or representative, or elector of president and vice-president of the United States, or to any office, civil or military, under the government of the United States, from having engaged in insurrection or rebellion against the same, congress is empowered to remove this disability by a two-thirds vote of both houses.

ACTS OF CONGRESS are the legislative enactments of the two houses of congress. Bills may originate in either house (except bills for raising revenue, which must originate in the House of Representatives), and be introduced by any member, and may be amended in either house. They are usually referred to the appropriate standing committee for examination and report; and are read a first, second, and third time before being put upon their final passage, being subject to modification or amendment and discussion, according to the rules in each house.

After a bill has been passed by both houses, it is presented to the president of the United States for his approval and signature. If he approves and signs it, it becomes a law. If he does not approve it, the president returns it, with his objections, to the house in which it originated; and that house must enter his objections at large upon its journal, and proceed to reconsider it. If after reconsideration it is passed by a two-thirds vote, it is sent to the other house with the president's objections, by which it shall likewise be reconsidered, and if approved by two-thirds of that house, it becomes a law; the vote in both houses must be taken by yeas and nays, and the names of the voters for or against are entered upon the journal of each house respectively. If the bill is not returned by the president within ten days (Sundays excepted), it becomes a law in the same manner as if he had signed it, unless congress by adjournment prevents its return, in which case it does not become a law.

Every order, resolution, or vote to which the concurrence of both houses is necessary (except adjournment) must likewise be presented to the president after passage, and in case of his disapproval (or veto) must be repassed by a two-thirds vote in the same manner as bills, in order to become a law notwithstanding his objections.

The sessions of congress usually continue during several months, but congress can adjourn at any time by the concurrence of a majority of both houses. If, however, congress adjourns without passing the appropriation bills necessary for the expenses of government, a special session of congress may be called by the president of the United States. Each congress ends on 4th March, every second year, at noon. See books by Moore (1895), Bryce (1910), and President Wilson (1914).

**Congreve, RICHARD**, Positivist, born at Leamington, Sept. 4, 1818, and educated under Arnold at Rugby, became a scholar, fellow, and tutor of Wadham College, Oxford, but resigned after having become definitively a disciple of Comte. He died 5th July 1899. In 1855 he published a good edition of Aristotle's *Politics*. Later works are *Lectures on the Roman Empire of the West* (1855); *Elizabeth of England* (1862); *The Catechism of Positivist Religion* (1858); *Essays: Political, Social, and Religious* (1874); besides many propagandist sermons and addresses. He died 5th July 1899.

**Congreve, WILLIAM**, the greatest master of the English comedy of repartee, as distinguished from the humoristic or Jonsonian comedy which it replaced, was born at Bardsey, near Leeds, and baptised on February 10, 1669 (1670). As a school-boy he was educated at Kilkenny, and as an undergraduate at Trinity College, Dublin. And if this does really make an English gentleman an Irish one, as certain writers learned in 'racial mixings' have generously assumed, Congreve's genius may be taken as another proof that English wit, like English poetry, is the outcome of that mysterious 'Celtic element,' or breath of the 'Celtic Titan' discovered by Matthew Arnold. After the completion of his education, Congreve returned to England, and began life in London, where, like Wycherley, and, indeed, like many another man of letters, he entered upon the study of the law—an arid study, as is generally supposed, for a wit, and yet one which (being the study of the practical logic of life) does more than any other, it has been said, to solidify and strengthen the disparate forces of the intellect in whatsoever field those forces may afterwards come to be exercised. Entered at the Middle Temple, but finding, as Leigh Hunt says, that 'having family as well as wit and scholarship,' he could 'make way in life without a profession,' Congreve invaded very early the literary arena

where 'family and wit and scholarship' were in those old days of more account than would now seem possible. His first publication was *Incognita, or Love and Duty Reconciled*, a novel of cross-purposes and disguises, based partly on reminiscences of the method of Shakespeare's fancy-plays, and partly on reminiscences of a very different dramatic method, that of the new prose comedy which, invented by Etherege, had been very greatly strengthened by Wycherley. When Dr Johnson said of this novel that he 'would rather praise it than read it,' he spoke with his usual sagacity—indeed, he may be said to have marked out a course of criticism which has found high favour among succeeding critics of fiction—a course which is, no doubt, as wise as amiable in regard to nine novels out of any given ten. But whether the tenth, the novel to be read as well as praised, should properly be *Rasselas* or *Incognita* seems to depend, now as then, on the temper and the constitution of the praiser. If *Rasselas* is the more instructive, *Incognita* is the more amusing. For though to laugh with the author is difficult, to laugh at him is easy enough, and laughter is certainly good. Congreve's novel is rich in 'cultismo' of that highly ornate kind which has at intervals illuminated modern literature from Góngora to Dr Chivers. Such a passage as that in which Congreve talks about his heroine's employing one of Cupid's pen-feathers 'to pick her teeth' would have satisfied even such masters of style as the author of *Polyphemus* and the author of *Eonuchs of Ruby*.

That a story so full of that silly mock-sentiment then in vogue—stuff which would now make even school-girls laugh—should have been written by the great wit and humorist of *Love for Love*—that the story should have had a very great success among those same cynical beaux and brazen belles who were in the habit of sitting out *She Would if She Could* and the *Country Wife*—would be incredible did we not remember the still more astonishing fact that the love-passion—the passion which Shakespeare and Ford and the rest of the Shakespearians had delineated so powerfully—was, judging from the literature of Congreve's time, wiped out as by a sponge from the English character. It is not enough to say that as soon as the wits of the coffee-houses attempted to touch the love-passion their sense of humour straightway fled: their common sense fled too; they became idiots, positive idiots. As far as date of publication goes, Congreve's novel was followed by his translation of the eleventh satire of Juvenal. This appeared in Dryden's *Juvenal and Persius*, dated 1693, but actually published in 1692. From Dryden, to whom he had been introduced it is said by Southerne, Congreve received unvarying kindness—kindness which was answered by unvarying gratitude, or rather by that generosity of recognition among fine spirits—the sublimation of gratitude—which is said to be undreamed of by smaller souls. In January 1693 appeared Congreve's comedy the *Old Bachelor*, under the auspices of Dryden—'then as now a living and immortal witness to the falsehood of the vulgar charge which taxes the greater among the poets with jealousy or envy, the natural badge and brand of the smallest that would claim a place among their kind.' But if Dryden was free from envy, the disease which, according to the above skilful diagnosis by Swinburne, afflicts poetasters and criticasters alone, not less free from this literary leprosy was Congreve himself. This is what makes him, notwithstanding his rank-worship, so interesting as a personality; this is what also makes the other comic dramatists Etherege and Vanbrugh interesting, so interesting, that we would fain, if we dared, condone even such sins against the sanctities of art as theirs; they

were free from the disease which it seems feeds the lower slopes of Parnassus with poisonous air. No three writers were ever more generally beloved—none were ever beloved more deservedly than these. And even Wycherley—he whose literary sins were the most grievous of all—was, on account of his fine social qualities, called ‘Manly Wycherley.’ That a corrupt court should have spoiled such men as these is, among all the heavy impeachments of the Restoration, the heaviest.

Congreve's freedom from the fussy egotism of the literator served him in good stead in regard to the *Old Bachelor*. Dryden, while declaring that he ‘never saw such a first play in his life,’ hinted at the same time that a great deal of skilful manipulation was required before it could be safely placed upon the boards. And he and Southerne and Maynwaring, who set about manipulating it, seem to have had from Congreve *carte blanche* to do with it as they liked. The brilliant success of the *Old Bachelor*—a play whose merits were of entirely a literary kind—is evidence of the enormous change that has come over play-goers since those days. Congreve's second comedy, the *Double Dealer*, which appeared in the November of 1693, was more firmly knit, and in every way stronger than the *Old Bachelor*, but the satire on the morals of the time—especially on the meanness and heartless treachery in sexual relations which had become the fashion of the court, was administered in too serious a temper to please an audience composed largely of the very people satirised. The empty-headed beaux and callous women who went to the theatre went there to be amused, not to be sermonised. But besides this repellent quality, the play suffered from a want of dramatic illusion greater in a certain sense than even the *Old Bachelor* had displayed. An audience can scarcely be interested in the doings of a villain who every few minutes comes to the footlights in order to assure them what a consummate villain he is, and on what admirable psychological principles his creator has fashioned him, nor yet in a hero who lets a villain do what he will in order that the dramatist's plot may be conveniently worked out. In stage-craft Congreve was always weaker than Vanbrugh and Wycherley, but the weakness made itself specially conspicuous here.

It was to this play that was prefixed Dryden's famous verses ‘To my dear friend, Mr Congreve,’ verses whose generosity passes into pathos. Congreve's next publication was the *Mourning Muse of Alexis*, a poetic dialogue upon the subject of Queen Mary's death, as full of artificial conceits as his novel. *Love for Love*, the finest prose comedy in the English language, finished in 1694, was produced at the ‘theatre in Little Lincolns Inn Fields’ in 1695. It has an abandonment of humour, an irresistible rush of sparkling merriment, such as Congreve's previous plays had not promised. In judging of its qualities we must not forget that in comedy as in tragedy—in prose as in verse—nothing is really informed by artistic vitality which lacks the rhythmic rush born of creative enjoyment. To him who is really and truly organised to write, whether in verse or in prose, there is always in the genuine exercise of his faculty a sense of sport as delightful as it is deep, an exhilaration that cannot be simulated and that cannot be supplied to the nervous system of the true writing man by any other stimulant. Not all the *Paradis artificiels* summoned up by the geni of Opium, Hashish, or Alcohol, can compete with the true paradise which the Genius of the Inkhorn throws open to the born literator when the impulse is really upon him. And as surely as the hilarity of artistic creation is seen in Aristophanes, in Lucian, in Rabelais, in Shakespeare, in Swift, in Dickens, is it seen in Congreve's *Love for Love*. No wonder then that of

all his plays it was the last to be banished from the stage. So late as 1842 Macready revived it (modified of course) at Drury Lane, and this was followed by still later revivals, the last of all being a version of the play in three acts, compressed by Mr John Hollingshead at the Gaiety Theatre in November 1871, with Miss Cavendish in Angelica and Miss Farren in Prue. In *Love for Love* culminated the prose comedy of England. Abundant and brilliant as is the wit, the coruscations do not, as in Congreve's other plays, outdazzle the sweeter and softer light of the humour. The characterisation is true, true under the conditions which, as he himself admirably said in his letter to Dennis, the comedian must always work under. ‘The distance of the stage,’ says he, ‘requires the figure represented to be something better than the life; and, sure, a picture may have features larger in proportion and yet be very like the original. If this exactness of quantity were to be observed in wit, as some would have it in humour, what would become of those characters that are designed for men of wit? I believe, if a poet should steal a dialogue of any length from the extempore discourse of the two wittiest men upon earth, he would find the scene but coldly received by the town.’

Some of the characterisation, such as that of Angelica, is really beautiful, while some, like that of Sir Sampson Legend, in its genial breadth passes from the comedy of artifice into absolute comedy, and is almost Shakespearian. In 1697 Congreve's one tragedy, the *Mourning Bride*, appeared. The honours it received in the 18th century were as excessive as the contempt it met with in the next. No doubt it is full of improbabilities, but it shows a considerable power of invention of melodramatic if not of tragic incident. The purely theatric and scenic qualities of the second act are of a most original, if not of high order, and with the scenic appliances of our own day might be made theatrically effective. Of course, however, it is cold—cold as those ‘monumental caves of death’ which ‘shot a chillness’ to the ‘trembling hearts’ of Drs Johnson and Blackmore—and nothing could really warm it.

Between the date of the *Mourning Bride* and that of Congreve's last comedy, the *Way of the World*, he was busily occupied, in company with several others, in the famous Jeremy Collier controversy, defending the morality of the new stage. The great mistake of Congreve's life was this—of defending his plays on moral grounds. To ‘let well alone’ is wise: to let ill alone is perhaps wiser still. Of all sins, that of producing harmful literature is the blackest. It is the peculiar glory of letters that stronger than king or kaiser is he who writes strongly. It is so to-day: it was so when the warrior kings of Nineveh went out to reap glory—i.e., to slay and flay—in order to furnish the scribe with subjects—in order that the scribe should, in bas-relief and cuneiform character, record their doings. Hence, in the truest and deepest sense, to write is, as Bishop Butler has said, to act; and if, as he declares, ‘endeavouring to force upon our minds a practical sense of virtue, or to beget in others that practical sense of it which a man really has himself, is a virtuous act,’ what, on the other hand, was the act of him who wrote certain scenes in the *Double Dealer* and *Love for Love*?

And yet even this new stage was not without one saving grace till Congreve defended it; it had a frankness in sin: that was something at least. Its place was not alongside those filthy French fictions of our own time which, while pandering to the bestial side of man, set up an impudent pretence of doing so for the good of his soul. But Congreve in his lame defence condescended to

the part of the hypocrite—condescended to exploit Aristotle's paradox about comedy being an imitation of bad characters—an imitation with an ethical end; as if such comedy as his had anything to do with ethical ends! Notwithstanding the conventional tags at the end of Congreve's plays—tags which had no serious meaning, and were meant to have none—the 'Seventh Hell' of the Hypocrite could never claim the author of *Love for Love* until he set about defending that play. Better to leave ill alone, we say.

Congreve's last play, the *Way of the World*, was produced in 1700. Though quite as full of intellectual brilliance as *Love for Love*, and evidently written with more care, not to say labour, it lacks the humorous impulse which we have seen in Congreve's masterpiece. The glitter is that of icicles in the sunlight. The wit of the dialogue is not sufficiently held in hand to work out the characters and the plot. In a word, it comes more completely than does any other of Congreve's plays within the scope of the Duke of Buckinghamshire's strictures upon the comedy of repartee:

Another fault, which often does befall,  
Is when the wit of some great poet shall  
So overflow, that is, be none at all,  
That ev'n his fools speak sense, as if posset,  
And each by inspiration breaks his jest,  
If once the justness of each part be lost,  
Well may we laugh, but at the poet's cost.

This play was received with comparative coldness, and Congreve wrote no more for the stage; but he lived till January 1729. Socially his life was one unbroken success. Physical suffering he had, but most of it was the result perhaps of his own youthful indiscretions. Kneller's portrait shows him to have been a handsome man with dark eyes. His career shows him to have been a man of fine genius who, smitten with the English canker of rank-worship, succeeded in half-misprising his endowments and living and dying genteel. He amassed a fortune, and left it not to his greatest friend Mrs Bracegirdle, a woman of genius, of surpassing beauty, and most lovable nature, who had sacrificed everything for him, but to the Duchess of Marlborough, who, after his death, had a waxen statue of him made—a statue which sat at her table in his very clothes, and nodded mechanically over the dinner at Her Grace's smallest joke, even as he had used to nod in the flesh.

See the *Works*, ed. Summers (1923); *Comedies*, ed. W. E. Henley (1895); the edition by Knight; the short *Life* by Gosse (1888; rev. and enl. 1924); essays by Hazlitt and Swinburne; also A. Nicoll, *Restoration Drama* (1923); Bonamy Dobrée, *Restoration Comedy* (1924).

**Congreve**, SIR WILLIAM, was born 20th May 1772, the son of William Congreve, Comptroller of Woolwich Royal Laboratory. Passing through the Royal Academy at Woolwich in 1808, after many experiments he contrived the Congreve rocket. It was tried in the Basque roads in 1809, and at Leipzig in 1813, not too successfully. Honours were heaped on Congreve; he was elected F.R.S., M.P. in 1812, and in 1814 he succeeded to the baronetcy and his father's place. He died at Toulouse, 16th May 1828. See ROCKET.

**Coni**, or CUNEO, capital of an Italian province, stands in a fruitful district, 48 miles SW. of Turin by rail. It has a fine cathedral, lately restored. It was once strongly fortified, and a place of great strategic importance. Its chief manufactures are silk, cotton, and paper. Pop. 30,000.

**Conic Sections**. See CONE, CIRCLE, ELLIPSE, PARABOLA, and HYPERBOLA.

**Coniferæ**. This important and interesting class of gymnosperms attained its maximum importance during past geological periods; its world-wide

geographical distribution and strongly marked family and generic differences being in this way explained—i.e. when we regard the existing forms as the survivors of a larger and once predominant coniferous flora, which has been in good part displaced by the more recent and higher monocotyledonous and dicotyledonous (angiospermous) forms. About 350 species, included in about 33 genera, now remain. Leaving the questions of floral morphology and minute structure which separate the conifers (along with Cycads and Gnetaceæ) from the remaining phanerogams or 'angiosperms' to the article GYMNOSPERMS, it may be most profitable here to make a rapid survey of the most important groups of the class, with their principal types. Various systems of classification have been propounded; an old and widely adopted one recognises three orders, the pines (Abietinæ), cypresses (Cupressinæ), and yews (Taxinæ). Since, however, the first two of these are much less widely separated from each other than from the third, later systematists are returning to the classification of Lindley, and regard these as making up a single order (Pinoideæ) equivalent to the yew order (Taxoideæ). On account of the exceptional importance of this class, alike in forestry and horticulture, a brief enumeration of the families of these orders, with mention of their most important species, may now be given.

Commencing with the Abietinæ division of Pinoideæ, we find three families, the pines proper (*Abietinæ*), Araucarias (*Araucariinæ*), and Taxodiaceæ (*Taxodiinæ*). The genera *Abies*, *Picea*, *Tsuga*, consist of evergreen trees, or sometimes shrubs, in which the linear and always more or less completely needle-shaped leaves arise singly, and are never clustered in branchlets, while the scales of the cones are not thickened at the tip. The list may be headed by the Spruce Fir, or Norway Spruce (*Picea excelsa*), one of our commonest trees, while *Tsuga Douglasii*, *Abies nobilis*, and other Californian species are of special beauty as trees and value as timber, with other species too numerous to mention. The old Linnean genus *Pinus* (from which the firs, larches, and cedars have been separated off as *Abies*, *Larix*, and *Cedrus* respectively) still includes about 100 species, easily distinguished from *Abies* by the grouping of the leaves upon arrested branchlets, the thickening of the tips of the cone-scales, and other characters. Among the more important species, *P. sylvestris* (the Scots pine), *P. austriaca* (the Austrian pine), *P. Laricio* (the Corsican pine), *P. Pinaster* (the cluster pine), and *P. Pinea* (the stone pine of southern Europe), may be first mentioned, alike on account of their frequency of occurrence in forests and plantations in Europe, and as agreeing in having usually only two leaves on each branchlet. A large and chiefly Californian series agrees in having three leaves on each sheath. Of these, *P. insignis* (the Oregon pitch pine), *P. Benthamiana*, and *P. radiata* may be mentioned; finally a series, usually five-leaved, includes the Weymouth Pine and White Pine of North-east America (*P. Strobus*), the Siberian Stone Pine (*P. Cembra*), &c. Of the allied genus *Larix* (see LARCH) only *L. europæa* (*decidua*) need here be mentioned, while of *Cedrus* (see CEDAR) *C. Libanus* and *C. Deodara* are of special importance. The Araucariaceæ are familiarly represented by the *A. imbricata* of Chile, so common in suburban gardens (see ARAUCARIA), and other more graceful but usually less hardy species; as also by the important Kauri pine and other species of *Dammara*. See DAMMARA.

The Taxodiaceæ include a number of very important trees, notably the curious umbrella pine (*Sciadopitys*) of Japan, *Cunninghamia sinensis* of China, and the colossal *Wellingtonia* (*Sequoiia gigantea*)

of California, with its allied species (see *SEQUOIA*). In addition to these we may mention also the Japanese Cedar (*Cryptomeria japonica*, the Virginian Bald Cypress (*Taxodium distichum*).

Among the Cupressineæ we have first the cypresses proper, which include, besides the well-known genus *Cupressus* (see *CYPRESS*), *Chamaecyparis* of North America and Japan. *Juniperus* (see *JUNIPER*) alone forms another family; while *Thuja* (see *ARBOR VITÆ*) with its immediate allies *Thujopsis* and *Libocedrus* constitute a third; and *Callitris* with *Actinostrobus* and *Fitzroya* make up the fourth. *Callitris* is the Australian cypress pine, whose great virtue is its resistance to the white ant.

Passing now to the sub-order of yews (*Taxoideæ*) we have again two main divisions, the yews proper, or *Taxeæ*, and the *Podocarpeæ*. Among the latter we shall only mention the oriental genus *Podocarpus*, and the beautiful *Dacrydium cupressinum* of New Zealand; but the former are of much greater variety and importance (see *YEW*). Besides *Taxus*, we have the Chinese and Japanese *Cephalotaxus*, and the Chinese and Californian *Torreya*.

The sacred Chinese maiden-hair tree (*Ginkgo biloba*), formerly placed here, is now regarded as forming a genus, a family, and a class by itself.

See *GYMNOSPERMS*, and articles on particular genera; also Engler's *Pflanzenfamilien*, and Dallimore and Jackson's *Handbook of Conifere* (1923). For the purposes of the English horticulturist Veitch's *Manual of Conifere* is most exhaustive, while Gordon's *Pinetum*, Hemsley's *Handbook of Hardy Trees*, &c. (1877), and Webster's *Coniferous Trees* (1918) are of service to the amateur.

**Conington**, JOHN, a great classical scholar, was born at Boston, 10th August 1825. He was educated at Beverley, and for five years at Rugby, obtained a demysip at Magdalen College, Oxford, in 1843, and next year carried off, in the same term, the Hatford and Ireland scholarships. In 1846 he betook himself to University College, where he was elected to a fellowship two years later. Other distinctions he won were the chancellor's prize for Latin verse, for an English essay, and for a Latin essay. Determining not to take orders, he tried the study of law, but soon abandoned it in disgust. In 1854 he was appointed to the newly-founded chair of Latin Language and Literature at Oxford, which he filled until his untimely death at his native place, October 23, 1869. The impulse that Conington's lofty and contagious enthusiasm gave to classical scholarship and real culture in England was far more considerable than anything he was able to effect in the way of performance. His unique personality and the singular charm of his simple but serious nature made a profound and permanent impression upon his friends and pupils. His greatest work is his edition of *Virgil* (3 vols. 1861-68), with its singularly subtle and suggestive essays. His edition of the *Agamemnon* (1848) and *Choephori* (1857) of *Æschylus* are of less moment, though indeed the latter is admirable. In his last years he gave himself much to translation, the results of which were his metrical version of the *Odes* of Horace (1863); the *Æneid* (1866), in Scott's ballad-metre; the *Iliad* (1868), in the Spenserian stanza; and the *Satires* and *Epistles* of Horace (1869), in the couplet of Pope. Of these the last is without doubt the most valuable. His edition of *Persius* was published in 1872, and in the same year his *Miscellaneous Writings* (2 vols.), with a short Life by Professor H. J. S. Smith.

**Conirostres**, a term often applied to a section of Passerine birds, characterised by a strong conical beak. It includes numerous families, and such types as weaver-birds, finches, sparrows, and larks.

The character referred to is too external and adaptive to be of much importance, and the term is too wide in its application to be of much use. It is better disused.

**Coniston Grits and Flags**, a series of siliceous sandstones, grits, flags, and conglomerates, belonging to the Silurian system of Cumberland, &c. They take their name from Coniston in Lancashire, and attain a maximum thickness of probably not less than 7000 feet. They are characterised—the finer grained beds (flags) especially—by the presence of many species of graptolites and other fossils. They are believed to be on the same geological horizon as the Denbighshire grits and flags of Wales. See *SILURIAN SYSTEM*.

**Coniston Water**, in the English Lake District, lies in North Lancashire, at the east foot of the Coniston Fells, 9 miles W. of Bowness on Windermere, and 10 by rail NNE. of Foxfield Junction. It is 5 miles long,  $\frac{1}{2}$  mile broad, 143 feet above the sea, and its greatest depth is 184 feet. Its waters abound with trout and perch. On the east shore stand Brantwood, once Ruskin's home, and Tent House, once Tennyson's. The Old Man of Coniston, to the NW., is 2633 feet high. See *LAKE DISTRICT*.

**Conium**. See *HEMLOCK*.

**Conjeveram** (*Kanchivaram*), 'the Benares of South India,' 45 miles SW. of Madras by rail, with three old pagodas, ancient tanks, and United Free Church missions. Here Hyder Ali defeated the British in 1780. Pop. 54,000.

**Conjugal Rights**. See *MARRIAGE*.

**Conjugation of Cells**, a mode of reproduction in which two apparently similar cells unite, as in *Amœba*, *Diatoms*, *Spirogyra*, &c. See *ALGÆ*, *DESMIDS*, *DIATOMS*, and *REPRODUCTION*.

**Conjunction**, in Astronomy, is one of the Aspects (q.v.) of the planets. Two heavenly bodies are in conjunction when they have the same longitude—that is, when the same perpendicular to the ecliptic passes through both. If they have, at the same time, the same latitude—that is, if they are both equally far north or south of the ecliptic—they appear from the earth to be in the same spot of the heavens, and to cover one another. The sun and moon are in conjunction at the period of new moon. In the case of the inferior planets Mercury and Venus, there is an inferior conjunction when the planet is between the earth and the sun, and a superior when the sun is between the earth and the planet. In general, a heavenly body is in conjunction with the sun when it is on the same side of the earth, and in a line with him; and it is in *opposition* to the sun when it is on the opposite side of the earth, the earth being in a line between it and the sun. Planets are invisible when in conjunction with the sun, except in rare cases when an inferior planet passes over the sun's disc, and may be seen as a speck on his surface. Conjunctions are either *geocentric* or *heliocentric*, according as they are actually witnessed from the earth, or as they would be witnessed if observed from the sun. In observing a conjunction from the earth's surface it is usual to reduce the observation to what it would be if made from the earth's centre; by this means the exact times of conjunction are more accurately fixed, and the observations of one astronomer made available to every other, wherever he may be on the earth's surface. *Grand conjunctions* are those where several stars or planets are found together. Chinese history records one in the reign of the Emperor Tehuen-hiu (2514-2436 B.C.), which astronomers calculate to have actually taken place.

**Conjuring**, as understood at the present day, signifies the production of effects apparently miraculous by natural means.

The art of producing apparently supernatural phenomena has been cultivated from remote antiquity. The earlier professors of the art claimed *bona-fide* supernatural powers; and in ages when the most elementary principles of physical science were unknown beyond a very limited circle, it was not difficult to gain credence for such a pretension. The modern conjurer makes no such claim, but tells the public frankly that his marvels are illusory, and rest either on personal dexterity or on some ingenious application of natural principles. Of the conjurers of remote antiquity we have few reliable records; though it is a tolerably safe conjecture that the prestige of the ancient mysteries rested in no small degree upon effects of natural magic. It may also be gathered that the conjurers of old were familiar with certain forms of optical illusion, in which the use of plane and concave mirrors, and a partial anticipation of the principle of the magic-lantern, played prominent parts. Chaucer mentions illusions of his own day of which the above seems the most probable solution. In the accounts of very early writers, however, large deductions must be made for the comparative ignorance of the observer, and the desire, common to all narrators of extraordinary occurrences, to make the marvel as marvellous as possible. Perhaps the earliest really trustworthy authority is Reginald Scot, who in his *Discoverie of Witchcraft* (1584) has enumerated the stock feats of the conjurers of his day. The list includes swallowing a knife; burning a card and reproducing it from the pocket of a spectator; passing a coin from one pocket to another; converting money into counters, or counters into money; conveying money into the hand of another person; making a coin pass through a table, or vanish from a handkerchief; tying a knot, and undoing it 'by the power of words'; taking beads from a string, the ends of which are held fast by another person; making corn to pass from one box to another; turning wheat into flour 'by the power of words'; burning a thread and making it whole again; pulling ribbons from the mouth; thrusting a knife into the head or arm; putting a ring through the cheek; and cutting off a person's head and restoring it to its former position. Strange to say, many of these feats, which were doubtless already old in the time of Scot, are still performed, with more or less variation of detail, by conjurers at the present day.

The conjurers of Scot's time, and even of much later date, were accustomed, in order to facilitate the substitutions on which a great part of their tricks depended, to wear an apron with pockets, known (from its resemblance to a game-bag) as the *gibécère*. A later school suppressed this tell-tale article of costume, and used instead a table, with cover reaching nearly or quite to the ground. This table concealed an assistant, who worked most of the required transformations, &c., either handing the needful articles to the conjurer as he passed behind the table, or pushing them up through traps in the table-top. Conus the elder, a French conjurer who flourished at the close of the 18th century, made a further improvement by discarding the concealed assistant, and using an undraped table with a secret shelf (now known as the *servante*) behind it, on which his substitutions were made. His immediate competitors did not follow his example, a whole generation of later conjurers, including Comte, Bosco, and Philippe, retaining the suggestive draped table. Its death-blow, however, was struck by Robert Houdin (1805-71), with whom about 1844 a new era began. His miniature theatre in the *Palais Royal* was remarkable for the elegant simplicity of its stage arrangements, and in particular for the complete suppression of the *boîte à compère* ('wooden confederate'), as Robert Houdin

sarcastically terms it. The new style took with the public, and by degrees Robert Houdin's contemporaries found themselves compelled to follow his example.

To Robert Houdin belongs the credit of devising some of the best-known and most ingenious pieces of magical apparatus, as also that of the application of electro-magnetism, then little understood, to the production of magical effects. The well-known magic drum, that beats without visible drumsticks, the magic clock and bell, and the chest, light or heavy at command, are all fruits of his inventive genius.

The most modern school of conjurers, following the lead of Wiljalba Frikell, and subsequently represented by Hartz, Hermann, Buatier de Kolta, Verbeck, Lynn, Bertiam, &c., generally aim at producing their magical results with the minimum of visible apparatus. There has been, however, some reaction in favour of more spectacular illusions, such as those of Maskelyne, in which the resources of optical and acoustic as well as mechanical science are laid under contribution in aid of conjuring proper.

See works by Hoffmann—*Modern Magic* (6th ed. 1886), *More Magic* (1890), *Later Magic* (1904), and other volumes; Maskelyne and Devant, *Our Magic* (1911); *Sleight of Hand*, by Edwin Sachs (2d ed. 1885); Robert Houdin's *Secrets de la Prestidigitation et de la Magie* (1868; reprinted in 1878 under the title of *Comment on devient Sorcier*) and *Magie et Physique Amusante* (1877); and an anonymous work, *Recueil de Tours de Physique Amusante* (published by De La Rue of Paris). The three last-named works have been translated into English by Hoffmann, under the titles of *The Secrets of Conjuring and Magic*, *The Secrets of Stage Conjuring*, and *Drawing-room Conjuring* respectively.

**Conkling**, ROSCOE, American politician, born in Albany, New York, 30th October 1829, was admitted to the bar in 1850, sat in congress as a Republican in 1858-62 and 1864-66, and was elected to the United States senate in 1867, 1873, and 1879. He was now an influential member of his party; in 1876 he received ninety-three votes for the presidential nomination, and, in 1880, by his support of Grant, and his personal opposition to Blaine, divided the Republicans into two sections. In 1881 he and his colleague suddenly resigned from the senate, owing to a dispute with President Garfield on a question of patronage, and sought re-election; but after a warm canvass, both were rejected, though vigorously supported by Vice-president Arthur. Conkling afterwards practised law in New York city. He died 18th April 1888.

**Conn**, LOUGH, a picturesque Irish lake in the north of County Mayo, together with Lough Cullin (from which it is separated by a narrow neck of land), 13 miles long, and 1 to 3 broad. It lies in a wild romantic region of hills, glens, rocky slopes, precipices, broken ground, and bogs, contains many islets, and has bold shores.

**Connara'cea**, an order allied to Leguminosæ, including about 160 species, all tropical, of which the most important is *Connarus guianensis* (or *Omphalobium Lambertii*) of Guiana, the source of the zebra-wood of cabinet-makers.

**Connaught**, the most westerly and the smallest, both in extent and population, of the four provinces of Ireland. It is bounded N. and W. by the Atlantic; E. by Ulster and Leinster, from the latter of which it is separated by the Shannon; and S. by Munster. It contains the counties of Galway, Leitrim, Mayo, Roscommon, and Sligo. Greatest length from north to south, 105 miles; greatest breadth, not including Achil Island, 92 miles. Area, 6863 sq. m. The west coast has many fine bays and harbours, and the surface, especially in the western half, is mountainous and

rugged, forming remarkably grand and picturesque scenery. The people are still almost purely Celtic. In ancient times the O'Connors were kings of Connaught. In 1590 the province was divided by the English into six counties, its present five, with Clare, afterwards joined to Munster. The Duke of Connaught and Strathearn, third son of Queen Victoria (b 1850), was in 1902 made Field-marshal, in 1904 Inspector-general of the Forces, and in 1907 Commander-in-chief in the Mediterranean, and in 1911-14 was Governor-general of Canada. The Connaught Rangers, once the 88th foot, now comprise the old 88th and 94th Regiments. Pop. (1841) 1,420,705; (1891) 724,772; (1911) 610,984.

**Connecticut** (*kon-net'-e-kut*), one of the six New England states of the American Union, and one of the original thirteen federal states, is bounded by Massachusetts, Rhode Island, Long Island Sound, and the state of New York. It is the smallest in area (5000 sq. m.) of all the states, excepting Rhode Island and Delaware, but in 1920 ranked twenty-ninth (of the forty-eight) in respect of population. It is one of the most densely peopled states of the Union. A great part of the surface is rocky and uneven, and the Green and Taconic Mountains of the Appalachian system occupy a considerable part of the western extremity of the state; but the mountains here are all insignificant in respect of height. Much of the surface is not easily cultivated, and rather unfertile; but a considerable part of the valley of the Connecticut River is very productive, tobacco being a leading product of this section. Hay, potatoes, maize, oats, and rye are the principal crops. Grazing and milk farms, orchards and market-gardens, are profitably sustained in all parts of the state.

The Connecticut River, which, rising in New Hampshire, forms the boundary between that state and Vermont, and flows south through Massachusetts, crosses Connecticut also, and after a course of about 450 miles enters Long Island Sound, 30 miles east of New Haven. It is navigable for vessels of light draught as high as Hartford. In the east part is the River Thames, and in the west the Housatonic, both of which afford some navigation. But the greatest value of the very numerous streams is as a source of water-power. The surface-rocks are mostly Azoic, with the principal exception of a strip of Triassic sandstone or psammite running along the Connecticut River. This brown sandstone is largely quarried at Portland and East Haven, as are excellent red and plain granites and gneissoid building-stones at many points; valuable serpentine and verdantique exist near New Haven. Some quarries yield excellent flagstones of gneissoid character; the so-called 'trap' rock, which is a diabase of Triassic date, is also wrought; and in the north-west good limestones of Lower Silurian age are quarried. Brown hematites are extensively wrought in the north-west section, and yield excellent iron. Lead, copper, cobalt, and tungsten have been locally mined. Useful mineral-waters occur at various points. The climate is very changeable, and is rather severe in winter, but generally healthful. Nearly the whole surface was once richly forested; but no very extensive areas are now covered by large timber; still the aggregate production of wood for building purposes and for fuel is very considerable. The sea-coast affords a number of good harbours. Most of the maritime enterprise is now directed to the coastwise trade, the whale and seal fisheries having declined. Oyster-fishing is engaged in largely and very systematically, as is the taking of fish for oil and fish-guano. The manufactures of Connecticut are carried on upon

a very extensive scale, and are of exceedingly varied character; and notwithstanding its small area, the state stands in the first rank as respects the amount and aggregate value of manufactured goods. Copper, brass, and silver goods, machinery, clocks, hardware, india-rubber goods, firearms, textiles, and smallwares in great variety, are produced on a large scale. Life, fire, and accident insurance, and the publication of subscription books, receive great attention. The state is well supplied with railways. In very few parts of the world has more been done for popular education than in this state. Private schools of every grade supplement the work of this public-school system. The latter dates from 1644. Yale University at New Haven comprises collegiate and post-graduate courses, besides medical, theological, scientific, law, and art schools, and takes a very high place among the seats of learning in the country. Mention should be made of Trinity College, Hartford, and of the Wesleyan University at Middletown. There are also divinity schools at Hartford (Congregationalist) and Middletown (Episcopalian), an agricultural college at Storrs. The state supports a full complement of institutions for correction and charity. Among the principal cities and towns are New Haven, Bridgeport, Hartford (the capital), Waterbury, New Britain, Stamford, Meriden, New London, Norwalk, and Norwich.

The old stock of inhabitants were of English Puritan origin, but of later years there has been a large immigration of Irish, German, English, and others. The colony of Connecticut may be said to date from 1634, when the movement began in which Hartford, Wethersfield, and Windsor were settled by persons removing from Massachusetts, and displacing a slender colony of the Dutch. This movement was in reality the secession of the more democratic element from Massachusetts. Saybrook, named in honour of Lord Say-and-Sele and Lord Brooke, was the nucleus of a separate colony which in 1644 was united to Connecticut, as was in 1662 the New Haven colony, founded in 1638. The Connecticut colony adopted a constitution in 1639, 'the first written democratic constitution on record.' The royal charter of 1662 was exceedingly liberal, it being essentially a confirmation of the older constitution; and it continued in force even after the independence of the American states, but in 1818 was replaced by the present state constitution. A large part of Long Island was for a considerable period under the government of the colony. Prominent events in Connecticut history have been the bloody war with the Pequot Indians, 1637; the governorship of Sir Edmund Andros, during a part of which (1687-88) the colonial charter was in abeyance, and according to the very doubtful but commonly received account was only saved from destruction by being hidden for a time in a hollow tree, the Charter Oak at Hartford. Slavery was abolished in 1818. Pop. (1870) 537,454; (1880) 622,700; (1890) 746,258; (1900) 908,420; (1910) 1,114,756; (1920) 1,380,631. See Johnston's *Connecticut* (1887); G. L. Clark's *History of Connecticut* (1915).

**Connellsville**, a borough of Pennsylvania, 35 miles SSE. of Pittsburgh, has a very great coke industry, and manufactures automobiles and machinery; pop. 13,500.

**Connemara**, a wild and picturesque district, the westernmost division of Co. Galway. Its scenery, lakes, streams, and inlets attract many fishers and tourists. Connemara is also called Ballynahinch.

**Connoisseur**, a term borrowed from the French, to designate persons who, without being themselves artists, are competent to pass a critical

judgment upon the merits of works of art, especially in painting and sculpture. The Italian equivalent for connoisseurs is *Cognoscenti*.

**Conodonts**, minute fossils met with in Paleozoic strata. They are variable in form, and look very like the teeth of different kinds of fishes, some being simple slender pointed sharp-edged cones, while others are more complex, resembling in form the teeth of certain sharks. Their affinities are very uncertain—some maintaining that they are really the minute teeth of fishes allied to the living hag-fishes and lampreys—others suggesting that they have more analogy with the hooklets or denticles of annelids and naked molluscs.

**Conoid**, a solid formed by the revolution of a conic section round its axis; such are the sphere, paraboloid, ellipsoid, and hyperboloid.

**Conolly**, JOHN, physician, born at Market Rasen, Lincolnshire, in 1794, graduated at Edinburgh in 1821, and in 1827 settled in London, where he was for two years professor of the Practice of Medicine in University College. In 1839 he was appointed resident physician to the Asylum for the Insane at Hanwell; this post he held till 1844, and afterwards he was retained as visiting physician. Here, under Conolly, all forms of mechanical restraint were from the first entirely discontinued; and although his views were admittedly not original, it is mainly to his earnestness and eloquence that the revolution in asylum management in England is due. His best works are those on the *Construction and Government of Lunatic Asylums* (1847), and kindred subjects. He died 5th March 1866. See the Memoir by Sir James Clark (1869).

**Conquest**. In the law of succession in Scotland heritable property acquired during the lifetime of the deceased, by purchase, donation, or excambion, was called Conquest, in opposition to that to which he has succeeded, which is called Heritage. The distinction was abolished by the Conveyancing Act, 1874. Conquest, in a marriage-contract, is property acquired by the husband during the marriage as distinguished from what he possessed before the marriage. Such property was frequently but is now rarely settled either on the heir or on the issue of the marriage.

**Conquistado'res** (Span., 'conquerors') is a collective term for the Spanish conquerors of America, such as Cortes, Balboa, Pizarro. See the articles under their names; as also MEXICO, PERU, &c.

**Conrad**, or KONRAD I., king of the Germans, was the son of the Count of Franconia, and the nephew of the Emperor Arnulf. He was elected king (practically emperor of Germany) on the extinction of the direct line of the Carolingians in 911 A.D. He gradually re-established the imperial authority over most of the German princes, carried on an unsuccessful war with France, and at last fell mortally wounded at Quedlinburg (918), in a battle with the Hungarians, who had repeatedly invaded his dominions. See GERMANY.

**Conrad II.**, king of the Germans, and Roman emperor, was elected after the extinction of the Saxon imperial family in 1024. He was the son of Henry, Duke of Franconia, and is by many considered as the founder of the Franconian dynasty. Immediately after his election he commenced a tour through Germany to administer justice. In 1026 he crossed the Alps, chastised the rebellious Italians, was crowned at Milan as king of Italy, and he and his wife Gisela were anointed emperor and empress of the Romans by the pope. He was soon recalled to Germany to put down four formidable revolts, in which he succeeded so well that by 1033 peace was restored. In 1032 he

had succeeded to the kingdom of Burgundy, which he annexed to the empire. In 1036 a rebellion in Italy again compelled him to cross the Alps; but his efforts to restore his authority were this time unsuccessful, and he was forced to grant various privileges to his Italian subjects. Shortly after his return he died at Utrecht, 4th June 1039. Conrad was one of the most remarkable of the earlier monarchs of Germany. He reduced the dangerous power of the great dukes of the empire, and defended the rights of the humbler people against oppression by the nobility.

**Conrad III.**, king of the Germans, the founder of the Hohenstaufen (q.v.) dynasty, was the son of Frederick of Swabia, and was born in 1093. While under twenty years of age, Conrad, with his elder brother Frederick, had bravely supported Henry V. against his numerous enemies, and in return that monarch granted Conrad the investiture of the duchy of Franconia. He subsequently contested the crown of Italy with the Emperor Lothar of Saxony, but was compelled to resign his pretensions. On the death of Lothar, the prince of Germany, fearing the increasing preponderance of the Guelph party, and attracted by his brilliant courage, moderation, and goodness, offered Conrad the crown, and he was accordingly crowned at Aix-la-Chapelle, 21st February 1138. He was immediately involved in a quarrel with Henry the Proud, Duke of Bavaria and Saxony, and head of the Guelph party in Germany; and the struggle was continued under Henry's son and successor, Henry the Lion (q.v., and see GUELPHS AND Ghibellines). While Germany was thus convulsed, the state of Italy was not a whit more peaceable. The several belligerents besought Conrad's assistance, but he well knew the natural inconstancy of the Italians, and determined to stand aloof. Soon after this St Bernard of Clairvaux commenced to preach a new crusade, and Conrad, seized with the general infatuation, set out for Palestine at the head of a large army (see CRUSADES). A new attempt by the Duke of Bavaria to regain his dukedom was defeated by the nephew of Conrad, whose health had broken during the crusade. Conrad died at Bamberg in 1152. See GERMANY.

**Conrad**, JOSEPH (FEODOR JOSEF CONRAD KORNIEWSKI, 1857-1924), novelist, born—of Polish parents—in the Ukraine, was educated at Cracow, and went to sea in 1874. He was naturalised in England in 1884, and took his master's certificate, but ten years later gave up the sea for literature. *Almayer's Folly* (1895) was followed by *An Outcast of the Islands*, *The Nigger of the Narcissus*, *Tales of Unrest*, and *Lord Jim* (1900)—all brimming with sea reminiscences. *Youth* (1902) and *Typhoon* (1903) proved him a master of the short story. In *The Inheritors* (1901) and *Romance* (1903) he collaborated with Ford Madox Hueffer. *Nostromo* (1904), the story of a South American revolution, well illustrates his faculty for making his characters tell their own tale. The novelist's Slavonic origin shows itself in *The Secret Agent* (1907) and *Under Western Eyes* (1911). Since *Chance* (1914) he has had an ever-widening audience. Later novels are *Victory* (1915)—like many of his stories, a South Sea yarn—*The Arrow of Gold* (1919), *Rescue* (1920), *The Rover* (1923). *A Set of Six*, like *Twist Land and Sea* and *Within the Tides*, is a volume of short stories. *The Mirror of the Sea* (1906) and *Some Reminiscences* (1912) are autobiographical; and *Notes on Life and Letters* (1921) also helps 'towards a better vision of the man.' By his transfusion of realism with romance, his blending of rich experience with a vivid imagination, his surprising command of English (an

unknown tongue to him till 1878), his masterly—if sometimes laborious—unfolding of plot, his psychological insight, his creation of atmosphere, his ironic power, sombre humour, artistic and lyric zest, Conrad is established securely in the very front rank of modern English fiction. See a memoir by his widow (1926).

**Conradin** OF SWABIA, last of the Hohenstaufens, the son of Conrad IV. (1237–54), was born in 1252, two years before his father's death. His uncle Manfred (q.v.) had assumed the crown of Sicily on a rumour of Conradin's death, though he declared himself ready to give it up. But Pope Clement VI.'s hatred of the Hohenstaufens led him to offer the crown of the Two Sicilies to Charles of Anjou, a consummate warrior and able politician. Charles immediately invaded Italy, and met his antagonist at Benevento, where the defeat and death of Manfred, in 1266, gave him undisturbed possession of the kingdom. But the Neapolitans, detesting their new master, sent deputies to Bavaria to invite Conradin, then in his sixteenth year, to come and push his claim. Conradin accordingly made his appearance in Italy at the head of 10,000 men, and being joined by the Neapolitans in large numbers, gained several victories over the French, but was finally defeated near Tagliacozzo, 22d August 1268, and taken prisoner along with Frederick of Baden and other comrades. The two unfortunate princes were, with the consent of the pope, executed in the market-place of Naples on the 20th October. A few minutes before his execution, Conradin, on the scaffold, took off his glove, and threw it into the midst of the crowd as a gage of vengeance, requesting that it might be carried to his heir, Peter of Aragon. The tragic tale has furnished materials for many poets. See SICILIAN VESPER.

**Consanguinity**, the relationship which subsists between persons who are of the same blood, is either *direct*, which is the relationship between ascendants and descendants, or *collateral*, between persons sprung from a common ancestor. In the direct line, a son is said to stand in the first degree to his father; a grandson, in the second degree to his grandfather; and so on.—*Affinity* (q.v.) is the relationship brought about by marriage between a husband and the blood-relations of his wife, or between a wife and the blood-relations of her husband.

Consanguinity and affinity have been in all parts of the world more or less looked on as impediments to marriage between the parties related. Among the ancient Persians and Egyptians, marriages were sometimes sanctioned between brother and sister, and even father and daughter; and in the book of Genesis we read of Abraham marrying his half-sister.

The Roman law prohibited marriage between ascendants and descendants, a prohibition extended to relations by adoption. In the collateral line, the prohibited degrees included brother and sister, and all cases where one party stood *in loco parentis* to the other, as uncle and niece. Marriage between cousins-german, at one time prohibited, was declared lawful by Arcadius and Honorius. The degrees prohibited in consanguinity were by Constantine also prohibited in affinity.

By the old canon law and early decretals, marriages were prohibited between persons as far removed as the seventh degree of consanguinity or affinity. The fourth council of Lateran, 1215 A.D., narrowed the prohibition from the seventh to the fourth degree; i.e. the grandchildren of cousins-german. A marriage between persons related in any of these ways was accounted incestuous, and the children bastards. The pope assumed the right of granting dispensations from impediments to

marriage arising from consanguinity and affinity, a power which seems to have been first exercised in the 12th century.

In the countries which embraced the Reformation, a general relaxation took place in the prohibitions to marriage from consanguinity and affinity. In England, an act of 1547 allowed all persons to marry who were not prohibited by the Levitical law; and according to the interpretation put on this statute, the prohibitions included all relations in the direct line, brother and sister, and collaterals, when one party is brother or sister to the direct ascendant or descendant of the other; the degrees prohibited in consanguinity being equally prohibited in affinity. In Scotland, acts of 1567, professing to take the Levitical law as the standard, assimilated the prohibitions from consanguinity and affinity to those of England. In France, the Code Napoléon prohibits marriage between ascendants and descendants lawful or natural, and persons similarly connected by affinity; and in the collateral line between brothers and sisters lawful or natural, and persons similarly connected by affinity. Marriage between uncle and niece, and aunt and nephew, is also prohibited. In various countries of Europe, as Denmark, no prohibitions from affinity, except in the direct line, are recognised. In most of the United States of America, marriage is allowed between uncle and niece. See AFFINITY, DECEASED WIFE'S SISTER, INCEST, KIN; and for exogamy and curious savage methods of counting relationship, MARRIAGE.

The much-vexed question how far the marriage of relations tends to injure the constitution of their offspring, either by the intensification of hereditary taint or more directly, is complicated by considerations introduced by Mendelian researches. The effects of inbreeding seem not to be purely evil; a certain amount of inbreeding may be necessary in order to start a new breed. See BREED, CATTLE.

**Conscience.** See ETHICS.

**Conscience**, HENDRIK, a popular Flemish novelist, was born 3d December 1812, at Antwerp. His father, who bought and broke up old ships, was a native of Besançon, but his mother was of Flemish birth. At fifteen the boy had to shift for his living as an under-master in a school, but at the outbreak of the revolution in 1830 he joined the Belgian ranks, and served till 1836. Patriotism and poverty together impelled him to write, and between them produced in 1837 his first volume in Flemish, *In't Wonderjaar, 1566*. Wappers the painter finally got him appointed in 1841 to an office in the Antwerp Academy, which he continued to fill until 1854. Three years later he received a place in the local administration of Courtrai, and became in 1866 director of the Wiertz Museum at Brussels. Here he died, September 10, 1883. His *Phantazy* (1837), a fine collection of tales, and his most popular romance, *De Leeuw van Vlaenderen* (1838), early made his name dear to his fellow-countrymen; but it was his series of charming pictures of Flemish life, beginning with the little book, *Hoe men schilder wordt* (1843), that, through French, German, and English translations, carried his fame over Europe. Amongst those translated into English, besides the *Lion of Flanders*, are *Blind Rosa*, *Ricketicketack*, *The Poor Gentleman*, *The Miser*, and *The Demon of Gold*. The historical accuracy of his *Geschiedenis van België* (1845) was somewhat impaired by his Catholic predilections. The vast popularity of Conscience's novels depended mainly on the unflagging vigour and interest of the incidents in which they abounded, although these often enough defied all historical consistency and verisimilitude alike. It should be remembered to his credit, as, indeed, it

was his own proudest boast, that in his hundred volumes he had never painted vice in seductive colours. A complete collection of his works appeared in 1867-80; another in 1912; and a German translation at Munster in 75 small volumes, 1846-84. See his *Life*, in French, by Eekhoud (Brussels, 1881).

**Conscience, COURTS OF, IN ENGLAND.** These were courts for the recovery of small debts, constituted by special local acts of parliament in London, Westminster, and other trading districts. The county courts have superseded them. See **COUNTY**.

**Conscience Money**, money paid to relieve the conscience, is a not inapt term for money sent to the Chancellor of the Exchequer in payment of a tax that had previously been evaded, and in regard to which a tender conscience feels that something remained to be done. The conscience money is often sent anonymously.

**Consciousness.** This is the most comprehensive term employed in designating the mind. In the widest and most unexceptionable meaning, consciousness is a term which includes all mental states, operations, or processes, and, as has been truly said, it is not strictly susceptible of definition, seeing that we can have no experience of the unconscious. We may specify different modes or varieties of consciousness, such as thoughts, feelings, and volitions; but the quality in which they all agree, and which constitutes them mental facts or states of consciousness, cannot be otherwise explained than by a mere reference to the constant experience of every human being. Consciousness, in this its strict sense, thus embraces the whole field of mental experience, and the expression 'facts of consciousness' is frequently used as synonymous with psychical facts or facts of mind to designate the subject-matter of psychology.

Popularly, therefore, when we are mentally alive, or performing any of the recognised functions of the mind, we are said to be conscious; while the total cessation of every mental energy is described by the term 'unconsciousness,' among other phrases. In dreamless sleep, in stupor, fainting, and under the influence of the anæsthetic drugs, we are unconscious; in waking, or rallying into renewed mental activity, we are said to become conscious.

The difficulties of the subject, however, have prevented a perfectly definite and uniform usage from being adhered to. As the mind in its waking or active condition may be more or less excited, or vary in the intensity of its manifestations, there are degrees of consciousness; and, accordingly, the name is apt to be applied to denote the higher degrees in opposition to the lower. Thus, in first learning to write, to cast up sums, to play on an instrument, or to ride a bicycle, our mind is put very much on the stretch; in other words, we are very much excited or highly conscious. But when years of incessant practice have consummated the process into a full-formed habit, a very small amount of mental attention is involved; and we may then be said to perform the work all but unconsciously. Such habitual actions are frequently designated secondarily automatic, and Sir W. Hamilton, for example, speaks in this connection of 'unconscious mental modifications.' But as he has previously defined consciousness as co-extensive with all mental phenomena, such a phrase evidently involves a contradiction in terms, being equivalent to unconscious consciousness. It is explained, though not justified, by the (unavowed) double use of the term consciousness just adverted to. Later writers have sought to escape from this inconvenient terminology by speaking of the more obscure mental processes as 'sub-conscious.' Stress is laid by

them upon the infinite gradations of consciousness, and some amount of consciousness, however infinitesimal, is postulated so long as we can speak with propriety of mental phenomena at all. This sub-conscious region is understood to include not only the phenomena of habit referred to above, but the mass of organic or bodily feelings which, though intellectually unanalysed, are constantly present as a kind of background to our more distinct consciousness, and mainly determine both our habitual temperament and our varying moods. The hypothesis is also employed to explain the phenomena of memory as well as that instinctive basis of human life to which, under the name of the Unconscious, Hartmann (q.v.) assigned such important philosophical functions.

Consciousness is sometimes used in a special sense to denote the mind's cognisance of itself, as opposed to the cognisance or examination of the outer world. Hence, in studying our own minds, we are said to be using consciousness as the instrument; but in studying minerals or plants, we resort to external observation by the senses. A contrast is thus instituted between consciousness and observation, which contrast gives to the former word a peculiarly contracted meaning; for in the wide sense above described, observation is truly an act of consciousness. But such a usage is confusing and undesirable, and has been generally abandoned by accurate writers. The study of our own mind may be more appropriately expressed by such phrases as 'self-consciousness,' 'reflection,' or 'introspection.'

Important philosophical points are involved in the determination of the *conditions* of consciousness, or the circumstances attendant on the manifestation of mental energy. The most general and fundamental condition of our becoming conscious is difference or *change*. The even continuance of one impression tends to unconsciousness; and there are a number of facts that show that if an influence were present in one unvarying degree from the first moment of life to the last, that influence would be to our feeling and knowledge as if it did not exist at all. This was formulated by Bain as the Law of Relativity. See also **DREAMS, PERSONALITY, PSYCHOLOGY**.

**Conscription.** A government, failing to obtain under voluntarism the number of recruits it needs for its war forces, resorts to the method of calling up by law the required number. If all the youths of military age are not needed, exemptions are first granted on certain accounts, as to an eldest male orphan, pupils of certain colleges, &c.; if there is still a superfluity, lot-drawing is resorted to. Conscription proper thus differs from universal military service. Before the Great War France, owing to stationary population and the German danger, had nearly reached the universal; Germany, great and growing, was still able to allow exemptions freely. Great Britain, her dependencies, the United States, and China were the only important peoples that had not adopted conscription, but the war forced it upon us and the United States. In peace-time the usual age for calling up was twenty years, but the strain of the war reduced this as low as to eighteen.

As an example of the working of the system, France was able to have about 300,000 recruits annually (before the war) out of 40 millions of a population. These served three years in the active army, eleven in army reserve, seven in territorial army, seven in its reserve, the men being thus liable to the age of forty-eight. Germany drew more than 300,000 annually with great ease out of her population of 65 millions, kept them for two years in the active army, and let them go at forty-five years of age. By the peace treaties of 1918-20

compulsory recruiting was forbidden in the defeated countries. The British Empire and the United States also abandoned conscription, but the latter at least tends towards universal military training.

Felons, being called up, are usually disposed of into 'penal battalions,' the French, for instance, sending them to Africa and Madagascar. In the Great War most of the active belligerents swept away all exemption rules, allowing to remain in civil life only those between eighteen and fifty who were reckoned indispensable for national work.

In the United Kingdom a form of conscription was created by the Ballot Act of 1860, which provides for all males over 5 feet 2 inches between the ages of eighteen and thirty being called upon to serve in the militia, but is held in abeyance by an annual act of parliament. In the Channel Islands, service in the militia is compulsory for the physically fit, from sixteen to forty-five years of age. Breaches of discipline are punished by the civil magistrate by fine or imprisonment.

**Consecration** is the act of solemnly dedicating a person or thing to the service of God. In the Jewish law, rites of this nature are frequently enjoined, the Levites and priests, the tabernacle and altar, &c. being specially dedicated or consecrated to God; and analogous forms occur in most pagan nations. Among Christians the word consecration describes—(1) the ordination of bishops. The Nicene Council (can. 4) requires the ceremony to be performed by not less than three bishops. This rule is maintained by the Church of England. Among Roman Catholics the pope may permit consecration by one bishop and two priests. (2) The hallowing of the elements in the eucharist, by the words of institution according to Roman Catholics and Anglicans; by the invocation of the Holy Spirit according to the Greeks. (3) The dedication of churches; first mentioned by Eusebius, *Hist. Eccles.* x. 3. The rites, originally very simple, have become long and elaborate in the Church of Rome, though the present form is in substance as old as the Sacramentary of St Gregory. In the English Church the bishop chooses his own form. That most generally used was drawn up by the Anglican episcopate in 1712. In the American Episcopal Church a form was appointed in 1799. (4) The benediction of abbots and abbesses according to forms prescribed in the Roman Pontifical. It is usually performed by a bishop. (5) The consecration of altars, chalices, and patens by the bishop with the chrism or hallowed oil. The consecration of altars is mentioned by councils of the 6th century, that of chalices and patens in the Gregorian Sacramentary.

**Consecutive**, a term in Music. The rules of harmony forbid consecutive octaves or fifths in part-writing, though there are exceptions in modern music.

**Consent** is the foundation of all contracts and legal obligations. The doctrine that the free consent of the parties bound, and not the will of any earthly legislator, or the form in which that will is expressed, constitutes the binding element in contracts, flows as an inevitable logical consequence from the doctrines of personal and political freedom. All that either civil or ecclesiastical authority can do is to ascertain, at the instance of one or other of the parties, whether consent has or has not been given.—For consent in a girl, under the Criminal Law Amendment Acts, see ABDUCTION.

**Conservation of Energy.** See ENERGY.

**Conservative**, as applied to one of the two great parties in English politics, was first used by J. W. Croker in an article in the *Quarterly* for January 1830, and was by Macaulay in the *Edinburgh* for 1832 referred to as a 'new cant word.'

*Conservative* accordingly began to supplant *Tory* about the time of the Reform Bill struggle. See *TORY*, and Lord Hugh Cecil's *Conservatism* (1912).

**Conservatoire**, or CONSERVATORIUM (Ital. *conservatorio*), a name given by Italians and others to schools instituted for the purpose of advancing the study of music and maintaining its purity. In the earliest times these schools were partly attached to benevolent institutions and hospitals; others, again, were supported by opulent private individuals. They were originally intended for foundlings, orphans, and the children of poor parents. Some trace their origin to St Ambrose, Bishop of Milan, in the 4th century, or St Leo, who flourished in the 5th. They were largely developed by Gregory the Great. The scholars, male and female, all received free board, lodging, and clothing, and were taught to sing and play. Extra boarders were also admitted on paying a fee. In Naples there were at one time four such schools, while in Venice there were four expressly for females. In 1808 the Neapolitan conservatoires were reduced to one, under the name of Reale Collegio di Musica. The Venetian conservatoires shared in the downfall of the Venetian republic. A new grand conservatoire was founded at Milan in 1808, which still exists. In France the necessity of a school for educating singers gave rise to the *École Royale de Chant et de Déclamation* in 1784. During the French Revolution, in consequence of the scarcity of instrumental musicians for the army, the government decreed the erection of an Institut National de Musique in 1793, which was changed into the present establishment in 1795 under the name of the Conservatoire de Musique. The yearly expenses of this conservatoire were fixed at 240,000 francs, the number of masters was 125, and the pupils of both sexes amounted to 600. The professors are about 100 in number. The tuition is divided over more than seventy different classes. The elementary works published by this conservatoire for all instruments are known over the whole world, and it possesses a library and museum of the first importance. The post of director has been held by Cherubini, 1822-42; Auber, 1842-71; Ambroise Thomas, 1871-96; Théodore Dubois, 1896-1905; Gabriel Fauré. Other important conservatoires are those of Brussels (founded 1833), Prague, Vienna (1816), and the great conservatorium of Leipzig, established in 1842 under the auspices of Mendelssohn; also those of Cologne, Munich, Stuttgart, Berlin, &c. The Royal College of Music in London, which received a charter in 1882, is designed to rival the conservatoires of the Continent. There are several of note in the United States, especially the National Conservatory of Music of America in the city of New York, the New England Conservatory of Music (1870) in Boston, the Peabody Institute, Baltimore, and the Cincinnati College of Music; and there are reputable schools of music, termed conservatories, in almost all the principal cities. The name conservatoire is used for other than musical schools in France. There is thus a *Conservatoire des Arts et Métiers* at Paris.

**Conservators of the Peace**, a title usually applied to knights elected in each shire from the 12th century onwards for the conservation of the peace. They were in fact the predecessors of the Justices of the Peace (q.v.), by whom they were superseded.

**Conservatory.** See PLANT-HOUSE.

**Conserve.** See PRESERVED PROVISIONS.

**Considérant**, VICTOR-PROSPER, French Socialist, was born in 1808 at Salins, in the department of Jura. After being educated at the Polytechnic School of Paris, he entered the army, which,

however, he soon left to promulgate the doctrines of the socialist Fourier. On the death of his master (1837), Considérant became the head of his school, and undertook the management of the *Phalange*, a review devoted to the spread of their opinions. Having gained the support of a young Englishman, Mr Young, who advanced the required sum of money, Considérant established, on a large estate in the department of Eure et Loire, a socialist colony or *Phalanstère*; but the experiment failed, and the *Phalange* fell to the ground. Thereafter he continued to promote his views in the *Démocratie Pacifique*. Among his numerous writings, the chief is the *Destinée Sociale*, dedicated to Louis-Philippe. In 1849 Considérant was accused of high treason, and fled from France. In Texas he founded a socialist community, *La Réunion*, which flourished for a time, but has since come to nothing. He returned to France in 1869, wrote occasional political pamphlets, and died 27th December 1893. See *Life* by Coignet (1895).

**Consideration**, in Law. In the law of contract a party to an agreement is said to receive 'consideration' for his promise when the other party, to whom the promise is made, does or abstains from doing something, or promises to do or abstain from doing something, in return for the promise.

In the law of England, a contract not under seal—i.e. not embodied in a Deed (q.v.)—is not legally binding unless it is based on 'valuable consideration.' A valuable consideration, in the sense of the law, may, according to a well-known definition, 'consist either in some right, interest, profit, or benefit accruing to one party, or some forbearance, detriment, loss, or responsibility given, suffered, or undertaken by the other.' Consideration, as is evident from this definition, may take the most various forms. Thus the abandonment of a right, or the compromise of a *bond fide* claim, or any labour or trouble undertaken may be a valid consideration for a promise. While consideration must be of some value in the eye of the law, it need not be adequate; nor will a court of law, in ordinary circumstances, inquire into its actual value. Where, however, the consideration is flagrantly inadequate, the fact may, in some cases, be evidence of fraud. The consideration may be either present or future; but it must not be something already past. A past consideration—e.g. something done by the other party before the promise was made—is, in effect, no consideration at all; for the promisor, in return for his promise, gets nothing which he has not got already. Similarly, if the person to whom the promise is made merely does, or promises to do, something which he is already bound to do under a general rule of law or under an existing contract, there is no consideration. Again, the consideration must not be illegal or immoral; for any contract which contemplates an illegal or immoral object is invalid. Consideration may be either 'executed' or 'executory.' Executed consideration is an act done or value given at the time of making the contract. An executory consideration is a promise to do something at a future time. Mutual promises made at the same time are concurrent considerations—the promise of one party being an executory consideration for the promise of the other party. It is now settled that a mere moral obligation is not a sufficient consideration for a promise. Thus the existence of a moral duty arising from blood relationship between the parties—though important in other branches of law—is not recognised in the law of contract as a 'valuable' consideration. While a person who promises to perform a service for another without valuable consideration is not legally bound to perform it, yet, if he does perform it, he is bound to exercise reasonable care in its performance, and is

liable for damage caused by his negligence in the performance.

In the United States the doctrine of consideration is substantially the same as exists in England.

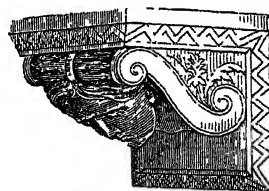
In Scotland, and in the legal systems of the Continent, the doctrine of consideration in contract is not recognised. Thus in Scotland a promise, though gratuitous, is binding in law if it is undertaken as a final engagement, and is not merely an expression of an intention; but, as a general rule, a gratuitous promise can be proved only by the writ or oath of the promisor.

**Consignment**, in Mercantile Law, is the term applied to goods which are placed in the hands of an agent or factor for sale, or for some other specified purpose. If the consigner fails, the consignee has generally a lien on the unsold goods for advances; if the consigner has to pay bills granted by consignee for advances, he may generally get back his consignment so far as unsold.

**Consistory** (Lat. *consistorium*), properly a place of assembly, but in the later Latinity the word came to signify the particular place where the privy-council or cabinet of the Roman emperor met, and after the time of Diocletian and Constantine, the council itself. The name passed over into the early Christian church. The bishops established their consistories; and the highest ecclesiastical court of the Roman Church, composed only of cardinals, still bears this name, as do also the pope's private councils. In the Lutheran Church the powers of the bishops passed largely into the hands of the princes, and consistorial courts took over the supervision of religion, public worship, the clergy, and theological training. Calvin's consistorial court was famous; and 'the consistorial system' of church government is practically presbyterianism, though the governing bodies are not called presbyteries. In England the bishops have consistorial courts for ecclesiastical causes, the chancellor of the diocese being generally the judge. In Scotland, where before the Reformation the land business of the country (as well as all matters matrimonial, which were specially consistorial business) was largely transacted in the bishops' consistorial courts, the courts survived the Reformation, but lapsed into commissary courts, as they again did into the general court system. See COMMISSARY.

**Consolato del Mare.** See CONSULATE OF THE SEA.

**Console** (Fr.), in Architecture, a projection resembling a bracket, frequently in the form of the letter S, used to support cornices, or for placing busts, vases, or figures on. Consols were often richly ornamented in the under part. The illustration, from Parker's *Glossary*, is from the palace of Diocletian at Spalato.



Console.

**Consolidation Acts**, acts of parliament which combine or consolidate into one general statute the enactments of several special measures, such as the Railway Clauses Consolidation Act, 1845, the Titles to Land Consolidation Act, 1868, &c.

**Consols**, a contraction of Consolidated Annuities. In incurring the national debt, government borrowed money at different periods on special conditions, being generally the payment of an annuity of so much per cent. on the sum borrowed. Great confusion arose from the variety of stocks thus created, and it was thought expedient to consolidate

them into one fund, kept in one account at the Bank of England. The Consolidated Annuities Act was passed in 1749-50, consolidation being completed in 1757. For consolidation of the Funded Debt subsequent to that period, see NATIONAL DEBT.

**Consonance** is a combination of notes which can sound together without the harshness produced by beats. See SOUND, MUSIC.

**Consonant.** See PHONETICS.

**Consort,** literally, one who throws in his lot with another. In English constitutional law, the term is applied to the husband or wife of the reigning sovereign, viewed not in a private but in a public capacity, as participating to a certain limited extent in the prerogatives of sovereignty. A queen-consort is specially so named in distinction from a queen-regnant, who holds the crown in her own right, as Queen Elizabeth and Queen Victoria, and from a queen-dowager, the widow of a king. A queen-consort is in all legal proceedings looked upon as a *feme-sole*, independent of her husband's control, as if she were a single woman. Coke gives as the reason for this that the common law would not have the king, whose care is for public affairs, troubled with the domestic concerns of his wife. The queen-consort has also a particular revenue and peculiar exemptions and privileges. One curious and ancient perquisite is that, when a whale, which is a royal fish, is taken upon the coast, it by right should be divided between the king and the queen, the head only being the king's property, and the tail the queen's. The consort is in all respects a subject of the sovereign; accordingly the husband of a queen-regnant is her subject, and may be guilty of treason against her. Up to the year 1857 the husband of Queen Victoria possessed no distinctive English title, and no place in court ceremonial except such as was conceded to him by courtesy. In that year the title of Prince-Consort was conferred upon him by letters-patent.

**Conspiracy,** a combination between two or more persons to perpetrate an unlawful act, or to do a lawful act by unlawful means. In criminal law, conspiracy is an indictable misdemeanour. The most important classes of conspiracy are conspiracy to commit a crime, conspiracy to cheat and defraud or to injure a man in his civil rights otherwise than by fraud, and conspiracy to obstruct or defeat the course of public justice. Formerly combinations by workmen to raise the rate of wages were conspiracy, but this is no longer so. By the Trade Union Act, 1871, the purposes of a trade union are not, by reason merely that they are in restraint of trade, to be deemed unlawful, so as to render the members liable to criminal prosecution for conspiracy or otherwise. By the Conspiracy and Protection of Property Act, 1875, no agreement or combination of two or more persons to do, or procure to be done, any act in contemplation or furtherance of a trade dispute is indictable as a conspiracy, if such act committed by one person would not be punishable as a crime. It is perfectly legal, under the existing law, for workmen to protect their interests by combining together, or forming unions, in order to stipulate with their employers the terms on which they will agree to work. But the right to combine must not interfere with the right of any workmen, who desire to keep aloof from the combination, to dispose of their labour as they think fit, or with the right of the masters to have contracts of service duly carried out. The Conspiracy and Protection of Property Act, 1875, renders liable to penalties any person who, with a view to compel any other person to abstain from doing, or to do, any act which such other person

has a legal right to do or abstain from doing, wrongfully and without legal authority uses violence to or intimidates such other person, or injures his property, or persistently follows him about, or watches or besets his house or other place where he resides or works or carries on business (commonly known as 'picketing'). Under the Trade Disputes Act, 1906, what is commonly called 'peaceful picketing' is now lawful; that is to say, it is now lawful for one or more persons, in contemplation or furtherance of a trade dispute, to picket a place 'if they so attend merely for the purpose of peaceably obtaining or communicating information, or of peaceably persuading any person to work or abstain from working.' See PLOT, SEDITION.

**Conspiracy Bill.** See POLITICAL OFFENCES.

**Constable** (Lat. *constabulus*), the title of an ancient officer, originally of high military rank, but now generally an officer of the peace. The older writers, as Coke and Selden, fancifully derive the word from *koning-stapel*, 'staff and stay of the king.' It represents, however, the Latin *comes stabuli*, 'count of the stable,' an officer who in the later Roman empire was at first charged with the care of the stables, and afterwards became captain of a military force, and chief officer of the army. The title was borrowed from the Romans by the Franks. The Constable of France rose gradually in importance from the comparatively modest position of an officer of the household, till at last he became *ex officio* the commander-in-chief of the army in the absence of the monarch, the highest judge in military offences and in all questions of chivalry and honour, and the supreme regulator and arbitrator in all matters connected with tilts, tournaments, and all martial displays. The office was suppressed by Louis XIII. in 1626. Under Napoleon, the constable was the fifth of the great dignitaries of the empire. The office was again abolished on the restoration of the Bourbons. But besides the Constable of France, almost all the great vassals of the crown had constables who filled analogous offices at their minor courts.

The Lord High Constable of England appears shortly after the Conquest as the seventh great officer of the crown, and formerly a judge in the Court of Chivalry. The office went by inheritance to the Earls of Hereford and Essex, and afterwards in the line of Stafford. When Edward Stafford, Duke of Buckingham, was attainted in 1521, the office became forfeit, and has never since been granted except for a special ceremony of state, as when it was conferred on the Duke of Wellington for the coronation of Queen Victoria. The High Constable of Scotland was an officer very similar to the Constable of France and England. The office, now purely honorary, in 1314 was made hereditary in the noble family of Erroll, and is reserved both in the Treaty of Union and in the statute of George II. abolishing hereditary jurisdictions. The High Constable is by birth the first subject in Scotland after the blood-royal.

The governor of a royal castle was often called Constable; see the article LONDON. The Constables of the Hundred, and of the Vill, were the predecessors of the high and petty constables of later times. The statute of Winchester (1285) ordains that in every hundred or franchise there shall be chosen two constables, to make the view of armour, and to see to the conservation of the peace. The petty constable exercised similar functions within the narrower limits of the township or parish, and was subordinate to the high constable of the hundred. The high constables were formerly appointed by the courts leet of the franchise or hundred over which they presided; or, in default of such appointment,

by the justices at their special sessions. An act of 1869 made provision for the abolition of the office of high constable throughout England and Wales. The appointment of petty constables was made by the justices, who were directed annually to require from the overseers of parishes a list of those within the parish qualified and liable to serve as constables. When not specially exempted, every able-bodied man, between twenty-five and fifty-five, resident in the parish, and rated to the poor, or a tenant to the value of £4 per annum, was to be included in this list.—SPECIAL CONSTABLES are persons sworn in by the justices to preserve the peace, or to execute warrants on special occasions, as in 1848 (the Chartists), in 1887 (the 'unemployed' riots in Trafalgar Square, London), and in 1914 (the Great War). Any two justices of the peace who shall learn that a tumult, riot, or felony has taken place, or is apprehended, may swear in as many householders or others as they may think fit, to act as special constables. The lord-lieutenant may also, by direction of one of the principal secretaries of state, cause special constables to be appointed for the whole county, or any part of it. By the Special Constables Act, 1923, amending and making perpetual those of 1914, regulations may be made by Order in Council providing for appointments being made though no riot or felony has taken place or is apprehended; and special constables may be substituted for metropolitan police at armament depots, &c. Special constables in Scotland are appointed by the burgh magistrates or the standing joint committee of the county. In the United States they are generally elected by the people, but special constables may be appointed by the authorities in emergencies. The title of High Constable is in some American cities given to the principal police officers. For county constabulary, see POLICE, and for the Irish constabulary, IRELAND.

**Constable, ARCHIBALD**, publisher, was born at Carnbee, Fife, 24th February 1774, and became a bookseller's apprentice in Edinburgh (1788-95). He then started as a bookseller at the Cross of Edinburgh, and speedily gathered round him the chief book-collectors of the time. He gradually drifted into the publishing business, secured the copyright of the *Scots Magazine* in 1801, and was chosen as the publisher of the afterwards famous *Edinburgh Review*. He published for all the leading men of the time, and his quick appreciation of the merits of the works of Sir Walter Scott became the envy and wonder of the book-trade. There were several business partners in the career of Constable & Co., but Archibald Constable was from first to last the mainspring of the concern. Had painstaking business qualities kept pace with his shrewdness and large-minded literary transactions, business calamities might have been averted. 'Among all his myriad of undertakings, I question,' says Lockhart, 'if any one that really originated with himself, and continued to be superintended by his own care, ever did fail.' In 1812 he purchased for between £13,000 and £14,000 the copyright of the *Encyclopædia Britannica*. In the commercial crisis of 1826 Constable & Co. failed, the liabilities amounting to upwards of a quarter of a million. The only noteworthy publishing scheme of Constable after this failure was the issue of his celebrated *Miscellany*. He died July 21, 1827. See *Archibald Constable and his Literary Correspondents*, by his son, Thomas Constable (1873).

**Constable, HENRY**, poet, was born in 1562, son of Sir Robert Constable of Newark, a soldier who was knighted by Essex in 1570. At sixteen Henry entered St John's College, Cambridge, early turned Roman Catholic, and betook himself to

Paris. He was pensioned by the French king, and seems to have been often employed in confidential missions to England and to Scotland. He died at Liège, 9th October 1613. In 1592 was published his *Diana*, a collection of twenty-three sonnets; two years later, the second edition, containing seventy-six, but some of these by his devoted friend, Sir Philip Sidney, and other poets. Constable's sonnets are quaint, and sometimes laboured, but they are instinct with fancy and the tremor of genuine poetic feeling. Constable contributed to *England's Helicon* (1600), and sixteen 'spiritual sonnets' to Park's *Heliconia*. See editions by W. C. Hazlitt (1859) and John Gray (1897).

**Constable, JOHN, R.A.**, landscape-painter, was born at East Bergholt, Suffolk, where his father was a well-to-do landowner and miller, 11th June 1776. At the age of eighteen he assisted his father for about a year in the mill; but his love of art was irrepressible, and it was encouraged by Sir George Beaumont, who prevailed upon his family to send him to London. Here he arrived in 1795; and, after an interval of a year spent in his old employment, he returned in 1799, and entered the schools of the Royal Academy, to whose exhibition he sent a work in 1802. Hitherto he had been carefully studying the methods of other painters, poring over Sir George's great Claude, and copying Ruysdael, seeking, as he says, 'truth at second-hand.' He now turned exclusively to nature, resolving to free himself from conventionality, to paint the very fact, to 'adopt a pure and unaffected manner of representing the scenes that may employ me.' But the public, trained to admire an artificial and pseudo-classical adaptation of nature, cared little for his simple renderings of common subjects, and he was nearly forty before he sold a single landscape beyond the circle of his relatives and personal friends. Meanwhile he supported himself by painting likenesses; he copied portraits by Reynolds for the Earl of Dysart, and executed altar-pieces for the churches of Brantham and Nayland in Suffolk.

In 1816 he married Mary Bicknell; and in 1828, on the death of her father, solicitor to the Admiralty, an inheritance of £20,000 placed the family in easy circumstances, and enabled Constable to devote himself quite exclusively to his beloved but unremunerative landscape work. In 1821 he had won the best artistic triumph of his life, in the applause which greeted the appearance of his 'Hay-wain' (then titled 'A Landscape—Noon'), when it was exhibited in the Paris Salon by a French purchaser. Not less marked was the impression produced by his 'White Horse,' at the Lille Exhibition in 1825. Each work gained a gold medal, and the former in particular won the warmest enthusiasm of Delacroix and the other leaders of the romantic school, and exercised a definite and powerful influence upon the future of landscape art in France. Appreciation of this sort was more precious to a true artist than such formal academic honours as Constable won in England, than his election as Associate in 1819, and his tardy and ungraciously awarded promotion to membership in 1829. His later years were saddened by the deaths of his wife and his friend Archdeacon Fisher, by ill-health, and by great depression of spirits; but he worked steadily at his art, though his landscapes still were frequently unsold, producing 'Salisbury Cathedral from the Meadows' (1831); 'Waterloo Bridge,' then titled 'Whitehall Stairs' (1832); and 'The Valley Farm' (1835). He was engaged upon 'Arundel Mill and Castle' at the time of his death, which occurred suddenly, on the 31st of March 1837.

The art of Constable marks the first definite departure in the history of English landscape from the conventional treatment of our earlier painters,

the breaking away from the traditions of Claude and the Dutch masters, the return to direct and personal impressions of nature. With a broad and rapid touch he renders all the force and variety of colouring that full-leaved English landscape presents; catches, with singular skill, her passing effects of rain-cloud and sunlight; suggests, with swift and unsurpassable power, her sense of glitter and motion. Mr Ruskin's criticism has, alike in its general scope and in most of its specific references, done much to disparage Constable's art in the estimation of the public of the time that is just passing; but already there is a recoil on the part of both painters and critics from the detailed intricacy of pre-Raphaelite methods; Constable's works are assuming their true place in the sequence of our national art; and their painter is being recognised as one of the very foremost figures of English landscape painters.

The most important of the engravings after Constable are the mezzotint plates by David Lucas. See his *Life* by C. R. Leslie (1843; new ed. 1896; French trans. 1905), and E. V. Lucas, *John Constable the Painter* (1924); also shorter works by C. J. Holmes (1902), Lord Windsor (1903), M. S. Henderson (1905), and F. Rutter (1924).

**Constable, SIR MARMADUKE** (1455?-1518), of Flamborough, served in France in 1475 and 1492, executed diplomatic commissions in Scotland, and fought at Flodden. Four scholarships were founded in his name at St John's College, Cambridge (1522).

**Constance**, or **KONSTANZ**, sometimes **KOSTNITZ**, a city of Baden, once a free imperial city, on both sides of the Rhine, at its exit from the Lake of Constance, 73 miles E. of Basel. One of the most ancient towns of Germany, Constance owed its prosperity to its linen industry, for which it was already famous in the 12th century; but five centuries later this had sunk greatly, and it has only been partially revived since the establishment of railways. Its manufactures include linen, cotton, jute, and waterproof fabrics, canvas, carpets, and chemicals; and other industries are bell-founding, printing, and publishing. Beside the picture-gallery, library, and town-hall, with a valuable collection of archives, the most noteworthy buildings are the cathedral (part of which dates from the 11th century), the old Dominican convent (now an hotel), and the present market-hall, in which three places the sessions of the great council were held. Population, 30,000.—The most notable event in the history of Constance is the meeting of the ecclesiastical council here in 1414-18 with a view to put an end to the disorders in the papedom and in the election of popes, and also to prevent the spread of the doctrines of Huss. There assembled with the Emperor Sigismund and Pope John XXIII. 3 patriarchs, 33 cardinals, 47 archbishops, 145 bishops, 124 abbots, 750 doctors, and about 18,000 priests and monks, besides numerous princes and counts of the empire, and representatives from all the monarchs of Catholic Christendom; and the retinues of these members of council swelled the number of strangers resident in the town to over 50,000. The three rival popes, John XXIII., Gregory XII., and Benedict XIII., were deposed, and Martin V. was elected. Huss (q.v.) and Jerome of Prague (q.v.) were condemned and burned. The emperor was, however, disappointed in his hope of a thorough reform of the church (*causa reformationis*), in spite of the efforts of such advocates of reform as Peter d'Ailly and Gerson (q.v.); and the Council of Basel (q.v.) was afterwards called to carry on the work which the Council of Constance had failed to accomplish.

**Constance, LAKE OF** (called by the Germans *Bodensee* or *Bodmansee*—the *Lacus Brigantinus*

of the Romans), lies between Switzerland and Germany, and on the north side of the Alps of Switzerland, and forms a meeting-point of the five territories—Baden, Württemberg, Bavaria, Vorarlberg, and Switzerland. It has an elevation of 1309 feet above the sea. The Lake of Constance is traversed by the Rhine from east to west; its greatest length is about 46½ miles, and utmost breadth 10½ miles, the area being 204½ sq. miles; the mean depth is 490 feet, while the greatest depth is 827 feet. The southernmost of the two western extremities is called the lower lake, and is separated from the main lake by a narrow channel two miles long, and lies full a yard below the level of the lake. The shores are formed by hilly lands, with low tracts at the mouths of the Rhine and smaller rivers. Cornfields, vineyards, pastures, orchards, and wooded declivities, with here and there the ruins of old castles interspersed, surround the lake. The water has a dark-green hue, often rises suddenly some ten or twelve feet during a thaw, and rolls in high waves during the prevalence of a strong south, north-west, or east wind. Without visible cause it sometimes rises and falls to a considerable degree. Usually the level rises from June onwards to August, when it sinks again. It is seldom frozen, except in very severe winters. The fisheries of this lake are important. Since 1824 steam-navigation has added to the facilities of commerce across the lake, and its commercial importance has been greatly increased by the connection of the chief towns on its shores with the railways of South Germany and Switzerland. The chief towns are Constance, Bregenz, Lindau, and Friedrichshafen. See Capper's *Shores and Cities of the Bodensee* (1881).

**Constans**, youngest of the three sons of Constantine the Great, received Illyricum, Italy, and Africa as his share of the empire. After the defeat and death of his elder brother Constantine, in 340 A.D., Constans became sole ruler of the West till his death in 350.

**Constant, BENJAMIN**, subject-painter, was born in Paris, 10th June 1845. He studied in the Ecole des Beaux-Arts and under Cabanel, and began to exhibit at the Salon in 1869, with his 'Hamlet and the King,' a work purchased by the French government. He soon turned to those Eastern subjects for the treatment of which he is best known, producing 'Prisoners in Morocco' (1875); 'Mahomet II.' (1876); 'The Harem' (1878); 'The Favourite of the Emir' (1879); 'The Day after a Victory in the Alhambra' (1882); and 'The Vengeance of the Chérif' (1885). His works are characterised by direct and powerful but frequently most repulsive realism, melodramatic feeling, bold portrayal of the nude, and vivid colouring; and he received medals in 1875 and 1876, and the decoration of the Legion of Honour in 1878. He died 26th May 1902.

**Constant de Rebecque, HENRI BENJAMIN**, author and politician, was born of French Huguenot ancestry at Lausanne, 23d October 1767. He was educated at Oxford, Erlangen, and Edinburgh, where he became acquainted with Mackintosh and Erskine. In 1795, settling in Paris, he quickly gained reputation as a publicist. He entered the Tribunat in 1799, but was banished from France in 1802, for having denounced the despotic acts of Napoleon. After travelling over Germany and Italy, in company with Madame de Staël, he lived for a number of years in Göttingen. On Napoleon's fall in 1814 he returned to Paris, and issued several pamphlets advocating constitutional liberty; during the Hundred Days he became one of Napoleon's Councillors of State, though previously he had styled Napoleon a Genghis Khan, and his government a government of Mamelukes. After

the second restoration of the Bourbons, Constant wrote and spoke consistently in favour of constitutional freedom. He was returned to the Chamber of Deputies in 1819, and became the leader of the Opposition. He was the ablest controversialist among the *Doctrinaires*, the French Whigs. The greater number of his very able political pamphlets were collected under the title of *Cours de Politique Constitutionnelle* (4 vols. 1817-20); his *Discours* were published in 1828. He died 8th December 1830. His powerful intellect had many sides. In *De la Religion* (5 vols. 1824-31) he maintained that the spirit of religion, as it grows loftier and purer, casts off the various forms in which it has been embodied, and which obstruct its expansion. He was likewise the author of a remarkable novel, *Adolphe* (1816), a short story of love and disillusion, in which Constant forestalls the method of the analytic novelists. His Correspondence appeared in 1844, his *Œuvres Politiques* in 1875, his Letters to Madame Récamier and his family in 1882-88, and his *Journal Intime* in 1894. See Life by Elizabeth Schermerhoin (1924).

**Constantia**, a district on the slopes of Table Mountain, about 10 miles south of Cape Town, between Wynberg and Hout Bay. The governor, Simon van der Stel, laid out a farm here in 1684, which became famed for the quality of the sweet wines it produced. Groot Constantia is still a government experimental wine farm. The district also produces fine fruit. For wine-growing at the Cape, see CAPE OF GOOD HOPE.

**Constantina**, a town of Spain, in Andalusia, situated in a mountainous district, 40 miles NNE. of Seville, with silver-mines, and a trade in wine and vinegar; pop. 13,500.

**Constantine**, capital of the easternmost department of Algeria, is very picturesquely situated on a nearly isolated chalk rock with flat summit, three sides of which are washed by a small stream, flowing through a deep and narrow ravine, and the fourth is connected by a narrow ridge with the adjoining mountains. It is 830 feet above the river, and 2160 feet above the sea; it is connected by rail with its port Philippeville, 40 miles NE., as also with Algiers and with Tunis. It is surrounded by walls constructed by the Arabs out of Roman sculptured stones. There are practically two cities, the French and the Arab, though the running of wide streets through the Arab town has taken away much of its primitive oriental look. Constantine was anciently the capital of Numidia, called *Carta* by the Carthaginians, *Cirta* by the Romans; and near it many notable events occurred in the wars with Jugurtha. It was destroyed about 311 A.D., but was soon rebuilt by Constantine the Great, from whom it derives its present name. It held out against the Vandals and other besiegers, but was taken by the Arabs in 710. Subsequently, it shared in general the fortunes of Algeria (q.v.). Constantine manufactures woollen cloths, saddlery, leather goods, and carpets; it is a great trade centre, being the chief grain market of Algeria, and exports oil and wool. Pop. 78,000, of whom about half are French, with many Jews.

**Constantine I.**, Roman emperor, 306-337 A.D. FLAVIUS VALERIUS AURELIUS CONSTANTINUS, surnamed 'the Great,' was born c. 274, at Naissus, in Upper Moesia. He was the eldest son of Constantius Chlorus and Helena, and first distinguished himself as a soldier in Diocletian's famous Egyptian expedition (296), next under Galerius in the Persian war. In 305, the two emperors, Diocletian and Maximian, abdicated, and were succeeded in the supreme rank of Augustus by the two Cæsars, Constantius Chlorus and Galerius. Galerius, envious of young Constantine's

brilliant genius and popularity among the soldiers, took every means of exposing him to danger, and it was now that he acquired that mixture of reserve, cunning, and wisdom which was so conspicuous in his conduct in after-years. At last, extorting a reluctant consent from the jealous Galerius, he made his way hastily to his father, who ruled in the West, and joined him at Boulogne just as he was setting out on an expedition against the Picts in North Britain (306). Constantius died at York in the same year, having proclaimed his son Constantine his successor. The latter now wrote a conciliatory letter to Galerius, and requested to be acknowledged as Augustus. Galerius did not dare to quarrel with Constantine, yet he granted him the title of Cæsar only. Political complications now increased, until in 308 there were actually no less than six emperors at once—Galerius, Licinius, and Maximin in the East; and Maximian, Maxentius his son, and Constantine in the West. Maxentius having quarrelled with his father, forced him to flee from Rome; he took refuge with Constantine, who had married his daughter Fausta at Arles in 307, but was ungrateful enough to plot the destruction of his benefactor. This being discovered, he fled to Marseilles, the inhabitants of which were just about to give him up to the conqueror, when he anticipated his fate by suicide (309). Maxentius professed great anger at the death of his father, and assembled a large army, with which he threatened Gaul. Constantine anticipated his movements by crossing the Alps by Mont Cenis, and invading Italy. Already twice he had defeated Maxentius, when he finally crushed his power by the great victory of the Milvian Bridge, near Rome, 28th October 312. Maxentius himself was pressed by the thronging crowd of fugitives over the bridge into the river, and drowned. Constantine now entered the capital, disbanded the Pretorian guards, and destroyed their camp. During his short stay in Rome he assumed the title of *Pontifex Maximus*. It was during his final struggle with Maxentius that the famous incident occurred that is said to have caused Constantine's conversion, and which Eusebius gives us an account of from the lips of the emperor himself. At noon there appeared in the sky a flaming cross inscribed 'Εν τούτῳ νικά' ('By this, conquer'). Again, the night before the final battle, a vision appeared to Constantine in his sleep, bidding him inscribe the shields of his soldiers with the sacred monogram of the name of Christ. Hence the well-known *Labarum* (q.v.) or standard of the Cross (q.v.), which Constantine, however, did not give his army, according to Gibbon, till 323. Whatever the story of the conversion be worth, one satisfactory consequence was the edict of Milan (March 313), issued conjointly with Licinius, giving civil rights and toleration to Christians throughout the empire.

Constantine was now sole emperor of the West. Similarly, by the death of Galerius in 311, and of Maximin in 313, Licinius became sole emperor of the East. In 314 a war broke out between the two rulers, in which Licinius had the worst, and was fain to conclude a peace by the cession of Illyricum, Pannonia, and Greece. Constantine gave Licinius his sister Constantia in marriage, and for the next nine years devoted himself vigorously to the correction of abuses in the administration of the laws, to the strengthening of the frontiers of his empire, and to chastising the barbarians, who learned to fear and respect his power. In 323 he renewed the war with Licinius, whom he defeated, and ultimately put to death. Constantine was now at the summit of his ambition, the sole governor of the Roman world. He chose Byzantium for his capital, and in 330 solemnly inaugurated it as the seat of

government, under the name of Constantinople or City of Constantine. Two deeds of Constantine have thrown a dark shade over his memory. In 326 his eldest son (by his first wife), Crispus, a gallant and accomplished prince, who was very popular, he put to death on a charge of treason; and next year his own second wife, Fausta, mother of the three sons, Constantius, Constantine II., and Constans, amongst whom he divided his empire. In 325 was held the great Council of Nicæa, in which he opposed the Arians on political grounds, as the weaker party; but not being theologically interested in the dissensions, he refrained from active persecution. In 324 Christianity became the state religion. Yet it was only a short time before Constantine's death, which occurred 22d May 337, that he would allow himself to be baptised by the Arian bishop, Eusebius of Nicomedia. The story of his baptism at Rome by Pope Sylvester in 326, and of the so-called *Donation of Constantine* thereafter, alluded to in Dante's *Inferno*, and often cited in support of the temporal power of the papacy, may safely be dismissed (see CANON LAW). See books on him by Cutts (1881), J. B. Firth (1905), and Coleman (1915); and for other Constantines, see BYZANTINE EMPIRE.

**Constantine**, king of Greece, was born at Athens, 2d August 1868. Of Orthodox faith, and the first prince of a Greek reigning dynasty born in modern times on Greek soil, he embodied from the first the national aspirations of the Greeks. He studied under private tutors at Athens, and, while receiving his military education in Germany, attended also some courses at the university of Leipzig. By marrying in 1889 Sophia Dorothea of Hohenzollern, sister of Kaiser William II. of Germany, he became, in popular belief, that Constantine of ancient prophecy who, wedded to a Sophia, was to restore the empire of Byzantium to the Greeks. He commanded in 1897 the Greek forces in the disastrous war with Turkey, and, as the result of the rising of the garrison of Athens in 1909, suffered with his brothers removal from military command, and virtual exile for a time. But in 1913 he succeeded to the throne at a moment when his successes in the Balkan wars had removed the obloquy into which his military reputation had fallen. During the Great War Constantine strove for the maintenance of Greek neutrality, in direct defiance even of popular will as constitutionally expressed. The belief that Constantine was covertly, and even openly, hostile to the Entente led in 1917 to an allied demand for the abdication of himself and his eldest son, whereupon he withdrew to Switzerland, and was succeeded by Alexander, his second son. But on the untimely death of the latter in 1920, the ex-king was triumphantly recalled by plebiscite to the throne. In the following year he led Greece to war with Turkey, but revolution at home followed the overwhelming defeat of his arms in Anatolia; and in 1922 he was obliged for the second time to abdicate. Retiring to Palermo, he died there, 11th January 1923, and was succeeded by George, his eldest son.

**Constantine Nikolaevitch**, Grand-duke of Russia, the second son of the emperor Nicholas I., and the brother of Alexander II., was born 21st September 1827. During the Crimean war he commanded the Russian fleet in the Baltic, and directed the defensive preparations which held the English and French armaments in check before Cronstadt. The leader of the Muscovite or national party, he strenuously opposed the concessions made to the western powers, but throughout gave, though contrary to expectation, steady allegiance to his elder brother from his accession to his unhappy death. On the outbreak of the

Polish insurrection in 1862, he held the office of viceroy of Poland for three months, was appointed in January 1865 and reappointed in 1878 president of the council of the empire. After the accession of his nephew, Alexander III., in 1881, he was deprived of his offices on suspicion of having intrigued with the revolutionary party, and retired from public life, dying in 1892.

**Constantinople**, 41° N. lat., 28° 59' E. long., long capital of Turkey, stands on a site partly occupied by the ancient Byzantium. The Turks call it Istambul or Stambol. The original Byzantium was a colony (about 658 B.C.) from Megara, with an Aigive mixture. It was built on the apex of the triangular peninsula which juts out towards Asia on the southern side of the Golden Horn, where the present Eski Serai or 'Old Seraglio' stands, and its commanding position made it an object of strife among the nations—Persians, Gauls, and Greeks. In the middle of the 4th century B.C., the Athenians under Demosthenes, coming to the assistance of the Byzantines, repelled the siege of Philip of Macedon, aided, according to the legend, by the supernatural appearance of a crescent in the sky, which revealed the advance of the invaders, and was forthwith adopted as the badge or crest of the city, as it is to this day. After its submission, the Roman emperors long recognised its virtual independence, and in 328 A.D. Constantine the Great founded in the place of Byzantium a new metropolis on the Bosphorus, which he called New Rome, and which also received in his honour the name of Constantinopolis. The place was inaugurated in 330 as a new seat of Roman government, and for eleven centuries remained the capital of the Eastern Roman empire, giving its laws, its architecture, and its creed to the other countries. Its walls were enlarged by Anthemius under Theodosius II., and its public buildings were enriched by Justinian in 527-65. Since then it has undergone many sieges by Sassanians, Persians, Avais, Saracens (six times), Russians (in 9th to 11th century), Latins, and Turks; and of its twenty-six sieges and eight captures, that of the Latins under Baldwin and Dandolo in 1204 was by far the most disastrous, barbarous, and spoliating. In comparison, the Turkish sieges were humane and chivalrous: the first took place in 1356; Murâd II. made the attempt again in 1422; and Mohammed II. carried the city against the resolute resistance of Constantine Palæologus and Giustiniani in 1453. Since then, such has been the renown of the Turks or the jealousy of the powers that the imperial city has witnessed no fresh siege by foreigners, though the Bulgars came dangerously near in 1912. After the Great War Constantinople was left to the Turks, but was superseded by Angora as capital.

Constantinople consists of two distinct parts, besides more distant suburbs—Constantinople proper or Stambol, and what may be termed Christian Constantinople, where the Christian colonies chiefly congregate. The two are separated by the Golden Horn, a creek about 5 miles long and half a mile wide at the entrance, so called probably from its famous fisheries, a veritable horn of plenty to the ancient inhabitants; in the present day a safe, deep, and capacious harbour. Stambol or Turkish Constantinople lies on the southern side of the Golden Horn, and Christian Constantinople lies on the north side; the two are connected by a couple of rude but convenient bridges. Stambol is on the site of Byzantium, and the old walls of Constantine show that the modern Turkish city occupies much the same area as the capital of the first Christian emperor. The walls run a circuit of 14 miles from the grim but now ruined and disused castle of the Seven Towers—where many sultans met their deaths at the hands of

their mutinous soldiery, and where foreign ambassadors were imprisoned upon declaration of war—to the Golden Horn, then along its southern shore to Seraglio Point, and so back to the Seven Towers close along the margin of the Propontis. Within these walls the city rises, like Rome, upon seven low hills, crowned by noble mosques, with a wilderness of picturesque, tumble-down, filthy, wooden houses, and lane upon lane of even more picturesque and scarcely less dirty bazaars, climbing up their sides from the Golden Horn to the Hippodrome. Years ago Stambol was more beautiful and more filthy, but fire has so repeatedly laid it low that the old streets are becoming few, and their place is being taken by more sanitary but not equally pleasing thoroughfares and brick or stone houses. In the bazaars and some of the less reformed byways there is left quite enough of the old Mussulman leaven to make one aware of the charms and the drawbacks of an oriental city. Very few of the goods, however, which the admiring tourist carries away from the bazaars are made there; many come from Vienna, and not a few from Manchester.

In Stambol are nearly all the monuments. In the row of some half-dozen mosques, whose conglomeration of domes and semi-domes, like a clustered jelly-mould, contrasting with the numerous tall and exceedingly slender minarets, crown the summits of the hills, we see some of the most famous and magnificent monuments of Christian and Turkish art. First, next the Seraglio, stands Agia Sophia, Saint Sophia, the church dedicated by Constantine to 'Holy Wisdom,' and rebuilt with added splendour by Theodosius (415) and by Justinian (533-563), and now converted into a cathedral mosque. Outside it is not worth a second glance; but within, the airy grace of its stupendous dome, and the beauty of its marbles and mosaics, despite all the ravages of Moslem and, worse than Moslem, tourists' desecrations, fascinate and amaze the vision (see *BYZANTINE ARCHITECTURE*). Next, but not less beautiful, is the Suleymaniya, the mosque which the Great Suleyman and his architect Sinan erected in 1550-55 on the model of St Sophia, but with Saracenic ornament and a loftier though not quite so expansive dome. Some of the monolithic columns are remarkable for their size and beauty, and the general effect is even more imposing than that of St Sophia. Scarcely less stately is the mosque of Ahmed I. (1610), in the Hippodrome, distinguished without by its six minarets (instead of the usual four), and within by the four gigantic columns, 36 yards round, which support the dome; here the official celebrations and formal processions take place at the great festivals. The mosque of the conqueror Mohammed II. was unfortunately altered in the rebuilding of 1768. There are some beautiful royal mausoleums, and over three hundred other mosques in Constantinople, and an even larger number of chapels, but very few of them present features of special interest, except sometimes in the beauty of their wall-tiles, of the Rhodian style, for the manufacture of which the suburb of Eyvâb was famous.

The remains of the Greek churches are more interesting, and the Fanar, or Greek quarter of Stambol, recalls the memories of many distinguished Fanariote statesmen; but among the relics of ancient Constantinople none is more striking than the Hippodrome (now called At-Meydan, or 'Horse Manège'), originally a circus surrounded by marble seats, long since removed, but still showing remains of antiquity, such as the famous column of the Three Serpents which once stood at the Temple of Delphi, and supported a gold tripod made out of the spoils taken by the Greeks at the battle of Plataea, but was removed to his new capital by Constantine.

The serpents' heads are broken off; one was said to have been struck off by the scimitar of Mohammed the Conqueror, and one is still preserved in the museum of antiquities. In the Hippodrome also stands an obelisk brought from On (Heliopolis) in Egypt, and re-erected by Proclus the Pætor in the reign of Theodosius; hard by are the Burnt Column, the column of Theodosius, and the Seraskier's Tower, whence watchmen survey the city and give warning of conflagrations. Among the remains of Mohammedan splendour the Old Seraglio (Eski Serai) is the most important, though it has not been a royal residence since the days of Mahmûd II. Its first gate, Bab-i-Humayûn or 'Sublime Porte,' has given its name to the Turkish government in its foreign relations. Within its three spacious courts, full of beautiful trees and picturesque in their gray decay, are various stables and former offices of the court, the old council chamber, the armoury (once the Church of St Irene), the museum, mint, and the celebrated treasury, where uncut jewels, gold-embroidered vestments, and gorgeously mounted arms are preserved in fabulous value. The museum contains the famous Sidon sarcophagi and the products of many excavations, and a school of art is now attached. In the neglected gardens overlooking Seraglio Point are various kiosks, one of which, called that of Baghdad or Murâd IV., is lined with exquisite tiles, another contains the library of the sultans, and a third is the ominous Kafes or 'cage' where the unhappy princes who menaced the peace of sultans were immured for life. There are in Constantinople hundreds of *medreses* or mosque colleges, and *mektebs* or elementary schools; a university (re-organised since 1918) was founded in 1900, with faculties of arts, theology, law, medicine, and science.

Christian Constantinople comprises Galata, Pera, and Top-hâna. Galata is pre-eminently the merchant quarter, the seat of customs, and the steam companies' agencies; it was granted to a colony of Genoese merchants in 1265, and originally was enclosed by walls of 4 miles circuit, now destroyed. Traces of Genoese architecture may still be found in the narrow, dirty streets, and in the Tower of Galata, once the citadel, which serves the same purpose as the Seraskier's Tower on the opposite side in giving alarms of fires. Galata has been considerably improved; stone and brick houses have superseded the dangerous wooden constructions of the past; a good thoroughfare with a tramway extends to Beshiktash; a fine quay has been built on the shore of the Golden Horn, corresponding to a similar quay on the Stambol side (opened in 1900); and a tunnelled railway drags passengers up the steep ascent to Pera. Pera is the fashionable quarter; here are all the embassies and legations and consulates, and here every one of position has his town-house. Two-thirds of this quarter were burned down in 1870. The result was a considerable improvement in the architecture and ventilation of Pera. The steep and badly paved Grande Rue, which traverses the whole quarter, and is continued along the shore of the Bosphorus for many miles, is, however, still in parts little better than a lane; but it is lined with fair if expensive shops, and boasts an opera-house, and many cafés and restaurants, besides most of the principal hotels, and nearly the worst morals in Europe. In Pera is the English Memorial Church, erected in honour of those who fell in the Crimean war. Turks preponderate at Top-hâna, so named from its cannon-foundry. Close by is the magnificent palace of Dolmabahçhé, on the brink of the Bosphorus.

Among the other suburbs may be mentioned Kâsim Pasha, extending beyond Galata, along the north shore of the Golden Horn, the seat of

the admiralty; continued by Haskoi, inhabited by a Jewish and Armenian colony; and at the head of the Golden Horn the picturesque village of Eyyûb, a green medley of gardens and graveyards surrounding the celebrated mosque where every sultan had formerly to be girt with the sword of Osman before he ascended the throne. No Christian is allowed to approach the holy place. Along the European shore of the Bosphorus are many summer-resorts, Therapia, the chief summer residence of the ambassadors, and Biyukderé being the most important. The Asiatic shore is also lined with settlements, from Scutari (where is the chief Turkish burial-place, as well as the great Crimean cemetery, and admirable hospitals and schools) to Kandili, with its large European population, chiefly of the trading classes, and Beikos (see BOSPORUS). Numerous palaces of past sultans and ministers line both shores, Dolmabahçé on the European and Beglerbeg on the Asiatic being the largest; but the sultan latterly resided in a new palace called Yildiz Kiosk, at the top of the hill of Besiktâsh, beyond Pera. Famous among pleasure-resorts are the Sweet Waters of Europe, at the head of the Golden Horn; Kiahat-hâna, near the Castle of Asia; the forest of Belgrade; and the Princes' Islands in the Sea of Marmora, not far from Kadiköi, the ancient Chalcedon. The population of Constantinople is variously estimated, there being no satisfactory official figures. It amounts probably to 1,125,000, including 500,000 Turks, 200,000 Greeks, 180,000 Armenians, 65,000 Jews, and 70,000 Europeans, the city being essentially cosmopolitan. Its industries are of no great importance. There are glass, soap, tobacco, and cotton works, and works for the preparation of skins and other by-products of the slaughter-house, while small craftsmen work in leather (boots and saddlery), silk, brass, and copper. The naval and military arsenals and the railway repairing-shops are of considerable extent. Once the meeting-point of the trade routes of the world, Constantinople cannot now be counted a great commercial centre. Its trade is chiefly in the hands of Greeks, Armenians, and Jews. Grain from the interior is the principal export, but opium, mohair, tobacco, carpets, hides, silk, and oil are also important. The police administration of the city is divided into circles and wards, all under a prefect, subject to the Minister of the Interior. The first through train from Paris reached Constantinople in 1889; there are also railways to Salonika, Bourgas, and Angora. Within the city electric tramways are in operation.

See BYZANTINE EMPIRE and TURKEY, and Van Millingen, *Byzantine Constantinople* (1899); Sir E. Pears, *Fall of Constantinople* (1885), *Destruction of the Greek Empire* (1903), and *Forty Years in Constantinople* (1915); E. A. Grosvenor, *Constantinople* (1895); W. H. Hutton, *Constantinople* (1900, new ed. 1925); Lethaby and Swainson, *Saint Sophia* (1894); E. J. W. Gibb in S. Lane-Poole's *Turkey* (new ed. 1922); Gwatkin, *Constantine and his City* (1911, Cambridge Medieval History, vol. i.); Dwight, *Constantinople, Old and New* (1915); Schrader, *Constantinople* (Tubingen, 1917); G. Young, *Constantinople* (1926); and the works of Mordtmann, Paspates, Salzenberg, and Labarte. For the Councils of Constantinople, see COUNCIL.

**Constantius**, called CHLORUS, nephew of the emperor Claudius II., became Cæsar in 292 A.D., received Britain, Gaul, and Spain as his government, and after re-establishing Roman power in Britain and defeating the Alemanni, became one of the two Augustuses in 305, but died at York in 306. Constantine the Great was his son.—(2) **CONSTANTIUS**, third son of Constantine, was Roman emperor, 337–361 A.D. He fought with the Persians; and after the death in 350 of his brother Constans (who in 340 had defeated their

elder brother Constantine), became sole emperor till his death in 361.

**Constantza**, formerly KUSTENDJI, a seaport in the Dobruja, Rumania, stands on the Black Sea, at the end of Trajan's wall and of the railway to Tchernavoda, on the Danube. The harbour has been improved, and it is growing in commercial importance, especially for petroleum. Pop. 27,600. Tomi, the place of Ovid's banishment, was near.

**Constellation** (Lat. *con*, 'together,' and *stella*, 'a star'), a group of stars. The stars which stud the firmament have, from a time earlier than authentic records can trace, been formed into artificial groups, which have received names borrowed from fancy or fable, mainly from Greek mythology. These groups are called constellations. Though quite devoid of anything like systematic arrangement, this traditional grouping is found a sufficiently convenient classification, and still remains the basis of nomenclature for the stars among astronomers. They are divided into northern, southern, and zodiacal constellations. In old authors, 'constellation' is used to signify the relative positions of the planets (see ASPECTS) at a given moment. See STAR, ORION, URSA MAJOR, ZODIAC.

**Constipation**, or irregular and insufficient action of the bowels, is one of the most common of ailments; there are few persons in fact who have not at some time or other suffered from it. It may be due either to deficient secretion of fluids in the digestive organs, or to imperfect muscular action of the bowels (see DIGESTION), or most often to both these causes combined. The retention within the organism of matters which should be regularly evacuated as they are formed, and their consequent absorption into the blood and tissues of the body, often leads to a whole train of unpleasant symptoms: headache, or pain in other regions, irritability, lassitude, and debility, and many other discomforts may be due to this cause. In severe cases of constipation, partial obstruction of the bowels may be the cause, and may become complete; and often the bowel becomes so distended and its muscular power so enfeebled that the restoration of a healthy condition is impossible.

Constipation is especially apt to occur in those who lead sedentary lives, or whose diet consists too exclusively of animal food and starchy substances. It may often be avoided by judicious regulation of habits and diet; and the hygienic treatment is of far more importance than the medicinal.

In perfect health, the lower bowel should be evacuated every day, or at the furthest every second day. This process, like many others in the body, tends to recur at the same period every day, and every one should do all he can to acquire a habit of regularity in this respect. Moderate regular exercise, especially in the open air, is often of great importance; where the liver is at fault, riding is specially useful. A daily cold bath, or in the case of those with whom this does not agree, brisk rubbing with a rough towel, may be helpful. A favourite remedy with some is the use of a cloth wrung out of cold or tepid water and applied to the abdomen; this, as used at hydropathic establishments, is called an 'abdominal compress,' and is worn under a bandage of macintosh cloth, to keep the moisture from escaping, during the earlier part of the day.

Attention to diet is of prime importance. In Britain very many persons live almost entirely on animal food, white bread, and potatoes, a diet extremely apt to lead to constipation. There are many easily obtainable foods the habitual use of which would in many cases correct this tendency. Oatmeal, especially in the form of porridge, brown

or 'whole-meal' bread, or gingerbread; almost all vegetables (except potatoes), either cooked or uncooked; olive-oil, which may be used in salads; treacle, eaten with bread or made into puddings; fruit of all kinds, particularly prunes and figs, which can be obtained all the year round—all tend to increase the activity of the bowels. If such forms of food were more generally used, the rest of the community would gain even more than the many vendors of 'liver pills,' and other quack medicines would lose.

The amount of fluid taken in the day is also of importance. Many persons, especially those in whom much fluid taken with meals interferes with comfortable digestion, do not imbibe enough for the needs of the body. In such cases a stated amount of fluid should be taken at other times. A tumbler of water, either cold or hot, slowly sipped during the process of dressing in the morning, is sometimes efficient in relieving constipation.

Lastly, the use of medicinal remedies must be shortly considered. Compared with the measures already noticed, they must be regarded as an evil, though often a necessary one. Constipation may be seriously aggravated by their injudicious employment. Often a large dose of some purgative is taken and produces very free action of the bowels with temporary relief; but increased constipation is almost sure to follow. The condition to be remedied is a chronic and habitual one, and must be combated by patient and persevering treatment. The medicine selected should be taken every day, but the dose must be the very smallest which will produce the desired effect.

It is impossible to enumerate all the drugs which may be used, or to define the conditions in which each is most likely to be beneficial. A few of those in most general use only must be enumerated. Natural mineral waters and natural salts are in much repute at present: a dose should be taken on rising in the morning. Epsom or Glauber's salt, if dissolved in plenty of water, is much cheaper and almost as satisfactory. Effervescent salines (seidlitz powder, magnesia, and many much-advertised patent medicines) are more pleasant to take, and have a similar action. Many persons take one of these habitually over many years without any ill effect. Compound colocynth pills, or colocynth and hyoscyamus pills; compound liquorice powder (containing senna and sulphur, one of the best preparations); Gregory's powder (containing rhubarb and magnesia); podophyllin, euonymin, and other drugs from America, are all useful aperients, and should be taken at bedtime. Nux vomica is a useful addition to other aperients, as it acts specially upon the muscles of the intestines, increasing their activity. A word of caution is necessary regarding mercurial preparations, which are most valuable in certain cases, but most dangerous if used habitually. The indiscriminate use of calomel and gray powder in the nursery, where they are very popular owing to their tastelessness, cannot too strongly be condemned. The most generally useful of all aperients at present in use is *Cascara Sagrada*, the bark of a North American species of buckthorn (*Rhamnus Purshiana*). The liquid extract is the preparation in most general use, of which from 15 to 60 drops taken daily, either in one dose at bedtime or still better in several doses after meals, is generally sufficient. It increases the secretions, but especially the muscular power of the intestine; and in very many cases can be given up altogether after being used for a few weeks (see also **APERIENTS**). In some cases Clysters (q.v.) are the most satisfactory means of procuring an evacuation.

*Constipation in the lower animals* often depends, as in man, on imperfect secretion from, or motion of, the intestinal walls. But it also occurs as a

symptom in many diseases, as rinderpest, red-water, milk fever, paralysis, &c. In the horse it is usually accompanied by Colic (q.v.), and when long continued leads to Enteritis (q.v.). The treatment will depend largely on the cause, but amongst appropriate remedies are soap-and-water clysters given every two hours; smart friction and cloths wrung out of hot water applied to the abdomen, with aloes and calomel in suitable doses given in gruel, and repeated in sixteen hours, if necessary. Give, besides, walking exercise; restrict the amount of dry solid food, but allow plenty of thin gruel or other fluids, which may be rendered more laxative by admixture with treacle or a little salt. Similar treatment is called for in dogs, cats, and pigs.

In cattle and sheep, digestion principally takes place in the large and quadrisepted stomach; the bowels, accordingly, are little liable to derangement; and constipation, when occurring in these animals, generally depends upon impaction of dry hard food between the leaves of the third stomach, fardel-bag, or moniplies. The complaint is hence called *fardel-bound*. It results from the eating of tough and indigestible food, such as ripe vetches, rye-grass, or clover; it prevails in dry seasons, and on pastures where the herbage is coarse and the water scarce. It occurs amongst cattle eating freely of hedge-cuttings or shoots of oak-trees; hence its synonym *wood-evil*. From the drying-up of the natural secretions, it accompanies most febrile and inflammatory diseases. The milder cases constitute the ordinary form of indigestion in ruminants, are accompanied by what the cow-man terms *loss of cud*, and usually yield to a dose of salts given with an ounce or two of ginger. In more protracted cases rumination is suspended, appetite gone, and fever is present. There is a grunt noticeable, especially when the animal is moved, different from that accompanying chest complaints, by its occurrence at the commencement of expiration. By pressing the closed fist upwards and forwards beneath the short ribs on the right side, the round, hard, distended stomach may be felt. This state of matters may continue for ten days or a fortnight, when the animal, if unrelieved, becomes nauseated, and sinks. Stupor sometimes precedes death, whilst in some seasons and localities most of the bad cases are accompanied by excitement and frenzy, but this is frequently due to lead poisoning.

Give purgatives in large doses, combining several together, and administering them with stimulants in plenty of fluid. For a medium-sized ox or cow, use  $\frac{1}{2}$  lb. each of common and Epsom salts, ten croton beans, and a drachm of calomel, with three ounces of turpentine; and administer this in half a gallon of water. If no effect is produced in twenty hours, repeat the dose. Withhold all solid food; encourage the animal to drink gruel, sloppy mash, treacle and water; and give exercise, clysters, and occasional fomentations to the belly.

**Constitution**, in Politics, signifies a system of law established by the sovereign power of a state for its own guidance. Its main objects are to fix the limits and define the relations of the legislative, the judicial, and the executive powers of the state, both amongst themselves and with reference to the citizens of the state, regarded as a governed body. In continental countries, since the formation of the federal government of the United States of America, or, at all events, since the first French Revolution, the idea of a constitution has been generally that of a body of written public law, promulgated at once by the sovereign power. In Great Britain it is the whole body of the public law, consuetudinary as well as statutory, which has grown up during the course of ages, and is continually being modified by the action of the general will as interpreted and expressed by the

parliamentary representatives of the nation. A constitutional monarchy is one in which the sovereign is restricted in his powers by chambers of the representatives of the people; the 'granting of a constitution' accordingly means the transforming of a monarchy more or less nearly absolute into a constitutional state. The constitutions of the various countries will be found under FRANCE, GERMANY, &c., as also at PARLIAMENT, CONGRESS, GOVERNMENT, &c.

**Constitutions, APOSTOLIC.** See APOSTOLIC CONSTITUTIONS.

**Consubstantiation**, as opposed to Transubstantiation (q.v.), is the Lutheran doctrine that in the eucharist the body and blood of Christ are, in a way not to be explained, in, with, and under the unchanged bread and wine. See LORD'S SUPPER.

**Consuetudinary** or CUSTOMARY LAW is an unwritten law established by usage and derived by immemorial custom from remote antiquity. When universal, it is called common law; when particular, it is called custom in a narrower sense, as the custom of a trade or of a district. See CUSTOM, COMMON LAW.

**Consul**, the title of the two highest ordinary magistrates in the Roman republic. The idea of two supreme magistrates or joint-presidents of the state seems to have been interwoven with the earliest conceptions of political organisation in Rome. After the expulsion of Tarquin, Lucius Junius Brutus and Lucius Tarquinius Collatinus were chosen joint heads of the state; but the title of *consules* appears first to have been introduced about 300 B.C. At first, the consuls seem to have differed from the kings in little else than their limited tenure of office, and the power which their fellow-citizens retained of calling them to account at its termination. They never assumed the golden crown, but their dress in almost every other respect was regal. They made peace and negotiated foreign alliances, had the supreme command of the army, and appointed the public treasurers. They likewise exercised the judicial functions of royalty. Dates were always determined by naming the consuls of the year. The symbol of their authority was the bundle of rods (*fascies*), with the axe in the centre, which was carried before them by twelve lictors. For a considerable period the consuls were chosen exclusively from the *populus* or patricians, as opposed to the *plebs*. At length, however, two plebeian officers called *tribuni plebis* were appointed as a sort of democratic rivals to the aristocratic consuls. The result of this rivalry was that the consulship was opened to plebeians, the famous *Lex Licinia* (367 B.C.) ordaining that one of the consuls should belong to that order. This law was more stringently re-enacted in 342, and from that time it was customary for one of the consuls to be a plebeian. This same law prohibited any individual from holding the same office within ten years, but the enactment was often suspended. The appointment of *Censores* (443) and of *Prætores* (367) relieved the consuls of many of their judicial functions. In the government of the provinces, the aid of the former consuls was called in, the consul thus appointed having the title of *pro-consul*. In sudden and critical emergencies, the consuls were either superseded by a Dictator (q.v.), or absolute power for the occasion was conferred on them by the decree of the senate, which ran in the famous formula: *Videant consules ne quid respublica detrimenti capiat*—'Let the consuls look to it that the state take no harm.' The consuls were inaugurated by a great procession to the Capitol and a sacrifice to Jupiter Capitolinus. The shadow of the consulate survived the downfall of liberty;

but the election of the consuls was taken from the people and conferred on the senate. Then their number was increased; they were divided into classes; till at last the office became a mere honorary appointment conferred by the emperor.

The title of consul was revived in the French republic after the revolution of the 18th Brumaire, and lasted till the coronation of Napoleon as emperor, 18th May 1804.

**Consul**, the name given to those officers whom the state maintains in foreign countries for the protection of its trade and vindication of the rights of its merchants, and to whom the further duty is assigned of keeping the home government informed of all facts bearing on the commercial interests of the country. The practice of appointing such officers originated among the trading communities of Italy about the middle of the 12th century, and gradually extended itself, and in the 16th century had been adopted by all the countries of Europe. In addition to their commercial duties, others of a more strictly political kind were frequently confided to consuls in places in which there was no ambassador or political agent. In almost all civilised countries consuls are divided into consuls-general, consuls, vice-consuls, and consular agents. British consuls are appointed by commission from the crown. The consul's first duty on his arrival is to exhibit his commission to the authorities of the country to which he is accredited, in order that he may obtain their recognition of his appointment. This recognition is communicated to him in a document called an *exequatur*, which is a formal authorisation, issuing from the country in which his duties lie, to do, within the jurisdiction of that country, the different acts incidental to consular authority.

There are, speaking generally, two kinds of consuls: professional consuls, who devote their whole time to the consular office, and are always subjects of the appointing state; and persons who discharge consular duties in addition to following their ordinary callings, and who are often merchants resident in the district, and not subjects of the appointing state.

The duties of British consuls are of a very various character. One of their main duties is to give advice and assistance to British subjects generally in the difficulties arising from foreign surroundings, and, in particular, to protect their countrymen in the lawful exercise of trade. In upholding the rightful interests of his countrymen, or in obtaining redress of injuries done them, the consul may, if necessary, report the matter to the British ambassador or, in a serious case, to the home government. The commanders of British warships visiting the district are entitled to call on the consul for aid in procuring supplies. Consuls also have important duties in connection with the British mercantile marine. They exercise a disciplinary jurisdiction over merchant sailors, and, in case of wrecks, endeavour to recover ships and stores. They have also duties with regard to the relief and repatriation of distressed British seamen and other British subjects. They furnish annually to the Foreign Office commercial reports, which frequently contain valuable information as to the conditions of trade and industry. In addition, periodical reports are made by consuls, quarterly or monthly, to the Board of Trade, to the Registrar-general, and to the Board of Agriculture with regard to matters coming within the purview of these departments respectively. A consular officer has authority to issue passports to British subjects, and also to administer oaths, take affidavits, and do any notarial act which any notary public can do within the United Kingdom. It is also within his province to decide, as arbitrator appointed,

by consent, commercial disputes between British citizens. He keeps a register of all British subjects within his district, and also registers of births and of deaths of British subjects occurring there. Consular officers are authorised, by a warrant signed by the Secretary of State, to act as marriage officers under the Foreign Marriage Act, 1892, and, in that capacity, are entitled to celebrate marriages between persons one of whom at least is a British subject. The conditions under which such marriages may be celebrated are now regulated by the Foreign Marriages Order in Council, 1913.

Consuls, while not entitled to the privileges accorded to persons of a diplomatic character, have a right to discharge their public duties without hindrance; and official documents relating to their consular duties are inviolable. They do not have immunity from the jurisdiction of the ordinary tribunals of the foreign country, but it is generally recognised that they are immune from personal taxation. The functions and immunities of the consular service of the United States have been considerably extended by special treaties with other countries.

In many non-Christian and partially civilised states the consuls of the civilised powers discharge functions more ample and more responsible than those which are discharged by consuls in western countries. Within the borders of such states they act as judges, generally speaking, in all matters, civil and criminal, which concern their countrymen. The extra-territorial jurisdiction thus exercised by the consular courts within the territory of a foreign state means, in practical effect, that a citizen of a civilised power who enters the territory of that state remains under the jurisdiction of his home state. The extra-territorial jurisdiction exercised by British consular courts is regulated by the Foreign Jurisdiction Act, 1890, and by Orders in Council applicable to particular countries and territories. The system of exempting resident foreigners from the jurisdiction of native courts, and of maintaining for their protection judicial tribunals administering the law of their home state, had its origin and took shape in a series of agreements, usually termed 'capitulations,' entered into between the Ottoman empire and the several western states. By treaty, concession, and custom a similar system of extra-territorial protection was established in other oriental states, e.g. China, Japan, Persia, and Siam, as well as in many parts of Africa. The extra-territorial consular jurisdiction in Japan was abolished in 1899. In 1914 Turkey, on the eve of entering into war against the allied powers, declared the abolition of the capitulations. Great Britain and the other allied powers protested, and during the war the controversy remained in suspense. Under the settlement which has followed the war, Palestine, Syria, Mesopotamia, and other communities and territories, formerly belonging to the Turkish empire, are provisionally recognised as independent nations, subject to the administrative advice and assistance rendered by a mandatory power. Thus in Palestine, under the provisional administration of Great Britain, the old capitulatory régime has not been re-established, and the courts, as re-constituted, both civil and criminal, now exercise jurisdiction over all persons without regard to nationality. Accordingly in Palestine consuls no longer discharge judicial functions. In Egypt consular courts had long before the war given place to international courts or mixed tribunals; and now the whole judicial system of Egypt is being reorganised. As regards communities and territories which still remain within the Turkish empire, the treaty of peace with Turkey contains provisions dealing with the relation of foreigners to native tribunals and the extent of consular jurisdiction.

The consular service was reorganised after the report of Sir William Walrond's committee in 1903. From that time the service was recruited by competitive examination; provision was made for promotion from one grade to another; and a regular scale of pay and allowances was substituted for the former system, under which each post had a salary peculiar to itself. Since 1918 many important changes have been introduced in the organisation of the consular as well as of the diplomatic service. The scales of pay in the consular service have been assimilated to those for the diplomatic service. The examination tests imposed on candidates have been made more serious. Between the consular service and the diplomatic service a new commercial diplomatic service has been formed, to undertake the work of organising and developing our system of commercial intelligence. Both the commercial diplomatic and the consular service are under an additional parliamentary under-secretary, who is head of the Overseas Trade Department.

See *British Consular Instructions* (1807), issued by the Foreign Office; Oppenheim, *International Law* (3d ed. 1920); Jenkyns, *British Rule and Jurisdiction beyond the Seas* (1902). For American practice, see Hinkley, *American Consular Jurisdiction in the Orient* (1906).

**Consulate of the Sea**, a celebrated code of maritime law, the earliest extant edition of which was printed at Barcelona in 1494. The date of its original compilation is in doubt, being given by some as the 14th century, but by others as early as the 11th. *The Book of the Consulate* is the proper title of the work. It consists of the settled usages in respect of trade and navigation of the maritime communities of the Mediterranean, and contains (1) a code of procedure issued by the kings of Aragon for the guidance of the courts of the consuls of the sea; (2) a collection of ancient customs of the sea; (3) a body of ordinances for the government of cruisers of war. The code, originally in Catalan, was translated into Castilian, Italian, and French in the 16th century, and into Dutch and German in the 17th, and passed largely into the maritime law of Europe and America. See Twiss's *Black Book of the Admiralty* (1874); in the appendix (vol. iii.) is a translation of 'The Customs of the Sea.' See **MERCANTILE LAW**.

**Consumption**, in Political Economy, is that department of the subject which treats of the use of wealth. It is the converse of production, which refers to the making or creating of wealth. As production is the first stage in economics, consumption is the last. Consumption is the chief end of industry, for everything that is produced and exchanged is intended in some way to be consumed. Consumption may be divided into two heads—reproductive and non-reproductive. Wealth consumed in reproduction is simply Capital (q.v.). Wealth consumed as capital, while it is the final stage in one process of industry, becomes an item in a further process of industry. A shopkeeper who, having made a thousand pounds in his business, afterwards uses it in farming, proposes thereby to apply his money to a new kind of reproductive employment. Industry is to a large degree simply a continuation of this process. Wealth which is produced to-day will to-morrow be consumed in fresh production.

Regarded as non-reproductive, consumption is that use of wealth which has no fresh production immediately in view, as in the typical case of the application of wealth to the satisfaction of human needs. The wants of men, as well as the means of satisfying them, have varied greatly at different periods of history, and do still greatly vary in different countries and different states of society.

As regards wealth applied to consumption, we may recognise three stages: (1) necessities; (2) comforts; (3) luxuries. The commodities which were once a luxury are now in civilised countries merely a comfort or even a necessity. In the middle ages a linen shirt was a luxury even at royal courts. In fact, nothing perhaps so marks the development of comfort as the general use of underclothing, whether woollen, cotton, or linen. In the economics of all ages the question of luxury has claimed great attention. The extravagance of the wealthy was both in ancient and mediæval times considered so dangerous to society that Sumptuary Laws (q.v.) were passed to repress it, often without the desired effect. On the other hand, the luxury, extravagance, and even prodigality of the rich have been justified on the ground that such expenditure was necessary to provide labour for the industrial classes; but economically this notion will not stand examination. It should be clearly understood that consumption should be both rational and moral, and that the just and rational needs of men have the first claim on society.

As all wealth is produced in order to be consumed, and as there can be no consumption without production, it will be obvious how the great processes of production and consumption are correlated to each other. If there be insufficient production, consumption is checked and suffering ensues through human wants not being satisfied. On the other hand, over-production frequently tends to bring about commercial crises. When the effective consumption is unable to absorb the mass of commodities, the market becomes overstocked and the industrial process is deranged.

**Consumption.** See TUBERCULOSIS.

**Contagious Diseases Acts** were passed in 1865, 1867, and 1868 for about twenty seaport and military towns; to a certain extent they also applied elsewhere, and similar acts were largely adopted in the British colonies. The main features of this legislation were (1) the registration and police supervision of prostitutes; (2) the periodical examination of these women, which might be compelled; (3) their detention in hospital when necessary. The acts were from the first strongly opposed as contrary to constitutional freedom and public morality, as giving undesirable safety to vicious practices, as dangerous to virtuous women, as treating unequally the two sexes, and as encouraging clandestine prostitution. Their operation was inquired into by a Royal Commission in 1870, which was generally favourable to their retention; and by a Select Committee in 1882, which reported that the acts had diminished venereal disease, and had increased the efficiency of the army. The army returns, however, left this fact in some doubt. They were condemned by a wave of strong public feeling in 1883, and have since been repealed. This repeal was not carried out in India till 1897. The system of police control of prostitution was definitely rejected by the Medical Congress in London in 1913, in favour of confidential notification with systematic diagnosis and treatment. The police method leaves the worst spreaders at large. See WOMEN'S RIGHTS.

**Contagious Diseases (Animals) Acts.** This series of acts is designed to prevent the introduction and spread of contagious diseases among animals. The earlier acts were revised and consolidated in the Diseases of Animals Act, 1894; and, since the date of this consolidating act, its scope has been extended by subsequent statutes—e.g. an Act of 1896, as to the slaughter of foreign animals, an Act of 1903 dealing with sheep-scab, the Dogs Act of 1906, and the Poultry Act, 1911. The administration of the acts in Great Britain is

now controlled by the Ministry of Agriculture, which, by an act passed in 1919, was substituted for the Board of Agriculture. The Ministry has extensive powers to issue orders for carrying out the statutory purposes. Local authorities are also authorised to make regulations on the subject, and to appoint inspectors. The acts, the orders issued by the Ministry, and the regulations made by local authorities constitute together an elaborate administrative code. The animals protected include cattle, sheep, goats, and all other ruminating animals; swine; and, for certain purposes, horses, asses, mules, and dogs. By the Poultry Act, 1911, poultry in course of conveyance by land or water are brought within the ambit of the acts. The diseases dealt with are cattle plague or rinderpest, contagious pleuro-pneumonia, foot-and-mouth disease, swine fever, sheep-pox, and sheep-scab. In addition, the Ministry, in exercise of the powers conferred on it, has issued orders as to glanders or farcy, rabies, anthrax, epizootic lymphangitis, and tuberculosis. The local authorities responsible are, in England, the borough councils in boroughs with a population exceeding 10,000, and elsewhere the county councils; and, in Scotland, the town councils in burghs with a population exceeding 7000, and elsewhere the county councils.

Every person having in his possession an infected animal must isolate it and give immediate notice to the police, who must immediately inform the Ministry, and, in cases of pleuro-pneumonia and foot-and-mouth disease, also inform an inspector of the local authority. A 'place'—i.e. the actual spot, the field or building—where the disease exists is provisionally declared to be infected when an inspector signs a declaration of the existence of disease at that place. This provisional declaration is subject to confirmation by the Ministry in the case of cattle-plague, or by the local authority in the case of pleuro-pneumonia and foot-and-mouth disease. Further, the Ministry, acting on the report of the local authority or independently, may declare any 'area'—i.e. a district containing the infected place—to be an infected area. The Ministry has full powers to make regulations as to isolation and disinfection in an infected place or area, or as to the movement of animals, carcasses, or persons within, or into, or out of, such a place or area. In the case of certain diseases a duty, and in the case of other diseases a discretionary power, is conferred on the Ministry or a local authority to slaughter affected or suspected animals. A record of all animals so slaughtered must be kept, and compensation is paid to the owners. The Ministry in various orders has made regulations as to the mode of ascertaining the value of animals slaughtered, and as to applications for, and payment of, compensation. Where animals are slaughtered by order of the Ministry, compensation is paid out of funds provided by parliament; where the slaughter has been ordered by a local authority, compensation is paid out of the local rate. An owner who is guilty of any offence against the acts is liable to forfeit, in whole or in part, his claim for compensation. The Ministry is empowered to issue, and has issued, orders prescribing the ports at which alone foreign animals may be landed, and regulating the inspection, slaughter, and removal of animals so imported, and the carcasses of such animals. The Diseases of Animals Act, 1910, amended by the Exportation of Horses Act, 1914, deals with the shipping of horses. The Act of 1903 provides for inspectors having power to enter premises to examine sheep, and for the establishment of sheep-dipping tanks by local authorities. The Ministry of Health in England and the Scottish Board of Health in Scotland have power to issue orders for the inspection of dairy cattle, the registration of dairies, and

other matters relating to dairies, cow-sheds, and milk-shops. The Milk and Dairies (Consolidation) Act, 1915, sect. 1, and the Milk and Dairies (Amendment) Act, 1922, set out the purposes for which, and the conditions under which, such orders may be issued. These acts also contain provisions designed to prevent the sale of tuberculous milk.

Special statutory provision as to dogs is made in the Dogs Act, 1906, and the regulations issued under that act. Persons contravening these regulations are guilty of an offence under the Diseases of Animals Acts, and the inspectors appointed under these acts have power to prosecute offenders against the Dogs Act, or orders issued in virtue of the powers given in that act.

**Contango.** See STOCK-EXCHANGE.

**Contarini**, the name of a noble family in Venice, one of the twelve that elected the first Doge. Between 1043 and 1674 eight Doges were furnished by this family, which also counted amongst its members four patriarchs, and a large number of generals, statesmen, artists, poets, and scholars (see VENICE).—CARDINAL GASPARO CONTARINI (1483–1542) distinguished himself as Venetian ambassador at the court of Charles V., and was papal legate at the Diet of Ratisbon (1541), where he displayed great moderation, seeking by concessions to bring about the reunion of the Protestants with the church.—SIMONE (1563–1633) was Venetian ambassador at several Italian courts, in Spain, in Constantinople, &c., and was a Latin poet.—LUDOVICO (1629–53) was ambassador in Paris.

**Conté**, NICOLAS JACQUES, French painter, chemist, and inventor, was born at Annon-sur-Orne, near Sées, 4th August 1755. Displaying precocious artistic ability, he early acquired a fair competency, mainly through his work as a portrait-painter. Turning thenceforth to scientific pursuits, he discovered a substitute for plumbago—war with England had cut off the supply—and in 1795 took out a patent for a form of lead-pencil which still bears his name. His experiments in military ballooning led to his appointment in 1796 to the command of all the aerostatic establishments of France. As head of the Conservatoire des Arts et Métiers, he was a pioneer in technical education. In 1798 he devised a barometer similar to the later one of Vidi. During Napoleon's Egyptian expedition his services were of the utmost value, not only as chief of the aerostatic corps, but in making good grievous losses in matériel; in a country almost uncivilised he contrived machinery of every kind, and so provided the army with bread, cloth, arms, munitions, engineering tools, operating instruments, &c. One of the first members of the Legion of Honour, he died at Paris, 6th December 1805.

**Contemporaneity**, in Geology, has a somewhat more extended signification than the word bears in ordinary language. When a geologist speaks of the Silurian systems of America and Europe having been accumulated contemporaneously, he does not infer that they were precisely synchronous, but merely implies that each occupies the same relative position in the succession of systems. Each was preceded by a Cambrian and succeeded by a Devonian system; but for aught he can tell, the Silurian period may have commenced earlier or endured longer in one area than the other. Huxley suggested the term *homotaxis* ('similarity of order') as a substitute for contemporaneity. According to this view we should apply the term *homotaxial* instead of *contemporaneous* to widely separated systems which contain the same assemblages of fossils—all that the proposed term indicates being this, that the order of organic succession was the same in both regions. All the evidence, however, goes to show that in the earlier

ages of the world the climate of the earth was not differentiated into zones as it is now, so that faunas and floras were enabled to extend themselves readily in every direction. Hence, although it is impossible to say that any particular bed of palaeozoic or mesozoic limestone in Europe is of precisely the same age as a similar limestone in America, yet it seems in the highest degree probable that the great system to which both these limestones happen to belong was accumulated during one and the same long-continued period. Geologists seem to be justified, therefore, in describing the successive systems of the Old and New Worlds as actually contemporaneous.

**Contempt of Court**, a disregard of the rules or an offence against the dignity of a court which has power to punish for such offence. Contempts, according to the law of England, may be classed as (1) disobedience to the King's writ; (2) contempts in the face of the court, as when a witness refuses to be sworn or prevaricates in his evidence, or where jurymen refuse to give a verdict; (3) contemptuous words or writings concerning a court; (4) refusing to comply with the rules and awards of a court; (5) abuse of the process of a court; and (6) forgery of writs, or any deceit tending to impose on a court. Any act which insults or resists the power of a court or the persons of the presiding judges, or which plainly tends to create a disregard of judicial authority, may be a contempt, as unseemly behaviour, applauding, talking boisterously and obstreperously while the business of a court is proceeding, intimidating a suitor to discontinue his action, kidnapping or corrupting witnesses or jurors, obstructing officers of court and the like. Contempt is occasionally punished by fine (e.g. of £500 during the Parnell Commission), but oftener by commitment to prison for an indefinite period. Similar powers are exercised by judges in Scotland, where contempts may be punished arbitrarily by censure, fine, or imprisonment, either by the court of its own instance or under a summary complaint by the public prosecutor. In the United States also the courts have power to fine and imprison all such contempt of their authority, every court being the exclusive judge of its own contempt, and having power to preserve its own dignity. Motions and affidavits for attachments in civil suits are on the civil side of the court, but as soon as the attachment issues the proceedings are on the criminal side. For Contempt of Parliament, see PARLIAMENT.

**Conti**, HOUSE OF, a younger branch of the Bourbon House of Condé (q.v.). Its founder and first prince was Armand de Bourbon Conti, brother of the great Condé. He was born at Paris in 1629, and took his title from the little town of Conti, near Amiens. Though feeble and deformed, and set aside for the church, he took with ardour to the career of arms, but after 1657 retired from the world, and died at Pézenas in 1666.—LOUIS ARMAND, eldest son of the preceding, was born in 1661. After a short but promising career in arms, he died childless in 1685.—FRANÇOIS LOUIS, Prince de la Roche-sur-You et de Conti, brother of the preceding, and the most remarkable of the family, was born at Paris in 1664. Educated under the eyes of the great Condé, he early conceived a passion for war, and already in his first campaign in Hungary covered himself with glory. Falling into disgrace with the court, he was banished to Chantilly, but pardoned by the intercession of Condé before his death. Subsequently Conti served under the Duc de Luxembourg, who was warmly attached to him, and took a brilliant part in the victories of Steinkirk and Neerwinden. In

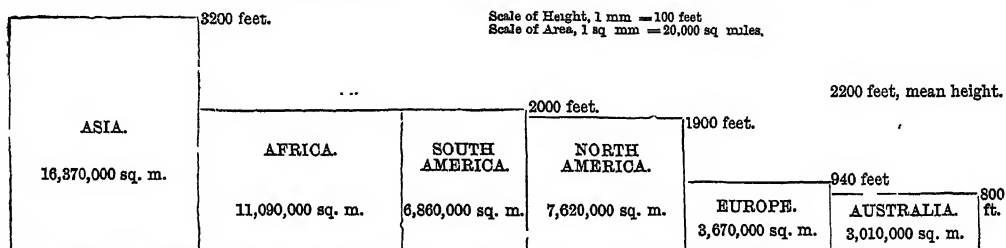
1697 he narrowly escaped being made king of Poland. On his return to France he was still coldly received by Louis, who, however, was at last forced by disaster to employ him. He received the command of the army of Flanders in 1709, but died on the 22d February of the same year. Saint-Simon, in his *Mémoires*, thus speaks of him: 'He was the delight of armies, the divinity of the people, the hero of officers, the darling of parliament, and the admiration of the most learned savants.'—The last member of the House of Conti was LOUIS FRANÇOIS JOSEPH, who was born 1734, and died at Barcelona, 1807.

**Contiguity, LAW OF.** See ASSOCIATION OF IDEAS.

**Continent.** This name, originally applied to a great division of the earth's surface holding together, or continuous, has latterly come to have a more precise scientific meaning. Six continents are recognised by geographers—Asia and Europe (which, strictly speaking, form but one continent, the division between the two being arbitrary and uncertain); the three great triangular peninsulas,

Africa, North America, South America; and the vast islands, Australia and Antarctica.

The earth's surface is divided by the 1000 fathom (6000 feet) line of ocean soundings into two equal parts, one a region of depression surrounding the south pole and stretching northward in three wide branches or ocean-basins, the other a region of elevation surrounding the north pole and stretching southward in three great arms crowned by the continents. All the land rising above sea-level forms collectively the *continental area*, and amounts to  $\frac{1}{4}$  of the earth's surface. Geological evidence shows the extreme probability that the continental and abysmal areas have never changed places, but are permanent features of the earth's surface. Continental rocks, granite, gneiss, schist, and their derivatives, differ entirely from those of oceanic islands. Detached portions of the continents, though now far from the mainland, may therefore be readily recognised (see ISLANDS). Wegener's theory of continental drifting has, however, gained many adherents. Around all continents the action of waves has carved out a ledge or terrace, the continental shelf, of variable width, on which the



Relative Areas and Average Heights of the Continents, according to Murray.

bottom slopes gently from the land to soundings of 100 fathoms, and then abruptly plunges to the oceanic depression (see SEA). The absolute elevation of continents or mountains above mean sea-level cannot easily be determined, on account of the permanent distortion of the sea surface by the attraction of the projecting mass of land. This heaping up of the sea has been calculated at 300 feet for the vicinity of the Himalayas at the Bay of Bengal, and 2000 feet for the Chilean Andes. Sir John Murray calculated the average height of continental land above sea-level as 2200 feet, and gave as probable estimates the mean heights represented in the diagram. But see also the table in the article ANTARCTICA. Particulars of each of these continents will be found under their respective names.

The continents occur in north and south pairs, united by a narrow isthmus or archipelago, or separated only by a shallow strait. They are directed south-south-eastward, tapering from the north, and frequently ending in a series of south-pointing peninsulas, which are often partially submerged so as to form archipelagoes of small islands on the eastern side. Each continent has an axis or backbone of high land, usually a plateau containing an area of internal drainage, and serving as a watershed for rivers flowing to all sides. This high land is situated towards the south, and runs east and west on the whole in Eurasia, giving the north-flowing rivers long slopes, and the south-flowing streams a short and rapid run. Africa is a transition type, the watershed being on the whole nearer the east; Australia, more extreme, has the main watershed lying close to the east coast. In the two Americas there is a high western mountain-ridge or plateau running from north-west to south-east, and a low range on the eastern coast, leaving great central low plains watered by large rivers.

The interior of a continent has usually a very low rainfall (see DESERT), and is subject to great extremes of temperature between summer and winter, and between day and night; hence the term continental climate. Land and sea breezes and the Monsoons (q.v.) of tropical coasts result from this circumstance.

**Continental System**, the name given to Napoleon's plan for shutting England out from all connection with the continent of Europe. This system began with Napoleon's famous 'Berlin Decree' of November 21, 1806, which declared the British Islands in a state of blockade, and prohibited all commerce and correspondence with them; all merchandise belonging to an Englishman became a lawful prize, and all trade in English goods entirely prohibited. No ship coming direct from Britain or from a British colony was allowed to enter any port.

Britain was not long in making reprisals. By an 'Order in Council,' issued January 7, 1807, all neutral vessels were prohibited from entering any port belonging to France or her allies, or under her control. Every neutral vessel violating this order was to be confiscated with its cargo. Still more oppressive for neutral commerce was a second order in council of November 11, 1807, by which all harbours and places of France and her allies in Europe and the colonies, as well as of every country with which England was at war, and from which the English flag was excluded, were placed under the same restrictions as if strictly blockaded. These orders were followed by new French measures. By the Milan Decree of December 17, 1807, strengthened by a second of January 11, 1808, from the Tuileries, any vessel, of whatever nation, that had been searched by an English ship, had submitted to be sent on a voyage to England, or paid any duty to the English government, was to be declared *denationalised*, and treated as English.

Most of the countries of Europe were coerced by Napoleon into joining the continental system. The great war of 1812 against Russia was largely owing to her refusal to adhere to it any longer. It was a violent interruption of human intercourse, which could not last long, and could only serve to strengthen the hatred of Europe against French tyranny. Accordingly, with the breaking up of Napoleon's power, the continental system fell to the ground. The policy of England in connection with the continental system can be justified only on the ground that it was necessary to avert a supreme national danger. It was not without its mischievous results, for the measures adopted in regard to neutral commerce led to the American war of 1812.

**Contorted Strata** are beds which are highly folded, plicated, and twisted—the folds being extremely irregular, and giving rise to rapid changes in the direction and angle of inclination. Contorted strata are frequently crumpled and puckered—the fossils and pebbles which they may chance to contain being compressed, flattened, and distorted—facts which show that the beds have been subjected to great crushing and squeezing.

**Contour.** When, on a map of any district or country, a line is drawn through points on the earth's surface which are all at the same height above mean sea-level, the curve so obtained is termed a *contour-line*. For equidifferent altitudes a series of such lines may be drawn. It is obvious that they may be ideally laid down by projecting orthographically on the map the sections of the earth's surface made by a series of horizontal planes at equal distances apart; or (what is the same thing) were the sea-level to rise 100 feet, then to 200 feet, and so on, above its normal level, the sea-margins made at each successive rise would be the contour lines of the district for 100 feet, 200 feet, &c. These lines, which are drawn on British Ordnance Survey maps for intervals of usually 50 feet, however they may vary in form in different cases, have certain common properties which render them of assistance to the surveyor, engineer, and geographer. Suppose, for example, the case of a hemispherical hill be taken (see fig.), and that the contours (which are, in this case, concentric circles) are drawn for each 100 feet of altitude. It will be noticed that where the shortest distance between two successive contours is least, there the hill is steepest; for, in ascending the hill at that part, a given length inwards horizontally is accompanied by the greatest vertical ascent. In other words, the steepness of slope or gradient at any point in any given direction is inversely as the distance between the contours at that point in the given direction. The line of steepest slope at any point is therefore the shortest line which can be drawn to the next contour which it cuts at right angles. This is the course which would be taken by water running down the hillside, and hence is termed a *stream-line*. Thus in any given system of contour-lines the corresponding system of stream-lines can be obtained by drawing a system of orthogonal curves.

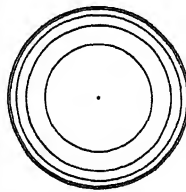
The method of contours has found many applications in science besides the one already detailed. Especially in meteorology has it been of service; here isothermals and isobars drawn on a map are simply lines drawn through points having the same temperature and barometric pressure respectively; the corresponding stream-lines being lines of flow of heat or of atmospheric pressure. Similarly,

lines of equal magnetic dip, variation, and intensity are examples of applications in terrestrial magnetism.

The method is also applicable to other dimensions in space than those we have dealt with. The contours of a curve are points; of a surface (exemplified above), curves; while those of a solid are surfaces. From the examples given it may be seen that a contour is a point, line, or surface at, along, or on which some physical property or characteristic is constant. Generally the advantage of the method is that by its means the mutual variations of three quantities may be represented by lines in two dimensions.

**Contraband of War** is the term applied to neutral property on board ship on the high seas, or in the territorial waters of a belligerent state, which is by nature capable of being used to assist in, and is on its way to assist in, the naval or military operations of the enemy. A neutral state is under no obligation to prevent its subjects from trading in contraband of war. It lies with the belligerent state, if it has the requisite naval power at its disposal, to prevent neutral vessels from transporting to the enemy such articles or commodities as may be of use to the latter for carrying on the war. Under international law the belligerent has a right to seize the prohibited goods, and, in exercise of this right, a belligerent cruiser is entitled to stop and search any neutral merchantman she may meet on the high seas or within her own or her enemy's territorial waters. Such visit and search were formerly called out at sea, but during the Great War, owing to the magnitude and variety of the cargo carried by modern vessels, the ease with which contraband could be concealed, and the danger from enemy submarines, it was the practice, when search at sea was impossible, to divert the ship into the nearest port of the belligerent and carry out the search there. Where the search of the vessel is made at sea, and the search discloses grounds of suspicion, the belligerent commander may take possession of the vessel, secure her papers, and send her by means of a prize crew to the most accessible port of his own, or an allied, state for adjudication by a prize court of his own state. Not only are the contraband goods liable to condemnation, but the vessel carrying contraband may be condemned if the contraband, reckoned either by value, weight, volume or freight, forms more than half the cargo. Property in neutral goods or vessels which are seized by a belligerent remains in the neutral until judgment of confiscation has been pronounced by a competent tribunal after due investigation. The tribunals set up by the Admiralty of maritime belligerents for the purpose of deciding upon the validity of the captures made by their cruisers are called Prize Courts.

The range of articles included within the category of contraband has never been definitely settled. A distinction was long recognised between 'absolute' contraband, consisting of articles, such as arms and ammunition, which are either solely of use in war or are particularly adapted for purposes of war, and 'conditional' contraband, consisting of articles, such as food-stuffs and clothing, which are capable of being used for the purposes either of war or of peace. The Declaration of London (1909), articles 22 and 24, set out lists of absolute and of conditional contraband, and on 4th August 1914, at the beginning of the Great War, Great Britain issued a proclamation containing lists of absolute and conditional contraband which were identical with those in articles 22 and 24 of the Declaration of London, except that aircraft were transferred from the conditional to the absolute list. The circumstances of the war, however, very soon



demonstrated the inadequacy of these lists, and fresh lists were issued from time to time. In the final British list, which was formulated in a royal proclamation dated 2d July 1917, and which amended and consolidated the earlier lists, the articles to be treated as absolute contraband and the articles to be treated as conditional contraband continued to be set out separately; but, in actual practice, during the later period of the war no distinction was made between absolute contraband and conditional contraband. The grounds upon which the British government proceeded were stated in an official memorandum, issued by the Foreign Office on 13th April 1916, as follows: 'The circumstances of the present war are so peculiar that his Majesty's government consider that for practical purposes the distinction between the two classes of contraband has ceased to have any value. So large a proportion of the inhabitants of the enemy country are taking part, directly or indirectly, in the war that no real distinction can now be drawn between the armed forces and the civilian population. Similarly, the enemy government has taken control, by a series of decrees and orders, of practically all the articles in the list of conditional contraband, so that they are now available for government use. So long as these exceptional conditions continue, our belligerent rights with respect to the two kinds of contraband are the same, and our treatment of them must be identical.' See J. A. Hall, *The Law of Naval Warfare* (2d ed. 1921).

**Contra-bass.** See DOUBLE BASS.

**Contract**, the voluntary agreement of two or more persons, by which something is to be given or done upon one side, for a valuable consideration, either present or future, upon the other. English lawyers usually adject to this definition the qualification that the agreement is enforceable by law, an agreement not enforceable by law being regarded as void. Every contract requires a consideration, a *quid pro quo*, but as a general rule any consideration, adequate or inadequate, will be sufficient. For the making of a contract there must be a communication between the parties of their intention—i.e., in one shape or another, there must be offer and acceptance of distinct terms. An offer or proposal can be revoked at any time before it is accepted; and in strict law, silence does not give consent. When silence is taken to constitute acceptance, it must be silence under such circumstances as to amount to acquiescence. An acceptance must be unqualified, otherwise there is no contract. As the validity of a contract rests upon the consent of parties, persons legally incapable of giving consent cannot be parties to a contract. Contracts made by a person under the age of twenty-one are as a general rule voidable, unless they have been made for his benefit, or, as in England, for his 'necessaries.' And persons in a state of absolute drunkenness cannot contract, although a lesser degree of intoxication may be compatible with legal consent. Similarly, contracts made by a lunatic are voidable when it can be shown that his state was known to the other contracting party. Further, the consent given must be genuine, and a contract will be void if there is mistake or error in either of the parties with regard to any essential particular. Thus, if A sell to B a bar of brass in the belief that it is a bar of gold, and B buy in the same belief, the contract is bad by error. Misrepresentation, or innocent misstatement of fact, and fraud, or wilful misstatement of fact, will also vitiate a contract, as will force and fear or undue influence exercised to compel the consent of either of the parties. A contract may also be void by impossibility—e.g. when the thing

agreed to be done is naturally impossible, as in the case of a pianoforte player who is prevented from performing his agreement by dangerous illness; or impossible by construction of law, as when a change in the law of the country supervenes upon and contradicts a private agreement. Besides these, the law refuses to recognise contracts to perform any illegal act, as to burn a house or steal a horse; and such an agreement may be in itself a crime, as conspiracy. Contracts against good morals, as, e.g., an agreement to pay the price of prostitution, are denied legal recognition and enforcement, as also are agreements against the public policy of the country where they are made. Examples are agreements in fraud of the revenue, as in smuggling transactions; or contracts in restraint of marriage, which are held to be against public policy as tending to decrease the population. Thus a contract not to marry is void.

Contracts are variously classified. The law of Scotland adopts the old division of the civil law into Nominate Contracts and Innominate Contracts. The nominate contracts are loan, commodate, deposit, pledge, sale, permutation, location, society or partnership, and mandate. The law of England distinguishes between Contracts of Record and Contracts under Seal—both of which are formal, or dependent for their validity upon their form—and simple contracts, which depend for their validity upon the presence of consideration. Contracts of record are the judgments of a court; recognisances, as contracts made with the crown in its judicial capacity; and the obsolete acknowledgments of debt known as Statutes Merchant and Staple. Deeds and bonds may be taken as examples of contract under seal. Of simple contracts, some require no specialities of form; others are by law required to be in writing, as, e.g., a bill of exchange or an assignment of copyright. Contracts are distinguished into express or implied accordingly as they are based upon formal statements in words, spoken or written, or upon matter of inference and deduction either from the conduct of the parties or from the provisions of law. They are also distinguishable into executed contracts, where the transaction is completed the moment the agreement is made, as where an article is paid for and delivered over the counter, and executory contracts, where some future act is to be done after the arrangement is completed, as where an agreement is made to build a house in six months. A contract of benevolence is one made for the benefit of only one of the contracting parties. See BREACH, DAMAGES, HUSBAND AND WIFE, SALE, WARRANTY.

The remedy for breach of contract is an action for a certain sum due by the defaulter or for damages, ascertained by a jury; but where the remedy of damages is inadequate or unsuitable, the courts may enforce a contract by decree for specific performance of the thing agreed to be done, or by injunction forbidding an act agreed not to be done.

**Contractility.** See MUSCLE.

**Contractions.** See ABBREVIATIONS, PALÆOGRAPHY.

**Contract Notes**, also called BOUGHT AND SOLD NOTES, or ADVICE NOTES, are notes of a purchase or sale signed by a broker, and delivered to his principals, by which the bargain through him is completed. They are used by all kinds of brokers, and the following is the form of a *stockbroker's* contract and note:

2 OLD BROAD STREET, LONDON, 20th December 19—.  
BOUGHT by order and on account of A. B., Esq. (subject to the rules and regulations of the London Stock Exchange),  
160 Anglo-Dutch Rubber Shares, at £2... £330 0 0  
Brokerage..... 1 12 0

C. D. & Co.,  
Members of the Stock Exchange, London.

£321 12 0

These notes are, in fact, transcripts from books in which it is the practice of brokers to enter or register their transactions. The bought notes and the sold notes are respectively delivered to the principal parties; and as they contain the essential parts of the bargain, they will suffice as evidence, in the absence of a corresponding entry in the broker's books; but if they describe the particulars differently or incorrectly, as one species of goods for another, or erroneously state the terms, no contract arises, and a variation of this nature cannot be corrected by a reference to the broker's book.

Contract notes are compulsory when the value of the stock or security is £5 or upwards; they require an *ad valorem* stamp. See **BROKER, SALE**.

**Contrafagotto** (Ital.), or **DOUBLE BASSOON**. a Bassoon (q.v.) an octave lower than the ordinary bassoon.

**Contralto** is the deepest or lowest species of musical voice in boys, in eunuchs, and best of all in women, where its beauty of tone gives it the preference. This quality of the human voice was too much neglected by the French and German composers and singing-masters. Rossini and the Italians have, on the other hand, abundantly utilised its capabilities, and it is now one of the normal parts in the choral music of all nations. The powers of expression which it possesses are quite peculiar, and cannot be supplied by any other kind of voice. Its tone-character (timbre) is serious, spiritual, tender, and romantic. The low contralto in particular has a fullness of tone combined with power in the lower range. The high contralto has generally the same range of compass as the mezzo-soprano, but differs from it in the position of the cantabile and in its character of tone. Contralto voices generally consist of two registers, the lowest beginning at F or G below middle C, and reaching as high as the A or B above it. The higher notes up to the next F or G partake more of the character of the soprano. See **VOICE**.

**Contract Social** ('Social Contract') is the name of a famous work (1762) by J. J. Rousseau, and of the theory maintained in it that government is based on the consent, direct or implied, of the governed. See **ROUSSEAU, SOPHISTS**.

**Contravallation**, **LINES OF**, form a chain of works round a besieged place to resist the sorties of the garrison. See **BLOCKADE, CIRCUMVALLATION, and SIEGE**.

**Contrayerva**, a medicine once in much repute against low fevers, and as a mild stimulant and diaphoretic, also as efficacious against snake-bites, whence the Spanish name, consists of the root-stocks (rhizomes) of different species of *Dorstenia*, a tropical American genus of the natural order Moraceæ. The genus is remarkable for the plane receptacle in which the numerous small flowers are depressed, the female flowers more deeply so. In Jamaica the name is given to a birth-wort (*Aristolochia odoratissima*) of similar reputation; and the other is there distinguished as Spanish contrayerva.

**Control Department**. See **COMMISSARIAT**.

**Convalescent Hospitals** are institutions of the greatest importance. Many patients die on returning to their own unhealthy homes from our ordinary hospitals; the convalescent home or hospital supplies a valuable stage in the process of cure. Either a series of detached cottages or one large and well-appointed house may serve to secure pure air and wholesome treatment. Of the latter kind, one of the first and best models was the magnificent establishment at Vincennes, founded in 1857.

**Convallaria**. See **LILY OF THE VALLEY**.

**Convection**. See **HEAT**.

**Convent**. See **MONACHISM**.

**Conventicle** (Lat. *conventiculum*, a diminutive of *conventus*) originally meant a cabal among the monks of a monastery. The word was given as an appellation of reproach to meetings of the English and Scottish Nonconformists in the 17th century. Severe statutes were often passed for the suppression of these conventicles, especially the Conventicle Act of 1664, which was repealed by the Toleration Act of 1689.

**Convention**, in Diplomacy, is a kind of treaty (especially military) of a temporary kind.

In Politics, it is a branch of the royal prerogative of Britain that no parliament shall be convened by its own authority, or by any other authority than that of the sovereign. Where the crown is in abeyance, this prerogative cannot of course be exercised, and the expedient of Convention Parliaments has been resorted to, the enactments of which shall afterwards be ratified by a parliament summoned in accordance with the provisions of the constitution. The convention parliament which restored Charles II. to the throne met five weeks before his return, and was afterwards declared to be a good parliament, notwithstanding the absence of the king's writs. In like manner, at the Revolution of 1688, the Lords and Commons, on the summons of the Prince of Orange, met in convention, and disposed of the crown and kingdom, and this convention was subsequently declared to be really the two Houses of Parliament, notwithstanding the want of writs and other defects of form. Under the name of Convention there also took place a meeting of the Estates of Scotland, called by the Prince of Orange on the same occasion. The word convention was frequently used in the United States during the struggles with the British authorities which preceded the revolutionary war. For the French National Convention, see **FRANCE**; for the Geneva Convention of 1864, see **GENEVA, PEACE**; for the Bern Convention, see **COPYRIGHT**; for the Convention of Royal Burghs, see **BOROUGH**.

**Conversano**, a town of south Italy, 18 miles SE. of Bari, with a fine cathedral; pop. 15,000.

**Conversion**, a conscious change of heart prompting a repentant sinner to a new life, and a part of regeneration. Popularly the name means the sensible experience of this, and obviously there will be as much variety in its intensity and immediateness in individual cases as there was in their temperaments and antecedent spiritual conditions. The man who really knows something of the human heart will no more sneer at the grotesque expression of his experience from the lips of an awakened collier than he will smile at its intensity in the pages of a St Augustine or a Bunyan.—The word is applied also to a change of religion or of creed, as that of John Henry Newman from the Anglican to the Roman Catholic Church. By those who disapprove the change, such a conversion is called *perversion*.

**CONVERSION**, in Logic, signifies that one proposition is formed from another by interchanging the subject and predicate. Thus, 'No A is B' has for its converse, by simple conversion, 'No B is A.' For the rules of conversion, see any handbook of formal logic.

**Conveyancing**. A conveyance may be defined as the form prescribed by law or custom for transferring property from one person to another. In the earliest stage of society, before written titles and contracts were in use, property was transferred by symbolical acts, performed in the presence of witnesses. Thus, in Ruth, iv. 7, a person surrendering his rights binds himself by plucking off his

shoe and giving it to his neighbour; 'and this was a testimony in Israel.' Among the ancient Goths and Swedes, the conveyance of land was made in the presence of witnesses, who extended the cloak of the buyer, while the seller threw into it a clod of land. Similar to these symbolic forms are the old English and Scottish modes of conveyance by solemn delivery of seisin, sasine, or possession. Goods have always been transferred with less ceremony than land; but the customs of ancient markets provided in certain cases for delivery in presence of witnesses, that frauds and disputes might be avoided.

Written forms of conveyance are almost as old as the art of writing. An early example is given in Jer. xxxii. 9-12, where the prophet describes his purchase of the field of Hanameel, and the book or written evidence of the purchase subscribed by the parties and their witnesses. The Romans carried the art of conveyancing to high perfection. They had public registers in which formal documents might be recorded; and the same legal forms were used by notaries and lawyers throughout the empire. The Roman law favoured freedom of alienation, and applied the same principles to movable and immovable property. When the barbarians broke into the empire, they brought their primitive customs with them; and Sir H. Maine has shown that barbarian custom and Roman law combined to form the feudal system. The great aim of feudalism was fixity of tenure; but the churchmen, who were also the lawyers and conveyancers of the period, were led by their own interest, and also by their superior education, to favour free alienation, both *inter vivos* and by will.

In England and in Scotland feudal ideas so far prevailed, that for some centuries the owner of land was hampered in dealing with it by the incidents of his tenure. He was liable for military or other service, and his land was subject to many incidental claims of a vexatious nature (see COPYHOLD, ESCHEAT, FEUDALISM, FINE, FREEHOLD). The church lawyers were driven to devise a whole system of conveyancing, the object of which was to enable corporations and private persons to evade the strict rules of the common law. Political insecurity led to the invention of other forms of secret conveyance. In England by the end of the 17th century the art of conveyancing had become a complicated mystery, and all dealings with land, in the way of commerce or of family settlement, were attended with expense and difficulty. Modern conveyancing has been rendered more simple and reasonable, and, on the whole, less expensive, by a series of reforms extending from the acts prepared on the advice of the Real Property Commissioners in 1832-33 to the Conveyancing Act, 1881, and the Settled Land Act, 1882.

In Britain it is not necessary to employ a professional person to prepare a conveyance; but the risk run by those who trust to a deed or will drawn by an unskilled person is considerable. Conveyancing is part of the ordinary work of solicitors, and in Scotland of writers to the Signet. In England many members of the bar devote themselves entirely to conveyancing; and there is also a special class of practitioners known as conveyancers who are members of the Inns of Court, but not called to the bar. Like solicitors, conveyancers are required to take out an annual certificate. In some of the large cities in the United States, companies have been formed to undertake conveyancing, and to guarantee titles to real estate. In learning and practising his art, the conveyancer is much assisted by collections of precedents, which contain the styles and forms which have been found most safe and useful. By turning over any of the books of precedents now in use, even the

ordinary reader may obtain some notion of the variety and the importance of modern conveyancers' work. In the United States the laws of conveyancing are not uniform; but in general the essentials of a conveyance of land are that it shall be in writing, signed and sealed by the grantors, acknowledged before the officer appointed by law, and delivered and recorded in the office appointed. In most states conveyancing is done by members of the bar, but elsewhere by conveyancers not practising in court. See DEED.

**Convict.** See PRISONS, CRIMINAL LAW.

**Convocations** (from Lat. *convocare*, to 'call together') were originally provincial synods of the clergy or the ancient ecclesiastical councils of the archbishop, but became incorporated into the English constitution of church and state, and endowed with certain parliamentary privileges. Some writers distinguish between councils and convocations—the former as being for spiritual purposes, and summoned without authority from the crown; the latter as being for civil purposes, and by command of the crown. This distinction, however, has no foundation in fact, the truth being that the same assemblies discharged ecclesiastical functions, such as the enactment of canons, and civil functions, as the voting of subsidies to the crown, since the clergy were not subject to taxation save that levied by themselves in their provincial synods. The circumstances attending the famous assembly at Northampton in 1282, in the reign of Edward I., helped to settle the form which convocations have since assumed. In England the provinces of Canterbury and York have each their convocation. Previous to the Reformation these were sometimes convened into a National Synod; but since then, matters have usually been concluded in the convocation of Canterbury, and transmitted to York for concurrence.

A convocation consists of three elements—(1) the archbishop; (2) the suffragan bishops of the province; (3) the clergy of the second order. They originally met in one assembly, but since the beginning of the 14th century the clergy in the province of Canterbury have retired into a distinct chamber, presided over by a prolocutor, with officers and journals of their own. These two bodies are called the Upper and Lower Houses. In the Convocation of York the same distinction exists, but on the occasions of their meeting, the business has been generally conducted in one assembly. The archbishop has the sole power of summoning, presiding, and proroguing; he has also a veto upon all measures. He cannot, however, summon without authority from the crown. The Upper House is the proper *locus synodi*, where the bishops have a right to sit and vote, and before the Reformation the mitred abbots had place there also. The Lower House consists of the lesser dignitaries, as deans and archdeacons, and the proctors sent by capitular bodies and by the parochial clergy. In Canterbury the beneficed clergy send two proctors for each diocese; in York the clergy send two proctors for each archdeaconry, except Sodor and Man, which sends one. The Lower House deliberates on matters proposed by the archbishop; it may present petitions to the Upper House and state grievances, be with it in judicature on persons convened, and dissent from and so hinder the passing of any synodical act. Till 1534 the provincial synods or convocations could enact canons at pleasure, but in that year was enacted the statute 25 Henry VIII., chap. 19, making a license from the crown necessary before any new canons could be framed or published.

The passing of subsidies in convocation ceased in 1665, and the records were destroyed in the fire of London in the following year. Meetings of convo-

cation fell into abeyance in 1717, being indefinitely prorogued as a punishment for the synodical condemnation of a book by Bishop Hoadly, who was high in favour with the government. They have been revived (in 1852 for the province of Canterbury, in 1856 for York) with considerable advantage to the church, but their action has been and is greatly restricted. In Ireland the convocations of the four provinces assembled at Dublin, all together, and were on the model of those in England. From the Union downwards, the Irish convocations never assembled. Since the disestablishment the legislative assembly of the Protestant Episcopal Church is called the General Synod. An act of parliament in 1663 regulated the meetings of convocation in Scotland; but shortly after the Revolution of 1688, the Episcopal Church ceased to be the national establishment; and ever since the meetings of the Presbyterian Church, embracing clergy and laity, have been called General Assemblies. See ASSEMBLY (GENERAL), COUNCIL.

The position of the Church of England as respects its convocations was till 1919 exceedingly anomalous, but incidental to certain circumstances in the constitution and polity of the country. As practically interwoven with the state, the church possessed little independent action, its articles, liturgy, organisation as to benefices, &c. being all affected by civil statutes, its discipline falling within the scope of the ecclesiastical courts, a class of tribunals apart from the ministering clergy. The church, therefore, in its capacity as an institution to teach certain doctrines of religion, was left little to do in the way of jurisdiction. It was further urged, as a reason for restricting the power of convocation, that, being purely sacerdotal, it might be apt to run into excesses, and put forth claims adverse to the prevailing tone of sentiment on religious matters. A desire for a fuller expression of spiritual independence was met by the Enabling Act of 1919, by which a National Assembly was set up with defined legislative powers, subject to the veto of parliament. The National Assembly consists of the houses of bishops and of clergy (the two convocations) and a house of laymen (men and women)

elected by the lay members of the diocesan conferences. Two voluntary houses of laymen (one for each province) had already, since 1905, formed with the two convocations a Representative Church Council. The convocations of Canterbury and York assemble annually at the opening of parliament.

**Convolvulus** (Lat. *convolvère*, 'to twine together'), a genus of



Convolvulus (*Calystegia sepium*).

plants, the type of the order Convolvulaceæ. This order contains about a thousand known species, herbaceous and shrubby; generally with a twining stem and milky juice, chiefly tropical. Many are cultivated as ornamental plants, particularly species of Convolvulus and Ipomœa.

The acrid milky juice is often strongly purgative; and jalap and scammony are products of this order. Some species, however, have large, farinaceous roots, capable of being used as food, of which the Batatas or Sweet Potato (q.v.) is the most important. A few are natives of Britain, and are known by the name of Bindweed. A common name in the United States is Morning Glory. *C. arvensis* is a troublesome weed in some sandy soils in England, and *Calystegia sepium* in richer soils. The wood of *C. scoparius*, a shrubby species, native of the Canary Isles, called 'Rosewood,' or *Legnum Rhodii* by apothecaries, has so strong a smell of roses that the essential oil it yields on distillation is employed to adulterate the attar of roses.

**Convoy** (Fr. *convoi*) is the name given to one or more ships of war appointed to protect a fleet of merchant-vessels against the attacks of an enemy or of pirates. If a merchant-ship parts company with the convoy, or neglects to obey the convoy's instructions or signals, all claims of insurance are forfeited. The name is sometimes applied to the merchant-vessels so escorted. In the military service a convoy is a train of wagons or canal boats laden with provisions, treasure, or warlike stores, and escorted by a detachment of troops.

**Convulsion**, in Medicine, is sometimes used of any involuntary contraction of the voluntary muscles of the body; but especially of seizures in which the body is thrown into violent spasmodic contractions, the sensibility and voluntary motion being for a time suspended. In adults convulsions almost always indicate the presence of grave disease, either of the brain (particularly Epilepsy, q.v.) or of the kidneys. In children, especially before the age of three years, they are of much more common occurrence, and, though serious in themselves, may be due to temporary and comparatively trifling causes. The following description applies chiefly to the convulsions of children. A fit of convulsions may last from a few minutes to some hours, and may readily prove fatal, if not relieved within a short period. The first symptom observed is often a twitching of particular muscles or groups of muscles, and a change in the habitual expression or colour of the face, with rigidity of the limbs, and turning of the globes of the eyes suddenly upwards. The fingers are sometimes clenched in the palm, and the feet turned inwards; sometimes, however, convulsions occur absolutely without warnings of this kind, and even in the midst of perfect apparent health. Their cause is usually to be found in some source of irritation, especially in the digestive organs; as, for instance, disordered dentition, worms in the intestine, indigestible or unsuitable food, &c. Most epidemic fevers are also apt to be attended, in children, by convulsions in their early stages, and if severe, particularly in the case of whooping-cough, during their progress as well; and diseases of the brain and its membranes at every stage. Convulsions are greatly promoted by bad ventilation and injudicious feeding, with deficient exercise; and a great part of the cure consists in discovering and removing the causes of the disease.

When a child is suddenly seized with a tendency to spasm, such as twitching of the features, or contractions of the fingers and toes, it should be placed at once in a very free current of air, with its feet towards the fire; the extremities should be kept warm, and a cold lotion may be applied to the head, especially if there is much flushing of the face; a little castor-oil may be given unless the bowels are loose; and if there is flatulence, the belly may be rubbed with a warm hand, or with some simple stimulating liniment, such as camphorated oil. If an actual convulsion occur, the feet, or if

possible the whole body, should at once be put in hot water to which a little mustard has been added, and cloths wrung out of cold water frequently applied to the head. If there is any suspicion that worms or undigested food may be the cause, a purgative Clyster (q.v.) should be given; and aperient medicine by the mouth as well, if the child be able to swallow. Nothing more should be attempted without medical advice. The further treatment generally consists in the administration of nerve sedatives, especially bromide of sodium or potassium and chloral, and in obstinate cases chloroform, with careful attention of course to any cause of irritation that may be present.

Convulsions are rare amongst horses and cattle. In young dogs, however, they frequently occur from intestinal worms, disordered digestion, or in connection with distemper or other debilitating diseases: they usually disappear when their special causes are removed.

**Convulsionaries**, the name given to a fanatical sect of Jansenists who sprang up in France about 1730. Their meeting-place was the churchyard of St Médard, in a suburb of Paris, where was the tomb of a certain Francis of Paris, who died in 1727, and was reckoned very holy by the Jansenists on account of his extravagant asceticism. At this tomb a multitude of people poured forth fanatical prayers, preachments, and prophesying. Miracles are also alleged to have been performed, for proof of which we are referred to a work written by M. Montgeron, a French senator, and entitled *La Vérité des Miracles opérés par l'Intercession de François de Paris* (Paris, 1737). After 1731 the fanaticism of the convulsionaries increased to utter madness. 'They threw themselves into the most violent contortions of body, rolled about on the ground, imitated birds, beasts, and fishes, and at last, when they had completely spent themselves, went off in a swoon.' In 1733 the king issued an order for the imprisonment of these fanatics, but it was found impossible to put a complete stop to the mischief. They took to predicting the downfall of the throne and the church, which prophecy the French Revolution appeared to fulfil. They were not much heard of in Paris after the middle of the eighteenth century, but occurred in country-places at various times within the nineteenth century. They brought Jansenism into so much disrepute, that Voltaire declared the tomb of Francis to be the grave of Jansenism. See Mathieu, *Histoire des Miraculés et des Convulsionnaires* (1864).

**Conway**, a river in North Wales, famous for the bold romantic scenery along its higher, as well as for the richly beautiful scenery along its lower course. It rises in a small mountain-lake round which meet the three counties of Merioneth, Denbigh, and Carnarvon; and it runs 30 miles northward past Llanrwst and Conway to Beaumaris Bay. In its last ten miles, a smoothly-flowing if winding stream, it is navigable for vessels of 100 tons. At Conway it is half a mile broad at spring-tides, which rise here from 21 to 24 feet. Pearl-mussels are found at its mouth.

**Conway**, or ABERCONWAY, an ancient and picturesque little seaport town of North Wales, in Carnarvonshire, situated on the left bank of the river Conway at its estuary, 45½ miles NW. of Chester by rail. The river is crossed by a fine tubular bridge constructed by Stephenson in 1848, as well as by a suspension bridge built by Telford in 1826 (see BRIDGE). The town is triangular in form, and is surrounded by a high wall 12 feet thick and 1 mile in circumference, pierced by four Moorish-looking gates, and crowned by twenty-one round towers. In its south-eastern corner are the magni-

ficent remains of Conway Castle, rising proudly from a rock above the river. It was first built by Hugh Lupus, Earl of Chester, and rebuilt in 1284 by Edward I., to check the Welsh. Its walls are 12 to 15 feet thick, with eight vast towers, four of which are each surmounted by a slender turret. The Plas Mawr ('great mansion'), a noble timber house erected in 1585, profusely covered with ornament, is occupied by the Royal Cambrian Academy of Art. A Cistercian abbey was founded here by Llywelyn ab Iorwerth, prince of North Wales, in which Llywelyn the Great was buried. Population, 6500. Conway (a chartered borough since 1876) is one of the Carnarvon boroughs. It is still visited by vast numbers of tourists, but as a place of resort it has been left far behind by Llandudno, 4 miles to the north.

**Conway**, HUGH, the pseudonym of Frederick John Fergus, who was born in 1847, the son of a Bristol auctioneer. He adopted that pseudonym from the school frigate *Conway*, stationed on the Mersey, which he entered when he was thirteen for the purpose of training for a seafaring life. His father set his face against this, so young Fergus entered the auctioneer business, employing his leisure in writing clever newspaper verse and occasional tales. Some songs of his were accepted and published in 1878, a volume of verse in 1879; but it was the issue and rapid sale of his melodramatic story, *Called Back*, as vol. i. of Arrow-smith's Bristol Library (1884), which made him famous. Within five years 350,000 copies of this book had been sold. Fergus sold his share in the auctioneer's business in Bristol, and went to London, where he adopted the profession of authorship. His *Dark Days* followed, and just as in *A Family Affair*, and other works which he now produced in rapid succession, he had begun to show higher capabilities as a novelist, he died of malarial fever at Monte Carlo, 15th May 1885.

**Conway**, MONCURE DANIEL (1832-1907), free-thinking author, born in Stafford county in Virginia, entered the Methodist ministry in 1850, but, after a course at Cambridge (U.S.), settled as a Unitarian preacher at Washington in 1854, and at Cincinnati in 1857. He was a strong opponent of slavery, and in 1863 came to England to lecture on the war. In London he became head of the South Place Institute (for advanced religious thought). He published *The Rejected Stone* (1861), *The Golden Hour* (1862), *Republican Superstitions* (1872), *Idols and Ideals* (1877), *Demonology and Devil-lore* (1879), *Thomas Carlyle* (1881), *Pine and Palm* (1887), *A Life of Paine* (1892), whose works he edited (2 vols. 1892), and an *Autobiography* (1904).

**Conway**, SIR WILLIAM MARTIN, born at Rochester in 1856, was professor of Art at Liverpool (1885-88), and Cambridge (1901-4), wrote on the Dutch wood-engravers, Reynolds and Gainsborough, Flemish painters, Dürer, on his own noteworthy exploring and mountaineering expeditions, and contributed the article on Art to this work. He became M.P. for the English Universities in 1918.

**Cony**. See HYRAX, RABBIT.

**Conybeare**, WILLIAM JOHN, joint-author with Dean Howson of *The Life and Epistles of St Paul* (1851), was born 1st August 1815, son of the dean of Llandaff, and was educated at Westminster and Trinity College, Cambridge. His post as principal of the Liverpool Collegiate Institution (from 1842) ill-health compelled him to exchange for the vicarage of Axminster. He died at Weybridge in 1857. *Essays, Ecclesiastical and Social* (1856), and a novel, were his only other works.

**Conyza**, an unimportant genus of Compositæ (sub-order Tubulifloræ). *C. squarrosa* is known

as Fleabane and Ploughman's Spikenard, and has a strong peculiar smell, traditionally said to drive away fleas and gnats.

### Cooch Behar. See KUCH BIHAR.

**Cook, DUTTON**, dramatic critic and author, the son of a solicitor, was born in London, 30th January 1829, spent four years in his father's office, then entered a railway office, which he left to follow the full bent of his literary and artistic tastes. He studied painting and engraving, wrote a successful melodrama, acted as 'dramatic critic for the *Pall Mall Gazette*, 1867-75, and then for the *World* till his death, 11th September 1883. He wrote for various newspapers and magazines, including *Temple Bar* and *Chambers's Journal*, and his eight novels, and others, were always interesting and well written, but sometimes failed in catching the average novel-reader. He wrote the dramatic and theatrical lives for the first two volumes of the *Dictionary of National Biography*, was also author of *A Book of the Play* (1876), *Hours with the Players* (1881), and *On the Stage* (1883).

**Cook, ELIZA**, a favourite minor English poetess, daughter of a London tradesman, was born at Southwark in 1818. She contributed poetical pieces to various magazines from an early age, and issued her *Melania and Other Poems* in 1838, which, along with the issue of volumes in 1864 and 1865, established her reputation as a meritorious verse writer of sound morality, and clear, sensible, and simple treatment. She conducted *Eliza Cook's Journal* (1849-54) till ill-health obliged her to relinquish it; in 1864 a pension of £100 a year was conferred upon her by government. She also wrote *Jottings from my Journal* (1860), and *Laconics* (1865). She died 25th September 1889.

**Cook, JAMES**, one of England's greatest navigators and maritime explorers, was born at Marton, in Cleveland, Yorkshire, where his father was an agricultural labourer, on October 28 (according to another authority, November), 1728. After a meagre education, Cook was apprenticed at the age of thirteen to a haberdasher at Staithes, 10 miles north of Whitby. After a short experience of this life, he was bound apprentice to Whitby ship-owners, and spent several years in the coasting and Baltic trade. In 1755 he entered the royal navy as an able seaman, and in four years rose to the rank of master. For about ten years after this he was mostly engaged in surveying about the St Lawrence and the shores of Newfoundland, and the results as embodied in his sailing directory (1766-78), are of value even at the present day. During this period he devoted himself to the study of mathematics, and otherwise qualified himself for the highest rank in the navy. In 1768 he was raised to the rank of lieutenant, and placed in command of the *Endeavour*, appointed to convey the expedition for the observation of the transit of Venus in the Pacific. The *Endeavour* sailed on August 25, and arrived at Tahiti in the following April, the transit being successfully observed on June 3. On the return, New Zealand was for the first time circumnavigated, and its coasts charted; the east coast of Australia was surveyed and taken possession of in the name of Great Britain. The strait which separates Australia from New Guinea was sailed through, and the distinction of those two islands established beyond doubt. Continuing his voyage by Java (Batavia) and the Cape of Good Hope, Cook anchored in the Downs on June 12, 1771. One important result of the voyage was to disprove the existence of the 'great southern Continent,' which had been supposed to extend from the Antarctic as far north as 40° S. Cook was promoted to the rank of commander, and given the command of a

second voyage of discovery in the *Resolution* and *Adventure*, which sailed from Plymouth, July 13, 1772. This expedition was out for three years. The great object was to discover how far the lands of the Antarctic stretched northwards. For this purpose Cook sailed round the edge of the ice, and penetrated as far south as possible, his farthest south point being 71° 10', in long. 110° 54' W. During the intervals between the Antarctic voyages, Cook cruised in the Southern Pacific, visiting Tahiti, exploring the New Hebrides, discovering New Caledonia, and many of the island groups in the Pacific. Plymouth was reached on July 29, 1775. One important feature of the second voyage was that, owing to the precautions taken by Cook, there was only one death among his crews during all the three years—a marked contrast to the fearful losses sustained during other voyages of this period.

Cook, who had been promoted to captain, and received an appointment in Greenwich Hospital, had scarcely been home for a year before he was appointed to the command of another expedition, the main object of which was to discover a passage round the north coast of America from the Pacific. Cook sailed from Plymouth in the *Resolution*, July 12, 1776, followed by Captain Clarke in the *Discovery*. Leaving the Cape on November 30, the expedition visited Tasmania and New Zealand, and spent the year 1777 cruising among the Pacific Islands. In the beginning of 1778 the Sandwich Islands were discovered, when Cook made for the west coast of North America. This he followed and surveyed from 45° N. as far as Icy Cape on the inside of Behring Strait, where he was compelled to turn back, reaching Karakakoa Bay in Hawaii, Sandwich Islands, January 17, 1779. At first the expedition was treated in the most friendly way by the natives. For some reason their attitude changed, and on February 14, when Cook landed with a party to recover a stolen boat, the natives set upon them with sudden fury, Cook being clubbed and stabbed to death at the edge of the water. Part of the body was recovered and buried, and in 1874 a monument was erected near the spot where he fell. Many varied accounts have been given of Cook's death, and many reasons adduced for the changed attitude of the Hawaiians; but the probability is that he simply fell a victim to a sudden outbreak of savage fury. Cook did more than any other navigator to add to our knowledge of the Pacific and the Southern Ocean; his observations have stood the test of modern investigations; in character he was honest and just, both to his own men and to the natives with whom he came into contact, and who almost invariably became greatly attached to him. A pension of £200 was granted to his widow (whom he married in 1762), and £25 to each of his three children.

An account of the first voyage originally appeared as vols. ii. and iii. of Hawkesworth's *Voyages* (1773); the narrative of the second was written by Cook himself, 2 vols. with 1 vol. of plates (1777); that of the third appeared in 3 vols. and an atlas (1784), partly by Cook and partly by Captain James King. See Kippis's *Life and Voyages of Captain James Cook* (1788; reprinted (1883); Sir J. K. Laughton's article in the *Dict. Nat. Biog.*; Besant's monograph (1890); the unabridged reprint of Cook's *Journal of his First Voyage* (ed. Wharton, 1893); and the *Life by Arthur Kitson* (1907).

**Cook, JOSEPH**, lecturer and author, born at Ticonderoga, New York, in 1838, graduated at Harvard and Andover, and after three years' preaching went to Europe in 1871, where he studied in Germany, and made a tour of the Mediterranean countries. In 1873 he commenced a series of 'Monday Lectures' in Boston, which, endeavouring to harmonise science and religion.

and discussing social and political questions, became very popular; and in 1880 he began an extended lecturing tour around the world. Besides his lectures, he has published a number of works on such subjects as *Biology* (1877), *Heredity* (1878), *Marriage* (1878), *Labor* (1879), *Socialism* (1880). He died 25th June 1901.

**Cook, SIR JOSEPH**, Australian statesman, was born in 1860 at Silverdale, Staffordshire, and there began life as a coal-miner. Emigrating to Australia in 1885, he entered politics in 1891, and subsequently held various offices in the New South Wales legislature and in the Commonwealth parliament. At first a Labour member, he later became a Liberal and staunch Free-trader. He was prime-minister of the short-lived Liberal government of 1913-14. At the Peace Conference of Versailles (1919) he was a representative of Australia, and in 1921 was appointed High Commissioner for Australia. He was made a Privy-councillor in 1914, and G.C.M.G. in 1918.

**Cook, THOMAS**, railway excursion and tourist pioneer, was born at Melbourne, Derbyshire, 22d November 1808. His educational advantages were few, and his early days were spent in gardening, then in wood-turning and cabinet-work, and in printing. In his twentieth year he became a village missionary, and whilst thus occupied his sympathies were actively enlisted in the cause of temperance and free trade. But from 1841 his time and toil were engaged chiefly in the initiation and promotion of railway excursions. His first trip was from Leicester to Loughborough in 1841, his aim being the furtherance of the temperance cause. The Midland Railway was for some years the centre of his operations, and the town of Leicester his home. In spite of the great difficulties that had to be encountered, the business grew until not only in Great Britain but throughout the world agencies have been established, and the tourist tickets of Thomas Cook & Son are found everywhere. The firm greatly assisted the English government during the Sudan troubles, and on behalf of the Indian government they convey the Mohammedan pilgrims from India to Mecca. The founder died 18th July 1892. See Fraser Rae, *The Business of Travel* (1891).

**Cook, MOUNT** (*Aorangi*, 'the sky piercer'), the highest peak of Australasia, is one of the Southern Alps near the centre of the range, on the western side of the South Island of New Zealand. It is 12,349 feet high, is covered with perpetual snow (the snow-line being 3500 feet lower than in Switzerland), was scaled to near the summit by Green in 1882, and to the summit by Fyfe, Graham, and Clark, 25th December 1894. See F. Du Faur, *The Conquest of Mount Cook* (1915).

**Cooke, GEORGE FREDERICK**, actor, born in Westminster in 1756, made his first public appearance at Brentford in 1776, and in the period between 1784 and 1800 became very popular in the English provinces and in Ireland, attaining a front rank in his profession, in spite of drinking habits that increased with his years. From 1801 to 1810 he played at Covent Garden both in comedy and in tragedy, and rivalled Kemble in the public favour; although here, also, from 1803, when he was hissed off the stage for drunkenness, his intemperance was a notorious thing, and a matter for jesting apology. His best characters were Richard, Shylock, Iago, Sir Giles Overreach, and Sir Pertinax MacSycophant. In 1810 he visited America, and appeared before enthusiastic audiences in the chief northern cities, where admiration for the actor secured indulgence and pity for the extravagances of the drunkard. He died in New York city, 26th September 1811; a monument marks his grave, erected in 1821 by

Edmund Kean, who regarded Cooke as the greatest of actors. See his *Life* by William Dunlap (Lond. 1813).

**Cooke, SIR WILLIAM FOTHERGILL**, electrician, born at Ealing in 1806, served in the Indian army from 1826 to 1831, and after studying medicine at Paris and Heidelberg, abandoned this for telegraphy, and in 1837 entered into partnership with Professor Wheatstone. After experiments on various railway lines, they patented the single needle apparatus in 1845. In 1846 Cooke formed a company, which paid £120,000 for the partners' earlier patents. In 1867 Cooke and Wheatstone received the Albert gold medal; Wheatstone was knighted in 1868, and Cooke in 1869. He died 25th June 1879.

**Cookery.** The art of cookery, like other arts and handicrafts, is one which cannot be taught in an encyclopædia article, but the general principles which underlie the operations of cookery may be briefly expounded. This part of the subject—the chemistry and physics of cookery—has been much neglected until very lately.

The chief agent in cookery is heat, and therefore a large part of our subject is the consideration of the chemical and physical changes which occur in food materials when subjected to the agency of heat. We may apply this agent either by bringing the food into direct contact with the source of heat, or by exposing it to radiations from the source of heat. Roasting, toasting, grilling, and to a partial extent, baking, are examples of the latter; while stewing, frying, and the so-called 'boiling' of food—i.e. immersion in hot water—are examples of heating by contact. The term 'boiling' is commonly misapplied in a manner that leads to confusion of ideas. Thus we speak of boiling a leg of mutton, boiling fish, boiling potatoes, &c. quite improperly. The food in question is not boiled, should not be boiled; it is merely immersed in water, which is conveniently used as a heating agent. As will presently be shown, even the water itself should not in most cases boil. Frying, properly conducted, is another example. Here a bath of fat is used to convey the heat.

What are the changes effected on the food by the action of cookery? is the fundamental question to be answered in treating cookery as a branch of applied science. What is the difference between a raw and a cooked potato? What is the difference between a raw and a cooked leg of mutton? and other such questions throughout. We all know the difference in flavour, but the chemical and mechanical changes are but little understood. To answer these questions we must first know something of the composition of the uncooked viands.

For this purpose the old-fashioned division of the elements of organic substances into proximate and ultimate is very convenient. The ultimate elements—carbon, oxygen, nitrogen, hydrogen, &c.—are not cookable, and in their uncombined state do not concern our subject; but the proximate elements, or more properly proximate constituents, such as albumen, gelatin, starch, cellulose, &c., are altered, and the whole subject will be best understood by considering separately the alterations which occur to these in the course of cookery.

Taking first the constituents of vegetable food, the largest of these is the material of the cell walls of the vegetable, *cellulose*, or woody fibre. The next in quantity, as existing in ordinary articles of food, is *starch*, or *fecula*, or *farina*. Both of these are carbohydrates—i.e. compounds of carbon with water, or the elements of water, and they contain these elements in the same proportions, but their structure and digestibility are very different. Starch in its raw state consists of small granules

(see STARCH) which, placed in cold water, sink to the bottom without any degree of solution or other change by union with the water. In this condition they are practically indigestible in the human stomach, but when cooked, starch is the most easily digestible of all human food.

The changes that take place in the cookery of starch are considerable. If pure starch (arrow-root is such) be placed in water raised to the temperature of 140° F., the granules swell considerably, and the mixture becomes pasty or viscous. A little stirring breaks up the distended granules, and we obtain a glairy paste such as used by the laundress, and seen in cooked arrow-root. If the heat be now raised from 140° to the boiling-point, and the boiling continued, the jellied mass becomes thicker and thicker; and if there are more than 50 parts of water to 1 of starch, a separation takes place, the starch settling down with its 50 parts of water, and the excess of clear water standing above. We have here a case of hydration or combination with water as the result of cookery, and the probable cause of the improved digestibility. Dry starch may be raised to 300° without becoming thus semi-soluble. The hydrate once formed may be dried by evaporation, and still retains some water and the same degree of solubility. Many farinaceous preparations, such as corn-flour, &c., consist chiefly of starch in this condition. This, however, is not the limit of starch cookery. If it is heated to about 400°, it is converted into *dextrin*, which is completely soluble in water at all temperatures, the solution being mucilaginous but not pasty. Dextrin differs from starch in other properties (see DEXTRIN), but is composed of the same elements in the same proportions,  $C_6H_{10}O_5$ —i.e. six equivalents of carbon to five of water, or its elements. This change of starch into dextrin is of great practical importance as an operation of cookery, inasmuch as it anticipates the first stage of the digestion of starch.

The saliva, the pancreatic juice, and one of the intestinal secretions contain a peculiar principle which has received the name of *animal diastase*, from its resemblance to the diastase of malt. This converts the starch of food into the completely soluble dextrin, a change absolutely necessary for its assimilation as nutriment. In some animals the supply of this is so small that starch is almost worthless to them as food. It passes through the body unaltered. Such is the case with the carnivora. Human infants, when suddenly deprived of their mother's milk, have not sufficiently developed the power of salivary, pancreatic, and intestinal secretion of diastase to digest starch, and therefore demand assistance. Such assistance may be afforded by carrying the cookery of starch to what we venture to call the second stage—viz. its complete or partial conversion into dextrin. Thus, ordinary flour or oatmeal, simply heated in boiling water or milk, is merely subjected to the first stage—viz. hydration of the starch; but if the flour or oatmeal be well *baked*, a considerable proportion of its starch is converted into dextrin. A knowledge of this is of great importance to mothers, and also to nurses preparing food for dyspeptics, as adults vary greatly in their powers of diastatic secretion.

The reader will now understand why bread is rendered more digestible by toasting, and why crust of bread is more digestible than the crumb, in spite of greater hardness. In the ordinary baking of bread a variable amount of the starch is converted into dextrin. Well-baked bread is more digestible than under-baked. In the cookery of oatcakes, bannocks, scones, and all kinds of biscuits, this should be understood. The writer enjoys the luxury of hot rolls without their in-

digestibility, by simply moistening stale crusts of bread and reheating them in a kitchen oven. They thus become softened like new bread, and more digestible than before on account of the dextrinisation of a larger proportion of the starch. Baked and fried potatoes have a similar advantage.

The Diastase (q.v.) of malt may be employed for the dextrinisation of farinaceous food by adding malt flour or extract of malt to it; or the grain itself may be malted. The temperature at which malt diastase acts most vigorously is about 140°. At lower temperatures it acts more slowly; at much higher, its curious property is destroyed. To illustrate its action, make some oatmeal porridge very thick, then add about  $\frac{1}{16}$ th part of dry malt flour at about 140°, and stir. In a few minutes the thick pudding becomes quite sloppy owing to the greater solubility of the dextrin into which the starch has thus been converted.

The cellulose—i.e. the stalks and the cell walls, such as the fleshy part of leaves, &c.—are more or less digestible, according to their looseness of structure and their interfuidity or succulent character. Thus we may digest a raw lettuce more easily than a raw cabbage, or the inner leaves of either more readily than the outer leaves or stalks. The action of cookery on cellulose appears to consist in the loosening of its fibres, and rendering them more soluble. It is therefore advantageous that the water in which green vegetables, such as cabbages, are cooked should boil vigorously, the agitation of the steam bubbles assisting in the loosening of the fibres. Cellulose, like starch, may be converted into dextrin and sugar by the combined action of moderate heat with moisture and an acid. This change is aided by a little diastase. Sawdust and old rags may thus be converted into digestible and nutritious food, but not with commercial profit *at present*. An example of such conversion in Nature's laboratory is afforded by the ripening of a pear. Many varieties which are hard, woody, and sour when full grown in autumn, become gradually softer and sweeter, and finally delicious by simple storage. The action of *ensilage* (see ENSILAGE) of cattle food probably includes some degree of such conversion of cellulose.

The nitrogenous constituent of grain, the *gluten*, is not so greatly altered by cookery. The writer's investigations of this neglected subject lead him to the conclusion that the alteration which does occur is that of a partial hydration rendering the gluten more soluble, but this hydration is not so decided and definite as in the case of starch. There is one constituent of vegetable food which demands no cookery. This is pecten (otherwise pectose and pectin)—i.e. vegetable jelly. It exists most abundantly in fruits, and is familiar to all in the form of currant jelly, apple jelly, &c., which are pecten plus sugar. The cookery of vegetable casein will be discussed with that of the casein of milk.

Of the proximate elements of animal food the most abundant is gelatin; it constitutes about half the weight of the body of most animals. It exists in two forms—soluble and insoluble. Its cookery consists in the hydration of the insoluble form and rendering it soluble, as in the stewing of bones, tendons, skin, &c. in a stock-pot until their gelatin becomes soluble jelly. The muscular fibre itself, which with its enveloping membranes form lean meat, is subjected to a similar change, but less completely, in the course of cookery.

The cookery of *albumen* differs materially from any of the preceding. Albumen exists in raw flesh meat as one of its juices, being a glairy liquid which is distributed between the muscular fibres and the joints, and around the bones, forming a lubricant, and probably conveying material of

growth and renewal. It is typically seen in the white of eggs. When heated to about 134°, white fibres begin to appear within it. If the heat is continued, and gradually increased, they increase, until at about 160° the whole mass becomes white and nearly opaque. It is now coagulated into a tender, delicate, jelly-like substance, easily digestible and highly nutritious. If the heat is further raised, it becomes harder and harder, up to 212°. If this heat is continued, it shrinks, and becomes tough and horny, losing some of its water of composition, and its easy digestibility.

Ignorance of these particulars, and further ignorance of the fact that water has the same temperature, whether 'simmering' or boiling violently, causes the spoiling of vast quantities of food and wasting of much fuel in this country. The cooking temperature for all animal food is from 160° to 180°. When maintained for any length of time at the temperature of boiling or 'simmering' water, it is spoiled. To prove this, take a beefsteak and cut it in half. Place one half in water in a common saucepan, and boil or 'simmer' it for half an hour or more. Place the other half in water in an open-mouthed jar (such as a gallipot), and place the jar in a saucepan of water so that only the outer water shall boil; cook it thus, and compare with the first. At a continued temperature of 212° not only does the albumen become toughened, but the gelatin also becomes dehydrated, hardened, and indigestible. All stewing operations should, therefore, be conducted at 30° or 40° below the boiling-point. When the exposure to a higher temperature is but for a short period, little or no mischief is done. This is the case in frying and grilling of animal food. These operations should always be rapidly conducted.

Besides the above-named constituents of animal and vegetable food, there are the saline juices necessary for supplying the saline constituents of the blood, and upon which the flavour of food largely depends. These are not altered by cookery, but are too frequently sacrificed. Potatoes, for example, contain a certain proportion of potash salts. The writer has examined the water in which potatoes have been cooked and that which is condensed when they are steamed, and finds that if the potatoes are peeled, a large proportion of the salts pass into the water. If they are cooked 'in their jackets,' much less is lost; but when baked or fried, all is retained. The complete retention of the juices is one of the reasons why roasted and grilled meat has more flavour than that which is cooked in water.

The changes which cookery effects on fat appear to consist in partial dissociation of its proximate elements. It is composed of a fatty acid combined with glycerine. These are partially separated by heat.

Another constituent of both animal and vegetable food is *casein*. It does not exist in the flesh of animals, but is an important component of milk; is the solid basis of the curd which is separated by the action of rennet or acids (see *CASEIN*). It also exists in peas, beans, and other seeds of leguminous plants. It is highly nutritious. There are two forms of casein—the soluble and insoluble. It is soluble as it exists in milk, but insoluble after precipitation by acids or rennet, as in making cheese. An infant that digests the casein of milk cannot digest it after separation as cheese.

The writer has succeeded in partially reconvert-ing the insoluble to the soluble form by adding bicarbonate of potash in the proportion of  $\frac{1}{4}$ th to  $\frac{3}{4}$ th of an ounce to 1 lb. of cheese; the potash dissolved, in about a teacupful of water, and the cheese, grated or sliced, added to the solution, which is boiled until the cheese dissolves, forming a custard-

like result. This may be added to oatmeal porridge and a multitude of other preparations. The theory upon which this method of treating cheese was founded is, that the curdling of milk is due to the combination of an acid with the natural alkali of the soluble casein, chiefly consisting of potash. The artificial addition in the proportion named not only renders the cheese more digestible, but restores the saline constituent of the original milk, which in the course of cheese-making, passed into the whey. The importance of thus rendering cheese more digestible, and supplying its saline dietetic deficiency, will be understood by the fact that 20 lb. of cheese contain as much nutriment as a sheep weighing more than 60 lb. Lean beef and mutton contain from 72½ to 73½ per cent. of water, cheese about 30 per cent. and no bone. Cheese may be stored and carried almost as easily as coal.

Of late in Great Britain much more attention than formerly has been bestowed on cookery, and the subject is now generally taught in schools and in colleges of domestic science.

See *BOILING, STEWING, &c.*; also *DIET, DIGESTION*.

**Cook Islands**, or HERVEY ARCHIPELAGO, lie about midway between the Society and Navigator groups, near 20° S. lat., and 158° W. long., and are some volcanic, some coralline; Mangaia, Atiu, and Rarotonga are the chief. The natives, mainly of the brown Polynesian stock, are some 7400 in all, of whom 3300 are in Rarotonga, which is mountainous (reaching 3000 feet) but fertile. Formerly cannibals, they are now all Christians. The islands, annexed by Britain in 1888, were made over to New Zealand in 1900. Each island is governed by an island council of *ex officio*, nominated, or elected members.

**Cookstown**, a town in County Tyrone, Ireland, 53 miles W. of Belfast by rail, with manufactures of linen, and bleach-works; pop. 3700.

**Cook Strait**, discovered by Cook on his first voyage, separates the North and South Islands of New Zealand, and is 20 to 80 miles wide.

**Cooktown**, a port (dating from 1873) in the north of Queensland, on the Endeavour River, 1050 miles NNW. of Brisbane, and 122 NE. of the Palmer gold-field. There are handsome public buildings and a monument (1889) to Captain Cook, who beached his ship, the *Endeavour*, here in 1770. Near there are gold-diggings and tin-mines, pearl-fisheries, and fisheries of trepang.

**Cooler**. See *BEER, REFRIGERATION*.

**Coolgardie**, a mining station in Western Australia, 270 miles NE. of Perth, with which it is connected by rail and telegraph. Gold was discovered here in 1892, over 500 oz. being obtained in a single afternoon with the aid of a tomahawk; the next year the even richer field of Kalgoorlie was opened up, and mining settlement has grown mainly round that centre, the present population being about 30,000. The native gold is remarkably pure, some specimens of sponge gold assaying 99.91 per cent. of gold with 0.09 of silver.

**Coolidge**, CALVIN, thirtieth president of the United States, was born at Plymouth, Vermont, 4th July 1872, and educated at Amherst College. He entered a law office at Northampton, Massachusetts, where he began to practise in 1897, becoming prominent later in local and state affairs. A city councillor in 1899, he was city solicitor in 1900-1; in 1904 became clerk of the courts and chairman of the republican city committee; and in 1910 mayor. He sat for Northampton in the state senate 1912-15 (as president in 1915), was lieutenant-governor of Massachusetts in 1916-18, and governor in 1919 and 1920. His defeat of the Boston police strike gained him favour in the re-

publican party. He became in 1921 Vice-president of the United States, but the death of Mr Harding, 2d August 1923, brought him to the presidential chair. He was elected for a full term from March 1925.

**Coolies** (Hind. *kali*, 'labourer'), Indian and Chinese labourers who emigrate to foreign lands, whether at their own charge or at the expense of the foreigner whom they bind themselves by contract to serve for a fixed term of years. Labourers who migrate from one part of India to another, as for instance from Bengal to Assam, are also called coolies. The European and American residents in the treaty ports of China give the same name to the lower class of Chinese labourers in their service.

In China, during the 18th and 19th centuries, pressure of population produced a continual outflow, chiefly from the southern provinces of Fuh-Kien and Kwangtung. The emigrants swarmed over the archipelago, settled by thousands and tens of thousands in Java and in the Straits Settlements, and threaten eventually to displace the natives in Siam and the Malay Peninsula. The discovery of gold attracted large numbers of Chinese to California and Australia. The first railway across the Rocky Mountains was partly made by Chinese labour, and M. Lesseps invited their help for the excavation of the Panamá Canal. In spite of his utility, the coolie has become an intolerable offence to the working-classes of America and Australia. He is accused of gambling, opium-smoking, and immorality; but the head and front of his offending is his working for low wages. In 1881 the United States negotiated a treaty with China, by which restriction of Chinese immigration was secured to the States in return for American prohibition of the opium trade on the coast of China. Another treaty between the two powers in 1888, prohibiting the entry of Chinese labourers into the United States for a period of twenty years, was refused ratification by the Peking government. In British colonies the attempt has been made to exclude the obnoxious coolie by the imposition of a poll-tax. In Canada, especially British Columbia, the number of Chinese immigrants has been such as to call forth attempts to exclude them. In 1885 it was enacted that every Chinese entering Canada—with certain exceptions—should pay a head-tax of \$50. In 1901 this tax was increased to \$100, and in 1904 to \$500. The chief classes exempted are consular officers with their suites, merchants, and members of the learned professions, with their wives and children in each case. Those who have been admitted may go abroad and return if they register and pay a small fee. In Australia similar acts failed to secure the desired end. In 1888 the New South Wales legislature passed an act to prohibit the landing of Chinese immigrants; but the law-courts decided against the legislature. At a conference of delegates from the governments of all the Australian colonies, it was unanimously agreed to endeavour to secure the exclusion of the Chinese, by means of a new treaty between the British and Chinese governments. The existing treaties which promise protection to the Chinese immigrant are the Treaty of Nanking (1842), the Treaty of Tientsin (1858), and the Convention of Peking (1860). Under the Commonwealth, Chinese and Japanese have been more or less effectually excluded by the indirect method of an education test.

The coolie in the United States and in some British colonies is an uninvited and unwelcome visitant. At the same time his services have been eagerly sought in other colonies, the governments and planters of which have borne all the expenses of his passage, paid him a small advance, and in addition paid head-money to the agent who obtained him. To recoup this expenditure, the planter required the coolie to bind himself to serve for a term

of years at a fixed rate of wages. Coolies thus indentured occupied a similar position to apprentices, soldiers, and sailors. The system is liable to the grossest abuse. The dark story of coolie emigration to Peru and Cuba, carried on from Macao (q.v.), rivals in atrocity the horrors of the slave-trade and slavery. This branch of the coolie traffic was brought to an end in 1874 by an enactment of the Chinese government, requiring that in the contract a clause should be inserted securing to the coolie a free passage home at the expiration of his term. The planters were not willing to incur this obligation, and coolie emigration from Chinese ports ceased. During the years between 1847 and 1875 there was a fearful loss of life, some perishing on shipboard in vain attempts to recover their liberty, others dying of ill-treatment or disease, or by suicide. The only redeeming feature was that sooner or later the bondage ended. The slave was a slave until death: the coolie could look forward to the end of his contract.

Coolie emigration under contract to British and French colonies was mainly Indian, with a small percentage of Chinese in its ranks. Both the Indian and the colonial legislatures took great pains to prevent abuse of the system, not without some success. Every step of the process, from the first solicitation of the labourer, until the ship carried him out of port, was regulated by the Indian government. The agents who collected the coolies, the depots where they were lodged, the contracts they signed, the ships in which they embarked, were inspected, licensed, supervised by government. Protectors of emigrants were appointed in Calcutta, Madras, Bombay, and Karachi, from which ports only the emigration was lawful. In like manner the colonial governments enacted regulations and appointed protectors, to secure to the coolie limitation of his task, sufficient food, suitable lodging, and medical care in sickness. The imperial government intervened by conventions entered into with foreign governments, with France in 1861, with the Netherlands in 1870, to secure the fair treatment of the coolie in foreign colonies. That all this legislation was neither unnecessary nor unfruitful is proved by the case of Réunion. In 1880 M. Rougon reported to the French government that the coolies in this island 'were badly clothed, badly fed, badly paid, and badly cared for when sick.' The Indian government, receiving similar reports, put in force a provision of the Emigration Act, and prohibited emigration to Réunion. The British consul at Cayenne reported that the coolies in French Guiana suffered 'barbarous and inhuman treatment'; and in 1876 emigration to that colony was stopped. According to the Indian Emigration Act of 1883, emigration under contract was lawful to the following places: British colonies—Mauritius, Jamaica, British Guiana, Trinidad, St Lucia, Grenada, St Vincent, Natal, St Kitts, and Fiji; French colonies—Martinique, Guadeloupe; also to Dutch Guiana, and the Danish island, St Croix. In 1886 the Jamaica government suspended immigration from China and India to that colony; but it was resumed in 1891. In Trinidad the coolies were usually well fed, not overworked, and well treated in sickness. In Mauritius Indians formed two-thirds of the population in 1911. The greater part of Port Louis had passed into their (and Chinese) hands, and many sugar estates have been purchased by Indians. Emigration to French colonies had been forbidden in 1886, and Dutch Guiana was the only country outside the British Empire to which Indian coolies could be sent when, in 1916, it was announced by Lord Hardinge that the whole system was to be abolished by degrees. The position of free Indians in Natal had long been a bone

of contention, and the Indian government had prior to 1916 forbidden emigration thither.

Coolie labour in India is regulated by acts of 1882 and 1883, but complaints of unfair and even cruel treatment were made, and an amending act was passed by the Viceroy's Council in 1901, regulating the importation of coolie labour to the tea-plantations of Assam. The coolie traffic between the southern ports of India and Ceylon is constant and mutually advantageous. The coolies of Ceylon are not indentured, and are free to leave on a month's notice. In the last years of indentured emigration some 10,000 coolies left India yearly, and about half that number returned. The rest settled in the countries to which they were sent.

The Pacific islands have been the scene of a 'labour trade' to supply the demand for cheap labour in the sugar-growing parts of Australia; shiploads of natives from some of the Polynesian islands were imported under conditions very like enforced slavery, as was proved by a Royal Commission (1884), and stricter regulations were introduced. In 1901 there were in Queensland 9237 Polynesians, 2269 Japanese, and 939 Indians or Ceylonese, besides 1557 other coloured aliens. The Australian Commonwealth in that year passed an Immigration Restriction Act for the gradual elimination of Polynesians. From 1904 the Chinese in the Transvaal gold-mines (53,000 in 1907) created much controversy, and all were repatriated by 1910.

The literature of this subject consists chiefly of parliamentary papers and government reports. Besides those referred to above, the following may be named: Correspondence, Papers, or Reports on the Macao Coolie Trade (1871 to 1875); on Coolie Emigration from India (1874); on the Coolies in Assam (1867), in Surinam (1877), in Trinidad (1885); on Coolie Importation from India to French Guiana (1878); and on Chinese Immigration into the Australasian Colonies (1888). *The West Indies and Spanish Main*, by A. Trollope (1860); *The Coolie: his Rights and Wrongs*, by E. Jenkins (1871); *In Quest of Coolies*, by J. L. A. Hope (1872); Charles Kingsley's *At Last* (1872); and Churchyard's *Blackbirding in Southern Seas* (1888), may be consulted.

**Coomassie.** See KUMASI.

**Cooper, ASHLEY.** See SHAFTESBURY.

**Cooper, SIR ASTLEY**, surgeon, was born, a clergyman's son, at Brooke Hall, Norfolk, 23d August 1768. In his seventeenth year he went to London, and became a pupil of Mr Cline, one of the most noted surgeons of his day. He devoted himself with ardour to his profession, and was a constant attender at the dissecting-rooms, and also at the lectures of the famous John Hunter. In 1789 he was appointed demonstrator of anatomy at St Thomas's Hospital; and two years after he assisted in the lectures on anatomy and surgery. In 1793 he was appointed lecturer on anatomy at the College of Surgeons, in 1800 surgeon to Guy's Hospital; and in 1813 professor of Comparative Anatomy in the College of Surgeons. Meanwhile, Cooper had been enriching medical literature by various contributions. An essay on the effects resulting from the destruction of the *membrana tympani* gained him, in 1802, the Copley medal of the Royal Society, of which he was elected a fellow three years afterwards. In 1804-7 appeared his great work on *Hernia*, with life-size illustrations, a contribution of the utmost value to medical science, though in a pecuniary point of view it proved very unprofitable to himself. The practical part of his profession was not neglected during this time. He was the first to attempt the tying of the carotid artery, an attempt which, though unsuccessful in his hands, has since proved effectual in the hands of other practitioners. His annual income, which in the

fifth year of his practice only amounted to £100, had in 1813 risen to the enormous sum of £21,000. In 1817 he tried what has been considered the boldest experiment ever attempted in surgery, the tying of the aorta, which did not prove successful. In 1820 Cooper removed a tumour from the head of George IV., who conferred a baronetcy upon him some six months after. In 1827 he was elected President of the College of Surgeons, in 1828 became sergeant-surgeon to the king, and in 1830 was made vice-president of the Royal Society. Other honours flowed in upon him. He was made a member of the French Institute, and corresponding member of the Royal Academy of Sciences, a D.C.L. of Oxford, and an LL.D. of Edinburgh. Ever busy with his pen as with his knife, he in 1822 published a great work on *Dislocations and Fractures*. His treatise on the *Anatomy and Diseases of the Breast* (1829-40) was characterised by all the care, research, and originality which distinguished his previous works; so likewise was his *Anatomy of the Thymus Gland* (1832). Cooper died 12th February 1841, and was buried in the chapel of Guy's Hospital. A colossal statue to his memory is erected in St Paul's Cathedral, London. As a teacher, Cooper possessed the faculty of communicating knowledge in a manner at once easy and agreeable; and he elevated medical surgery, the operations of which before his time had been described as a series of 'frightful alternatives, or hazardous compromises,' into a science. See his *Life* (2 vols. 1843).

**Cooper, JAMES FENIMORE**, an American novelist, was born at Burlington, New Jersey, September 15, 1789. His father, a man of wealth and Federalist member of congress, was of Quaker descent, and his mother, a Swede, was also of Quaker ancestry. In 1790 the family removed to Cooperstown, New York, then in a wild frontier region of great natural beauty. Cooper entered Yale College in 1802, a boy of thirteen. After remaining there three years, he was dismissed for some minor act of alleged misconduct. In 1806 he shipped as a common sailor, and in 1808 entered the navy as a midshipman. He rose to the rank of a lieutenant, but in 1811 resigned his commission, and married Susan, a sister of Bishop De Lancey of New York. His first novel, *Precaution* (1819), was a failure; and the thirty-two tales which followed it were of extremely unequal quality. Among those which had signal merit we may name *The Spy* (1821), *The Pilot* (1823), *The Last of the Mohicans* (1826), *The Prairie* (1826), *The Red Rover* (1831), *The Bravo* (1831), *The Pathfinder* (1840), *The Deerslayer* (1841), *The Two Admirals* (1842), *Wing-and-Wing* (1842), and *Satanstoe* (1845). His other writings include a meritorious *Naval History of the United States* (1839; abridged edition, 1841), and *Lives of Distinguished American Naval Officers* (1846). His works of fiction have long enjoyed great popularity; and his best productions, in spite of conspicuous faults, well deserve all the favour they have received. His sea-tales and stories of frontier life are in all respects his best. Cooper's descriptive talents were of very high order; and some of his characters, such as 'Long Tom Coffin,' 'Birch,' 'The Big Serpent,' and especially 'Leather Stocking' (Natty Bumppo), are drawn with as much strength and life as almost any in the whole range of fiction. The peace of many of the later years of his life was much disturbed by literary and newspaper controversies and actions for libel, in nearly all of which he was successful. He conducted his own lawsuits, and usually pleaded his own cases with admirable tact and ability. One good result of these suits was to put upon the newspaper press of his own time and country some degree of restraint from the scandalously savage and virulent freedom of speech

which then prevailed. On either side of the Atlantic Cooper's own severity of language won him no small amount of personal unpopularity; yet no man loved his own country better than he; and his high regard for the nobler side of the English character, and his appreciation of the grand achievements of British history, found frequent expression in his writings. These writings, other than the best of his novels, contained much to excite opposition, and they brought upon him, not altogether undeservedly, the reputation of being a proud, contentious, and somewhat wrong-headed man; yet there was in his real character much sweetness, as well as great strength, purity and dignity, and unqualified honesty. His pride was large, but unmixed with personal vanity. He died at Cooperstown, 14th September 1851. See *Life* by Lounsbury (1882); also *Letters and Journals* (2 vols. 1914), edited by Morse, and *Correspondence* (2 vols. 1922), edited by his grandson, J. Fenimore Cooper.

**Cooper, PETER**, manufacturer and philanthropist, born at New York, 12th February 1791, assisted his father in his successive occupations of hatter, brewer, and brickmaker, and served an apprenticeship to a carriage-builder, 1808-12. He next made independent ventures as a machinist, cabinetmaker, and grocer, and established a glue factory on Long Island. He erected large iron-works in Baltimore in 1828, and in 1830 constructed there, from his own designs, the first locomotive engine ever built in America. He afterwards built an iron-wire factory in New York, and large blast-furnaces in Pennsylvania; and he was largely instrumental in bringing about the laying of the Atlantic cable. To provide the working-classes with educational advantages, of which he himself had enjoyed so few, he erected and endowed the Cooper Union (1854-59), one of the most useful institutions in New York, where free lectures, reading-room, art collections, and technical schools have been provided. In 1876 he received the Independent nomination for president. He died in New York, 4th April 1883. See *Life* by Mrs Carter (1889).

**Cooper, THOMAS**, the Chartist poet, born at Leicester in 1805, was apprenticed to a shoemaker at Gainsborough, taught himself Latin, Greek, Hebrew, and French, and became a schoolmaster at twenty-three, and at the same time a local Methodist preacher. After reporting for some of the newspapers in the Midlands, he became leader of the Leicester Chartists in 1841, and was an active editor of tracts. He lectured in the Potteries during the riots in August 1842, was arrested on a charge of conspiracy and sedition, and sentenced to two years' imprisonment in Stafford gaol. Here he wrote *The Purgatory of Suicides*, a poem in the Spenserian stanza, and *Wise Saws and Modern Instances*, a series of tales, which were both published in 1845. Next year appeared his *Baron's Yule Feast*, a *Christmas Rhyme*, and a series of papers headed 'Condition of the People of England' in *Douglas Jerrold's Newspaper*. In 1848 he began to lecture on history and politics in London, and set up the *Plain Speaker* and *Cooper's Journal*, two short-lived penny weeklies. He published two novels, *Alderman Ralph* (1853), and *The Family Feud* (1854), and relinquishing sceptical opinions he had held since his imprisonment, became a Christian lecturer. In 1867 his friends purchased an annuity for him; in 1892 he got a Civil Service pension of £200, but died 15th July of the same year. Cooper published his *Autobiography* in 1872, and an edition of his *Poetical Works* in 1878.

**Cooper, THOMAS SIDNEY**, animal-painter, was born at Canterbury, 26th September 1803, and successively coach-painter, scene-painter, and

drawing-master, lived three years at Brussels (1827-30), was elected an A.R.A. in 1845 and an R.A. in 1867, and lived till his 99th year, dying 7th February 1902. See his *My Life* (2 vols. 1890).

**Cooperage** is a very ancient art, well known to the Romans. The bulge or belly of a barrel is formed by so shaping each stave that, when all are hooped together, their edges shall coincide perfectly; each stave, made broadest in the middle, is narrowed down in a curved line towards each end. A skilful cooper can work this curve so accurately, that no further fitting or alteration shall be needed when the staves are put together. The staves are made to meet at their inner edges, and by driving the hoops very hard, the inner part is compressed until the slight gaping outside is closed, and thus slight inaccuracies of fitting are remedied.

There are several branches of cooperage. The *wet* or *tight* cooper makes vessels for holding liquids. The *dry* cooper does inferior work, such as barrels for containing dry goods, where an inferior degree of accuracy is sufficient. The *white* cooper makes churns, pails, &c., which for the most part have straight sides.

The best work is made of oak, which must be thoroughly dried before being put together. In warm countries, the drying of the sun is sufficient, and casks are therefore mounted in summer only; but in Britain, artificial drying is commonly resorted to. The hoops are hammered down from the narrow to the wide part of the cask, by means of a mallet striking a piece of wood held against the hoop. Iron hoops are sometimes put on hot, in order that their contraction on cooling may bind the work together. Most ingeniously constructed machinery is now generally used in barrel-making.

**Cooperage**, on the North Sea, is that demoralising system of selling or bartering strong drink, tobacco, or other articles, to fishermen or sailors, from Dutch or other foreign vessels called *copers* (Ger. *kaufen*, Dut. *kopen*). They ostensibly cruise with the English fishing-fleets to sell foreign tobacco on which no duty has been paid, and what on shore would cost four shillings is perhaps sold for eightpence. The trade began in the middle of the 19th century by foreign vessels from Dutch ports trading with English smackmen in articles of clothing, which grew into the more profitable barter and sale of tobacco and spirits. An English smack, until the insurance company refused to insure her, has been known to take out £500 worth of grog and tobacco, and clear another £500 in two months in the traffic. To counteract the evils of the system, Mr E. J. Mather, in 1882, started a mission for the deep-sea fishermen, which in 1888 had at command eight mission ships, stored with good literature, woollen clothing, tobacco, and medicine, and a staff of twelve clergymen as honorary chaplains. The Customs Commissioners refused the necessary concessions for the sale of tobacco at a cheap rate in 1885, but granted the same in 1887, and now on each voyage extensive drawings are made for that commodity. Queen Victoria became the patron of the mission, and it is duly registered by the Board of Trade. As a result of an international conference at The Hague between the six fishing powers, a convention was signed in 1887, one of the provisions of which contemplated the absolute prohibition of the sale or barter of spirits on the North Sea. The North Sea Fisheries Acts (1888 and 1893) give effect (as far as Great Britain is concerned) to the recommendation of the convention. The sale of spirits to fishermen and others on board fishing-vessels is prohibited; fishermen are forbidden to buy spirits at sea; the exchange or barter for spirits of any article, especially the fish caught,

nets, or gear of the fishing-boat, is also prohibited. Vessels trading in provisions, &c. must be licensed, and penalties from £10 to £50 are exigible for offences against the convention. See E. J. Mather's *Nor'ard of the Dogger* (1887).

**Co-operation.** In the social and economic sense of the word, co-operation generally means the association of work-people for the management of their own industrial interests, in store, workshop, or other undertaking, and the equitable distribution of profits among those who earn them. In Great Britain it has succeeded best in distribution, that is, in the form of co-operative stores for the supply of the domestic wants of the workmen's families; in Germany and Italy it has flourished chiefly under the form of people's banks, for furnishing mutual credit to workmen and also small tradesmen. Co-operative production has not yet made corresponding progress. The co-operative movement acquired vitality with the foundation of the Rochdale Society of Equitable Pioneers in 1844. Before that date there had been instances of co-operative industry among English miners, New England fishermen, and the Greek sailors of the Levant. In Great Britain there exist even yet co-operative societies, which were founded prior to 1844; one at Govan, said to have been established in 1777, and another at Hull, started in 1795. The earliest in England, however, was that founded in 1794 at Mongewell, in Oxfordshire, by Shute Barrington, Bishop of Durham. During the Owenite agitation from 1820 to 1845, the movement began to assume national importance, hundreds of societies rising up, which for the most part rapidly disappeared. By general consent it is agreed that the movement took practical and permanent form with the Rochdale Pioneers (1844). The founders were twenty-eight weavers, nearly all of whom were socialists of the Owen school and Chartists; and their original capital was £28, painfully collected by subscriptions of twopence, afterwards raised to threepence a week. With this capital they opened a store for supplying themselves with provisions, but at first they had only four articles to sell—flour, butter, sugar, and oatmeal. Their success, which was steady and rapid, was chiefly due to their device of limiting interest on shares to 5 per cent. and dividing profits among members in proportion to their purchases. By 1857 they had a membership of 1850, a capital of £15,000, and annual sales to the amount of £80,000. Their society, its organisation and methods of conducting business, became a model to the working-men in the north and centre of England, as also in Scotland. In this way the movement rapidly spread, and the societies are now over 1450 in number, with nearly two million members. In 1864 the Wholesale Society for the supply of commodities to the various stores was established at Manchester, and a second at Glasgow in 1869; but the two work in harmony, and may be considered as one institution. In 1871 the *Co-operative News* was started as the organ of the co-operators. Since 1869 national congresses of co-operative societies have been held every year in one or other of the large towns of Great Britain. These may be regarded as the annual parliaments of co-operators. The efforts after organisation culminated in the consolidation of the Co-operative Union with a regular constitution drawn up in 1873. Subject to the congress, the Union is governed by a United Board of twelve members, representing the six sections into which the union is divided. The sectional boards have monthly meetings of their own. The Central Co-operative Board, consisting of all the members representing the seven sections, comes together for business only at meetings of congress.

Having thus sketched the general development

of English co-operation, we shall now more specifically indicate the rules and organisation of the societies. Any one may become a member on paying an entrance fee of one shilling, and members may pay up their shares at the rate of threepence a week. Shares are usually one pound each, and one or two of these shares, transferable but not withdrawable, constitutes all the capital a member is required to hold. The other share capital that a member may hold is withdrawable. The interest on capital is limited to 5 per cent. Goods are sold at the prices current among respectable shopkeepers in the neighbourhood, and after paying expenses the nett profits are distributed quarterly among the members in proportion to their purchases. These dividends may be allowed to accumulate in the store, but no member is permitted by law to hold more than £200. The general rule is that payments be made in ready money, a system to which co-operation largely owes its success, but which is not yet universal. At the congress of 1888 complaints were made that the credit system is to some extent permitted. Irrespective of the amount of his investments, each member has only one vote. The members elect a committee for the management of the business. The committees have frequent meetings, and control the employees of the store. The members themselves hold quarterly and in many cases monthly meetings. The Wholesale Society is a federation of retail societies, which have to take up shares, and they participate in the management in proportion to their membership. The Wholesale is a large and growing organisation for the supply of goods to the various societies composing it, with purchasing depôts not only in Great Britain and Ireland, but in North America, Spain, Denmark, and Germany. From 1876 to 1907 it was its own shipper for its North Sea traffic. It has also extensive productive works, as boot and shoe factories at Leicester, soap-works at Durham, woollen-cloth works at Batley, &c. Besides the productive works thus conducted by the Wholesale Society, there are a number of societies for production alone, societies for working corn-mills, and a number of retail societies which carry on corn-mills and various branches of domestic production. In addition to the societies already mentioned, there is a co-operative fire and life insurance society, and the *Co-operative News Society*, started in 1871 for carrying on the organ of the co-operators. It also publishes the *Wheat-sheaf*, the *Scottish Co-operator*, *Labour Co-partnership*, *Irish Homestead* (monthly), besides many local *Records*.

The following statistics were presented to the Co-operative Congress of 1922. The wholesale societies of England and Scotland make rapid progress. The English society in 1921 had 1205 members, and a total capital of £23,287,747, and the sales amounted to £81,941,682; it has purchasing agencies in Canada, Australia, the United States, Germany, Sweden, Denmark, and Greece; and the sales of the productive department were £26,569,333, the capital engaged in production being £9,969,222. Of the Scottish society the membership was 273, the capital £5,694,379, and the sales £22,041,158, with £409,394 of profit, while the sales of the productive department were £7,023,453. The retail societies in 1921 numbered 1352, with 4,548,557 members, having a share capital of £74,818,802, and the sales for the year were £218,780,384, with £14,253,671 of profit. The production societies, as distinct from the wholesale productive departments, had an output in the United Kingdom of £6,581,587 (profit, £322,358). The Co-operative Insurance Society undertakes fire, life, and fidelity insurance. Of agricultural societies, 181 farm 73,438 acres, with a capital of £3,262,901. The Women's

Co-operative Guild has 666 branches, with over 28,000 members. The Co-operative Union had 1307 societies belonging to it, representing 3,814,437 members. It organises the annual congress, and has parliamentary and international committees, and committees on production, propaganda, education, &c. By its efforts its various connected societies voted £128,786 for educational purposes in 1918.

In Ireland co-operation has been of much more recent growth than in England or Scotland, but its development has been unexpectedly rapid and beneficial. In 1890 there was only one society, while at the end of 1915 there were over 1000 of all kinds, with 140,000 members and a turnover of £4,184,984. The movement is principally directed to agriculture, and the Irish Agricultural Society had in 1915 344 creameries, with 45,385 members and £276,250 share and loan capital, and produced butter worth £3,499,264. These creamery-dairy societies are formed by small local farmers, who bring their milk to be separated or made into butter, the profits being divided. Their influence has greatly improved dairy-farming and butter-making in Ireland. There are also flax-growing societies, agricultural banks on the Raiffeisen principle, to aid small farmers with capital on co-operative principles, agricultural requisite supply societies, egg, poultry, pig societies, and the like.

The International Co-operative Alliance has 118 members, representing 569 societies in Britain and the Continent. Its object is to further the growth of co-operation, and by 1919 it had held nine congresses—in London, 1895; Paris, 1896; Delft, 1897; Paris, 1900; Manchester, 1902; Budapest, 1904; Cremona, 1907; Hamburg, 1910; and Glasgow, 1913.

In the United States of America co-operation has not made such progress as might have been expected from the energy and spirit of initiative prevalent among the people. Though co-operation had previously existed among the fishermen of New England, the Brook Farm (q.v.) experiment may be regarded as the starting-point of the movement. In Philadelphia co-operative building societies have provided the workmen with from 80,000 to 100,000 homes. The same form of co-operation flourishes in other parts of the country. A notable and thoroughly successful effort in productive co-operation was begun in the cooping trade at Minneapolis in 1874. But in America the influence of co-operation has been on a limited scale.

In France the co-operative movement has taken the direction of productive societies, especially in the building and furniture trades. They had contracts for the Paris Exhibition of 1900 for several million francs. They have a state subsidy of 150,000 francs. There are also numerous baking societies, and over 1785 co-operative credit societies, mostly agricultural.

In Germany co-operation has flourished greatly in the form of people's banks. These originated in 1849 under the auspices of Schulze-Delitzsch, at the little town of Delitzsch in Saxony. Schulze-Delitzsch was salaried counsellor (*amwalt*) or general manager of the societies till his death in 1883. In 1884 there were 800 societies (called after Raiffeisen, their founder) whose function it is to provide mutual credit for the small farmers of Germany. In 1906 there were 14,200 credit societies, 1837 distributive societies, 5246 agricultural societies, besides many others. The General Union of German Trade and Industrial Self-help Co-operative Societies, which carries on the traditions of Schulze-Delitzsch, is the chief body, though it does not recognise the distributive societies. In Italy co-operation is making great progress, chiefly in the form of people's banks. In 1906 there were about 1461 of these banks. Co-operation in other

forms also is rapidly making way—there are co-operative dairies, bakeries, and many others. In Belgium co-operation has established itself on a very considerable scale at industrial centres, in stores, bakeries, &c. In Denmark co-operative dairies, bacon-curing factories, egg-export societies, &c. have practically monopolised all the agriculture of the country (see DAIRY). In Russia co-operation dates from 1865, and although impeded throughout by political conditions, it had made steady progress before the revolution of 1917. Societies are of five types—consumers, credit, industrial, agricultural, and mixed. The Soviet policy towards the movement has been to preserve the outward form of co-operation, but to transfer all real control to the Soviet government; the All Russian Council of Co-operative Congresses being merged in the 'Centrosyus'.

The various Professional and Civil Service stores, begun in 1864, are simply a result of the application of the co-operative system to supply the wants of the middle classes; and these stores now do a very large business, the largest being the Army and Navy Stores, London. The salient difference between them and the workmen's store is that the former admits of the system of privileged shareholders, whereas the latter are open to every one who pays an entrance fee of one shilling.

From the above facts it will be apparent that the purpose and tendency of the co-operative movement is that the workmen, through the principle of associated industry, by means of a joint capital, should equitably manage their own affairs so far as they can. Such management, we have seen, has been applied on a large scale to distribution and to people's banks, and has had a considerable success also in various forms of domestic production, as in corn-mills, bakeries, boot and shoe factories, dairies, &c. Though essentially a workmen's movement, it owes much to the enlightened guidance of men of other classes, to Robert Owen, Maurice, Kingsley, to Neale, Holyoake, Hughes, Ludlow, and the Marquis of Ripon. So far as it has gone, the movement has been a real and effectual training for the intelligence, business capacity, and moral character of the workmen. It has taught them thrift, foresight, self-control, and the habit of harmonious combination for common ends; and it has opened up an unlimited field for peaceful, hopeful, and successful effort in the future.

See Holyoake's *History of Co-operation* (2 vols.), and his *Self-help a Hundred Years Ago* (1888); the reports of the Co-operative Congress; *Working-men Co-operators*, by A. H. D. Acland and B. Jones (1898); *Reports on Co-operation in Foreign Countries*, a blue-book issued in 1886; *Co-operation at Home and Abroad*, by C. R. Fay (1920); *Co-operation in India*, by H. W. Wolff (1919). See also *History of Co-operation in the United States*, published under the auspices of Johns Hopkins University (Baltimore, 1888).

**Cooper's Hill**, a ridge on the borders of Beiks and Surrey, commanding a beautiful view of the Thames valley, the scene of a famous poem by Denham (q.v.). Cooper's Hill College, established in 1870 for the education of engineers for the Indian Works Department, to which a forestry school (1885) was attached, was closed in 1906.

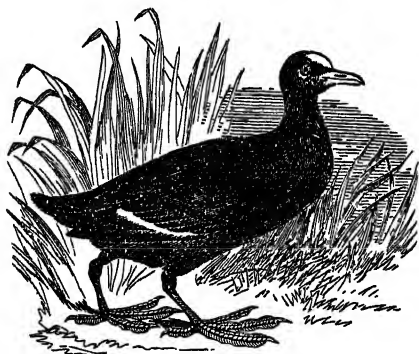
**Co-ordinates**. See GEOMETRY (ANALYTICAL).

**Coorg** (a corruption of *Kodagu*, a 'steep mountain'), a province under the government of India, on the eastern slope of the western Ghāts, and bordering on Mysore; area, 1583 square miles; population, 164,000. The capital is Merikara. Coorg is mainly within the basin of the Kaveri River; great part of its area is 3000 feet above the sea. The yearly rainfall is 122 inches, and hence the climate is humid. Nearly the whole of this rugged

region is covered with forests, which form the main natural wealth of the country, though gold and iron are found. The natives, a branch of the Dravidian stock, speaking a language akin to Kanarese, are handsome and athletic mountaineers. Agriculture is limited to the valleys. Coffee (injured recently by disease), cardamoms, and cinchona are grown. Polyandry used to be the rule. Cairns and dolmens are common, and the country is intersected by earthen ramparts, which are from 15 to 25 feet in height, with deep ditches.

**Coot** (*Fulica*), a water-bird in the same family as the rails (*Rallidæ*), and in the old order *Grallæ*. The members of the genus are well marked by a scalloped fringe round the long toes, which thus show an approach to the webbed condition. The beak is straight and short, but expands in a curious swollen patch on the front of the forehead. The tail is very short. The coots are essentially aquatic, almost always afloat, and especially frequent still waters. They feed on water-plants and small animals. The European species generally migrate southwards in winter.

The Common Coot (*F. atra*) is widely distributed in Central and South Europe, and in Western Asia. It is about 16 inches in length, and has a



Common Coot (*Fulica atra*).

predominantly slaty black colour, with a narrow white band across the wings. The beak has a pale flesh colour; a bald patch on the forehead is pure bright white; the feet are dark green. Coots make a large rough nest of water-plants and stems among the rushes, or on a rock in the middle of the stream. Coots are practically resident birds in Britain. The American coot (*F. americana*) is common in all parts of North America.

**Cooté**, SIR EYRE, soldier, born in County Limerick in 1726, entered the army at an early age, and from 1754 to 1762 served in India. It was by his arguments that Clive was induced to risk the battle of Plassey, and for his services in this and other engagements Cooté was in 1759 given the command of the newly raised 84th regiment. In 1760 he defeated Lally (q.v.) at Wandiwash, near Madras; and his capture of Pondicherry in 1761 completed the downfall of the French in India. Cooté returned to England, and was knighted in 1771. In 1779 he assumed the command-in-chief in India, with the rank of lieutenant-general, and in 1781 routed Hyder Ali at Porto Novo, a second time saving the presidency. He died at Madras, 26th April 1783. See Life by Wyly (1922).

**Cooté**, RICHARD (1636-1701), first Earl of Bellamont, supported William III., and was appointed governor of New England in 1695. He sent out Captain Kidd to put down piracy, and afterwards arrested him.

**Cootehill**, a town in County Cavan, Ireland, 88 miles NW. of Dublin; pop. 1550.

**Copaiba**, or COPAIVA, BALSAM OF, a valuable drug, consisting chiefly of a resin (resin of copaiba) and a volatile oil (oil of copaiba). It flows from incisions in the stems of various species of *copaifera* trees, natives of the American tropics, which belong to the natural order Leguminosæ. When these trees become old or surcharged with copaiba, it is no unusual thing for the stems to burst with a loud booming sound. The balsam has a peculiar, aromatic, but not disagreeable odour, which, however, is highly persistent, while its taste is decidedly acrid. It has stimulant properties, is diuretic, laxative, and in large doses often an active purgative. It is, however, mostly on account of its powerful action on the mucous membrane that it is used, and it is accordingly much employed in affections of the urino-genital system, in chronic catarrhs, &c. The resin itself has been found efficacious given in the form of a cough-pill. Balsam of copaiba is sometimes adulterated with castor-oil or volatile oils. The former of these is readily detected if any milkiness is produced when the balsam is shaken with ten times its volume of petroleum benzine. The volatile oils may be recognised by shaking the balsam with a little alcohol, when, being more soluble, they are removed first.

**Copais**, LAKE. See BÆOTIA.

**Copal**, a resinous substance used for a variety of purposes in the arts. It appears in commerce in smooth rounded masses, colourless or lemon-yellow, translucent or transparent, rather brittle, and in a cold state, almost without smell or taste. It is readily fusible and inflammable, is insoluble in water, and only partially soluble in alcohol and oil of turpentine, but becomes entirely soluble in them when it has been for a short time melted. Various useful pale-yellow or almost colourless varnishes and lacquers are made by dissolving melted copal in alcohol, oil of turpentine, or boiled linseed-oil. The chief sources of copal are the East Indies, Africa, and South America, but the varieties derived from these countries differ in their origin. The East Indian is the exudation of a large tree, *Vateria indica*, African from *Copaifera mopane* and *Hymenæa verrucosa*, American from *H. Courbaril*. Zanzibar supplies most of the best copal. *Gum Animé* is the name applied to copal frequently found in rounded masses embedded in sandy soil. See also KAURI.

**Copalchi Bark**, a bark resembling Cascarella Bark (q.v.) in its properties, and produced by a shrub of the same genus, *Croton niveus*, a native of Central America (see CROTON). The bark is in quills a foot or two in length, and has a thin corky epidermis. Copalchi Bark is much used as a substitute for cinchona in Mexico, where it goes by the name of *Quina blanca*, and is imported, although not to a large extent, into Europe. It contains a minute proportion of a bitter alkaloid resembling quinine.

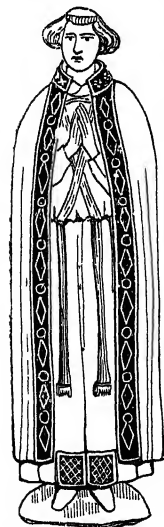
**Copán**, an Indian village in the south-western corner of the Central American state of Honduras, in a mountainous region, the site of a Maya city, of which magnificent ruins remain, first described by Stephens. See Maudslay, *Glance at Guatemala* (1899); Morley, *Inscriptions at Copan* (1920).

**Coparcenary**, an estate in England originating in descent to two or more persons, called thence coparceners or parcenars. It generally arises under the rule of law which makes the daughters of one dying without male heirs inherit equally, but it may also arise by local custom, as in the case of Gavelkind (q.v.). Although the property remains undivided, yet each parcenar is entitled to a dis-

inct share of it, and consequently there is no benefit of survivorship as in joint-tenancy, but the right of each descends to his or her heirs. The rule of descent is also *per stirpes*, so that the heirs of one who has predeceased the common ancestor take only the share which would have come to their immediate ancestor had he or she survived, and thus in the rare case of gavelkind a grandson of the common ancestor will also exclude his own sisters. Division may be carried through by voluntary agreement, or in an action of partition. Such parts of the property as cannot be divided (such as the manor-house, &c.) pass to the eldest sister or her issue, but an equivalent in value is assigned to the remaining sisters. Now, under modern statutes, instead of actual partition the property may be sold by order of the court, and the proceeds divided. These principles resemble closely the law of common property in Scotland, under which each *pro indiviso* owner may sell his right, and may insist on an action of declarator and division. If the subject is indivisible in a reasonable sense, it may be sold and the price divided. In the case of heirs-portioners in Scotland, also, such things as a peerage, a public office, or a mansion-house with accessories form a *præcipuum* for the eldest sister. Where the *præcipuum* comes under a settlement, compensation is generally due to the younger sisters. An Advowson (q.v.) is exercised in turns according to seniority. See GAVELKIND.

**Co-partnery.** See PARTNERSHIP, PROFIT-SHARING.

**Cope** (Lat. *cappa*, *pluviale*), an ecclesiastical vestment worn in the Latin Church during processions, solemn lauds and vespers, and other solemnities, but not by the celebrant at mass. The Greek form of the cope (*manduas*) is restricted to archimandrites and bishops. The cope of the former is plain, that of the latter with a pattern of wavy stripes. The Armenians alone use the cope as the vestment for mass. In the Church of England the cope was allowed as an alternative to the vestment or chasuble by the Common Prayer-book of 1549. Both were forbidden by that of 1552, but legally revived under Elizabeth in 1559. By Canon xxiv. of 1603, the principal minister at the Holy Communion in cathedral or collegiate churches, together with the epistoler and gospeller, is directed to wear the cope, and at Durham it was so worn till Bishop Trevor's episcopate (1752-71), when one of the prebendaries disused it, finding it interfered with his wig. The cope, however, has been customarily worn by the clergy officiating at coronations; while some further revival of its use has taken place of late years. The cope was originally a cloak worn for ordinary purposes. In form it is a semicircle, without sleeves and with a hood. It is fastened across the breast with a clasp or morse. Copes soon began to be ornamented with embroidery, and even with jewels; and so early as the 13th century they became the most magnificent and costly of all the vestments of the priesthood.



Cope.

**Cope, CHARLES WEST, R.A.**, subject-painter, was born at Leeds in 1811, the son of a landscape-painter. He attended the schools of the Royal

Academy, and studied for two years in Italy. He began to exhibit in the Academy in 1833, and produced a long series of sacred, historical, and domestic subjects. In 1843 his cartoon, 'The First Trial by Jury,' gained a £300 prize at the Westminster Hall competition; and in 1844 he was selected to execute, in the House of Lords, a mural painting of 'The Black Prince,' which was followed by 'Prince Henry,' and in the Peers' Corridor a series of eight subjects from the Civil War, completed about 1865. He was elected an A.R.A. in 1843, and an R.A. in 1848; and from 1867 to 1874 he held the professorship of Painting. He retired in 1883. He was an original member of the Etching Club, and his plate of 'The Life Class of the Royal Academy' (1865) ranks as one of the most vigorous figure-subjects ever etched by an Englishman. He died 20th August 1890.

**Cope, EDWARD DRINKER**, American naturalist, born in Philadelphia, 28th July 1840, was professor of Natural Sciences at Haverford College, 1864-67, and afterwards appointed palæontologist to the United States Geological Survey. His numerous papers and works on palæontology are highly valued; and to the discussion of the theory of evolution he contributed over a dozen works of importance. He was a member of numerous scientific societies in America and in Europe, and among other recognitions of his services to science, he, in 1879, received the Bigsby gold medal of the Royal Geological Society. He died 12th April 1897.

**Cope, SIR JOHN**, an English general, was a cornet in 1707, and, having been made a Knight of the Bath, in 1742 commanded the troops sent to the assistance of Maria Theresa. On the landing of Prince Charles Edward in 1745, Cope was commander-in-chief of the government forces in Scotland. After a fruitless march to the Highlands, he returned with his troops by sea to Dunbar, and on 21st Sept. was totally defeated at Prestonpans. His defeat is celebrated in the Jacobite song, 'Hey, Johnnie Cope, are ye waukin' yet?' Cope died 28th July 1760. See *Life* by Cadell (1899).

**Cope.** See KOPECK.

**Copenhagen** (Dan. *Kjøbenhavn*, 'Merchants' Haven'), the capital of Denmark, and headquarters of the national commerce, literature, and art, is situated on the low-lying eastern shore of the island of Zealand, in the Sound, which is here about 12 miles broad; an outlying portion, Christianshavn, stands at the north end of the island of Amager or Amak, which is separated from Zealand by a narrow arm of the sea. The channel forms a fine and capacious harbour, which is bridged over so as to connect Christianshavn and the main part of the city at two points. Fortifications on the land side were removed in 1863; so that the city practically incorporated the suburbs Østerbro, Nørrebro, Vesterbro, and Frederiksberg. The total population in 1735 was 60,000; in 1835, 120,000; in 1880, 235,254; in 1911, 559,393; in 1921, 710,353, or without suburbs, 561,344. To counterbalance the expected injury to the city's commerce from the opening of the Baltic Canal, a great free port (free from customs dues) was constructed in 1890-94 to the north of the harbour. The business quarter stretches from the harbour in a north-east direction towards the principal and central square, Kongens Nytorv, which in itself forms the focus of the life of the city. Farther north and east of this point lies the aristocratic quarter, with the handsome Amalienborg Square and its royal and ministerial palaces; this district is bounded in the extreme north by the citadel and the adjoining public gardens and walks on the shores of the Sound.

Amongst its few buildings of historical interest or intrinsic beauty, the metropolitan cathedral

church, known as Vor Frue Kirke, rebuilt after the bombardment of 1807, possesses statues of Christ and the Apostles, and a baptismal font, designed and in part executed by Thorwaldsen. Trinitatis-kirke is remarkable for its round tower, which is ascended by a winding causeway instead of steps; and Holmens' Kirke contains interesting monuments to the great naval heroes, Juel and Tordenskjold. An English church, built at a cost of £10,000, was consecrated in 1887. The royal palace, called Christiansborg, was rebuilt between 1794 and 1828, but was never remarkable for architectural beauty. The principal part of the vast building was destroyed by fire in 1884, when many precious works of art were destroyed. Happily most of the pictures in its great art gallery were saved. The castle of Rosenborg (1610-24), where the regalia are kept, contains interesting collections of objects of art; and the palace of Charlottenborg (1624) is now used as an academy of arts. Notable buildings are the magnificent Renaissance new town-hall (Raadhus) and the new art museum. The university was founded by Christian I. in 1479, has five faculties, 100 teachers, and 4500 students; all professors are obliged to give a series of public lectures free, and there are many foundations for poor students. Connected with the university are an observatory, a botanical garden, zoological and other museums and laboratories, a polytechnic institution, and a library of 500,000 volumes, with many ancient northern MSS. There is a veterinary and agricultural college. Copenhagen is the centre of Danish literature and art, and is the seat of the Royal Society, founded in 1742; the Royal Society for Northern Antiquities, founded in 1825; and many scientific societies. The Royal library contains 900,000 volumes, besides great treasures of Sanskrit and other MSS. The Museum of Northern Antiquities in Prindsens Palais, is unrivalled in its kind, having been made what it is mainly by Wojsaae. The Thorwaldsen Museum, opened in 1846, consists of works of art by that sculptor himself, and others left by him to the Danish nation, for which a separate building has been erected. Copenhagen contains also a number of well-supported benevolent institutions, banks, theatres, an exchange, &c. There are statues of several of the Danish kings, of Tycho Brahé, and of the poets. The chief exports of Copenhagen are grain, rape-seed, butter, cheese, beef, cattle, wool, hides, bones, and grain-spirit. Porcelain, pianos, clocks, watches, mathematical instruments, chemicals, sugar, beer, pencils, and tobacco are manufactured.

About the middle of the 12th century, Copenhagen was but a fishing-village, in the neighbourhood of which Bishop Axel, or Absalon, built a castle. In 1254 the village obtained the privileges of a town, and in 1443 King Christopher made it the capital of the kingdom. It was several times attacked by the Hanseatic League; was besieged by the Swedes in the 17th century; was bombarded by the English, Dutch, and Swedes in 1700; suffered grievously by fires in 1728, 1794, and 1795; witnessed a great sea-fight in its roads on 2d April 1801, when the English, under Sir Hyde Parker, with Nelson as his second in command, destroyed the Danish fleet; and (to prevent the Danish fleet from falling into the power of Napoleon) was bombarded by the English from the 2d to the 5th of September 1807, great destruction in life and property being wrought (see DENMARK). Most of the fortifications that defend the city date from 1836-1900. It was decided in 1920 to abolish the land defences.

**Copenhagen Fields**, in North London, noted as the meeting-place of an immense gathering of labour unionists on 21st April 1834, with the object

of overawing the ministry. But the crowd, seeing the military and other preparations made to receive them, dispersed quietly without attempting to carry out any of the violent designs with which they were credited. Since 1855 the site has been occupied by the Metropolitan Cattle Market.

**Cope'poda**, an order of minute marine and fresh-water crustaceans, belonging to the Entomostraca (q.v.).

**Coper'nicus**, NICOLAS, founder of the modern astronomy, was born 19th February 1473, at Thorn, which had lately belonged to the order of the Teutonic Knights (q.v.), but had become part of Poland. His father, a Polish subject, was apparently a Germanised Slav, and his mother of pure German extraction. Copernicus seems to have spoken German as his mother-tongue; but Poland and Germany still dispute with each other the honour of producing him. Brought up under the guardianship of his uncle Lucas, prince-bishop of the great Prussian diocese of Ermland, he matriculated at Cracow 1491, and there studied mathematics, optics, and perspective. Leaving without taking a degree, he enrolled himself in 1496 in the 'Natio-Germanorum' of Bologna University as a student of canon law, and was next year appointed canon of Frauenburg, the cathedral city of the diocese of Ermland, standing on the shores of the Frisches Haff. The year 1500 he spent at Rome, where he lectured on astronomy, and (6th November) 'observed an eclipse of the moon.' The following year he began the study of medicine at Padua, medicine in that age being essentially dependent on astronomy, and was at Ferrara, in 1503, invested with the doctorship of canon law. In 1505 he left Italy never to return to it, and settled in his native Prussia. 'Scholasticus' of Breslau till 1538, and canon of Frauenburg, yet Copernicus never became a priest. Appointed permanent medical attendant on his uncle, he lived with him from 1507 till 1512 in the princely castle of Heilsberg, 46 miles from the town of Frauenburg, where, besides thinking out his new astronomy, he had toilsome administrative and other duties to perform, involving him in frequent journeys. After his uncle's death in 1512, he lived at Frauenburg with an income as canon calculated at about £450 of present money, not merely to study the stars in his tower *Cura Copernicana*, but to execute difficult and multifarious offices as bailiff, military governor, judge, tax-collector, vicar-general, and physician. These offices he fulfilled with vigour and success, even while his difficulties were increased by the intrigues and wars which ultimately led to the restoration of West Prussia to the Teutonic Knights, and its incorporation with the Protestant state of Brandenburg. The coinage having been grossly debased by the Teutonic Knights and the three leading commercial towns of Prussia, Copernicus set himself strenuously to the task of its reform, and advocated the establishment of a single mint for the whole of Prussia. In 1523 he was appointed administrator-general of the diocese. The *De Revolutionibus* he completed in 1530, but could not be prevailed on to give it to the press till just before the end of his life. In 1542 he was seized with apoplexy, accompanied by paralysis on the right side. On the 24th May 1543 the first printed-copy of the work arrived at Frauenburg, and was touched by his dying hands only a few hours before he expired. His memory gone, and his faculties all obscured, it could only be said he seemed to know what it was he touched.

Besides the *De Revolutionibus*, Copernicus wrote and published at Cracow a Latin translation of the Epistles of the Byzantine author Theophylactus Simocatta, and a treatise on trigonometry. His

life was written by Gassendi; more recently by Von Hipler (1873), and Polkovski (Warsaw, 1873). By far the most complete account of Copernicus's life and labours is, however, the great biography by Dr Prowe (2 vols. Berlin, 1883; volume of documents, 1884). Copernicus's family name of *Koppernigk* is derived from a village so called in Silesia, and was Latinised by himself as *Copernicus*, and indeed by him generally so spelt.

THE COPERNICAN SYSTEM is that which represents the sun to be at rest in the centre of the universe, and the earth and planets to move round it as a centre. It got its name from Copernicus, who (although some vague general notion of the system seems to be due to Pythagoras) first distinctly drew the attention of philosophers to it, and devoted his life to its demonstration. For the rest, the glory of developing on the lines he broadly laid down, belongs to Kepler, Galileo, and others, and to Newton, who finally marked out the form of modern theoretical astronomy. Many who reverence the name of Copernicus in connection with this system, would be surprised to find, on perusing his work, how much of error, unsound reasoning, and happy conjecture combined to secure for him in all times the association of the system with his name; yet, with all its faults, that work marks one of the greatest steps ever taken in science.

Entitled *De Revolutionibus Orbium*, and dedicated to Pope Paul III., it consists of six books. The first contains the following propositions: 1. That the universe is spherical. This is established by such arguments as that the sphere is the most perfect figure, &c. 2. That the earth is spherical, which flows from the same kind of considerations. 3. That the earth and sea make one globe. 4. That the motions of all the heavenly bodies must be uniform and circular, or compounded of uniform and circular motions. Here, again, we meet with singular reasons. A *simple* body must move circularly, and nothing but circular motion could give periodicity to phenomena. 5. That, supposing the distance of the stars to be immense, there is no reason why the earth should not have a motion round its axis as well as a motion in its orbit. 6. That the sphere of the stars is immensely distant. The proof is fanciful, and shows he had no notion of a universe of stars pervading space. 7 and 8. The ancients were wrong in placing the earth at the centre of the universe. The arguments under this head are as fanciful as those which they were designed to refute. The falling of a body to the earth he deduces from the assumption, that it is only given to wholes to move circularly, while it is of the nature of parts, separated from their wholes, to move in right lines. That there must be a *centrum mundi*, an entity unknown to modern science, is admitted, the question being as to its position. 9. It is possible for the earth to have several motions. 10. He establishes the order of the planets, and draws a diagram of the system much as it is now represented. Following the old systems, such as the Ptolemaic, he lays down a *sphere* for the fixed stars. It is clear, also, that he had no idea of the motions of the planets other than that they were such as would be caused by their being fixed in immense crystal spheres revolving round the sun.

The sum of Copernicus's astronomical achievements is, mainly, the shifting of the centre of the solar system from the earth to the sun, and the consequent explanation of the alternation of day and night by the earth's rotation round itself, and of the vicissitude of the seasons by the earth's revolution round the sun. This complete transformation in astronomy was due in the first

instance to the sense of order in Copernicus's own mind, which, ever more clearly, protested against the inverse conception of a much smaller body at the centre, and a far greater at the circumference, and all the repugnant notions regarding the movements of the planets which such a conception involved. Discriminating motion as an attribute of matter, and space as the scene but not the subject of motion, Copernicus explained how the celestial sphere was but a limitation of space, and its movement only apparent; and how the 'backward loopings' of the paths pursued by the planets were only the perspective result of their real movements in conjunction with the real movements of the earth. Such was the comprehensive scheme of astronomy conceived by Copernicus; but it was impossible for him, with the instruments and ascertained facts then at his disposal, to master all the details. Instead of grasping the idea of elliptic orbits, he still abode by that of uniform circular motion, and had therefore to retain the 'epicycles' to account for 'irregularities,' though he reduced this apparatus of checks and balances to the number of thirty-four. It was reserved for Kepler to dispense with the epicycles (see PROTEMY, ASTRONOMY, KEPLER). Catholic churchmen received Copernicus's work with much favour; the only theological objections came from the Protestant party. Luther denounced Copernicus as an arrogant fool who wrote in defiance of Scripture, and Melancthon urged the suppression of such mischievous doctrines by the secular power. The conduct of the *De Revolutionibus* through the press having been delegated by Copernicus's friend, George Joachim von Lauchen (Rheticus) to Oslander (q.v.), the latter, by way of conciliating existing prejudices, foisted on the work a preface (*Prefatiuncula*) quite foreign from Copernicus's intentions, in which the doctrine of the earth's rotation is represented as a mere hypothesis, which has been attributed wrongly to Copernicus himself.

**Copiapó.** See ATACAMA.

**Copland, JAMES**, physician, was born at Deerness, in the Orkneys, in 1791, studied at Edinburgh, and settled in London in 1820. He wrote a well-known *Dictionary of Practical Medicine* (3 vols. 1832) and other works. He died 12th July 1870.

**Copley, JOHN SINGLETON, R.A.**, portrait and historical painter, was born 3d July 1737, at Boston, U.S. His parents, both of English extraction, had emigrated from Ireland in the previous year. It has usually been asserted that Copley was a self-taught artist; but Mr W. H. Whitmore of Boston has shown that he was instructed by his stepfather, Peter Pelham, the portrait-painter and engraver, and probably also by John Smibert. At the age of sixteen he was executing portraits of considerable merit; and in 1755 Washington sat to him. In 1766 and 1767 he sent over works for exhibition in the rooms of the Society of Incorporated Artists; and in June 1774 he left for Europe. In London he was well received by Reynolds, West, and Strange, and he was commissioned to paint the king and queen for Governor Wentworth. Passing to the Continent in August, he studied in Italy, returning to London in the end of 1776. His first important subject-picture was the 'Youth rescued from a Shark,' presented by the artist to Christ's Hospital School; which was followed by 'The Death of Chatham' (1779-80), an impressive subject, in which the portraits of the peers were carefully studied from life, and the still finer 'Death of Major Peelson' (1783). Both are in the National Gallery; the former was engraved by Bartolozzi, the latter by Heath. In 1789-90 he executed the immense 'Siege and Relief of Gibraltar,' now in

the Guildhall. Among his numerous other popular works may be named 'The Surrender of Admiral De Winter to Lord Duncan,' 'Charles I. demanding the Surrender of the Five Members,' now in Boston; 'Charles I. signing Strafford's Death-warrant,' and 'The Assassination of Buckingham.' He died 9th September 1815, leaving a son, the future Lord Lyndhurst. Copley's historical subjects are more original, spirited, and finer in colour than those of his friend and countryman West. See *Lives* by Perkins (1873) and Mrs Amory (1882), and his *Letters and Papers* (1915).

**Coppée**, FRANÇOIS (1842-1908), poet, was born at Paris. For three years a war-office clerk, he early gave himself to poetry, and already with *Le Reliquaire* (1886) and *Les Intimités* (1867) he took his place in the front rank of the 'Parnassiens.' Later volumes of poetry were *Les Humbles*, *Le Cahier Rouge*, *Olivier*—his one long poem—*Les Récits et les Élégies*, and *Contes en Vers*. His thought is marked by its distinction, his style by its perfection, and his exquisite treatment of Parisian elegy and idyll stand admittedly amongst the triumphs of modern poetry in France. His earliest dramatic poem, *Le Passant* (1870), owed much to the acting of Sarah Bernhardt, and was followed by *Deux Douleurs*, *L'Abandonnée*, *Le Luthier de Crémone*, and *La Guerre de Cent Ans*, which prepared the way for *Madame de Maintenon* and its 'succès d'estime' (1881), *Severo Torelli* (1883), his masterpiece in dramatic verse, and *Les Jacobites* (1885). Dramatic critic for some years to *La Patrie*, Coppée entered the Academy in 1884, and won fame in yet another field by several volumes of prose tales. See studies by Lescure (1889) and Schoen (1910).

**Copper**, probably the first metal employed by man, was early obtained from Cyprus, whence the name. Some prehistoric weapons are of unalloyed copper; the early use of Bronze (q.v.) was very extensive. Like gold and silver, copper is found native, but rarely and in small quantities. It can be extracted from its ores at a comparatively low heat, and is not altered by exposure to dry air; although in moist air, in the presence of carbonic acid, it soon takes on a coating of the green carbonate of copper. It has a characteristic fine red colour and takes a brilliant polish. It is nearly nine times heavier than water, its specific gravity being from 8.8 to 8.95. Next to silver it is the best conductor of heat and electricity, hence its many useful applications. Its point of fusion lies between silver and gold, but unlike these metals, it absorbs oxygen when strongly heated in the air, and scales of black oxide form rapidly on its surface. Copper is moderately hard, and is highly malleable, ductile, and tenacious, although not so strong as iron. When held, in the form of sheet or wire, in a flame, it communicates to it a highly characteristic green colour. Whereas steel is hardened by being heated to redness and suddenly cooled in cold water, copper is softened by the same process. Copper forms two important compounds with oxygen—cuprous and cupric oxides.

**Cuprous Oxide** (red oxide, sub-oxide),  $\text{Cu}_2\text{O}$ . This is obtained by heating to redness the black oxide with nearly its own weight of finely divided copper in a well-covered crucible, to protect the mixture from the oxidising action of the air. It is got as a hydroxide by adding grape-sugar to a solution of sulphate of copper, and then caustic soda, till a blue precipitate, which is first formed, is redissolved. The solution, on being gently warmed, deposits the hydroxide as a rich orange-yellow powder. On continuing the heating till the liquid has reached the boiling-point, and maintaining the ebullition for some time, the powder changes into

the red anhydrous oxide. This oxide is used in colouring glass a fine ruby tint. It is not acted on by air or moisture, and for this reason is produced on copper surfaces as a bronze to keep the metal itself from becoming stained. The salts of this oxide are generally colourless, but they are liable to absorb oxygen and pass into the blue-coloured cupric salts. Cuprous chloride is the most important salt, being used for absorbing carbonic oxide in gas analysis.

**Cupric Oxide** (copper monoxide, black oxide),  $\text{CuO}$ , is the scale or rust of copper which peels off the surface of the metal when heated. It is got for chemical purposes by heating nitrate of copper to redness in a crucible with occasional stirring, and carefully avoiding any possible admission of coaly matter. By the use of cupric oxide Liebig established the method by which the composition of all organic substances has been determined, as it readily gives up its oxygen at a red heat to carbon and hydrogen, converting them, respectively, into carbonic acid and water, from the weight of which the composition of the organic body is calculated. This oxide is used for staining glass, to which it imparts a green colour; and its solution in ammonia has the remarkable property of dissolving cotton fibre. The *Hydroxide*,  $\text{Cu}(\text{OH})_2$ , is obtained as a blue precipitate by adding caustic soda to sulphate, or other salt, of copper, which, as in the case of the cuprous oxide, becomes anhydrous on boiling, the blue precipitate becoming black and granular. The salts of cupric oxide are readily obtained by dissolving it in the necessary acids; for example, in sulphuric acid for the sulphate, and in nitric acid for the nitrate of copper.

**Cupric Sulphate** (sulphate of copper, blue vitriol),  $\text{CuSO}_4$ , occurs native in veins of copper and iron pyrites, and is manufactured on a large scale by gently roasting native copper sulphide (copper pyrites), when oxygen is absorbed from the air, the anhydrous sulphate thus obtained being dissolved in water, and from this solution the salt crystallises out. The blue crystals are much used by the dyer and calico-printer, in electroplating, for grain-dressing before sowing, for potato-spraying, for preserving organic substances, and, in very small quantities, for purifying water.

**Cupric Nitrate**,  $\text{Cu}(\text{NO}_3)_2$ , has crystals of an intense blue colour and deliquescent; it is much used in calico-printing as an oxidising agent.

**Cupric Cyanide**,  $\text{CuCy}_2$ , along with cyanide of potassium, gives the solution from which copper is deposited on an iron surface. It is not, however, necessary to prepare pure cupric cyanide, as the sulphate in excess of potassium cyanide serves the purpose.

**Cupric Arsenite**,  $\text{CuHAsO}_3$  (Scheele's green), is a well-known green pigment, got by adding an alkaline arsenite to cupric sulphate, and washing the precipitate till free from sulphate, and drying. This colour has been much used for wall-papers, but has been supposed to have insanitary effects. See ARSENIC.

**Copper Acetate**,  $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2$ , is got by adding copper hydroxide, or carbonate, to acetic acid. It forms dark blue prisms. If acetic acid is allowed to act on metallic copper in the presence of air and moisture, a basic acetate is slowly formed termed *verdigris*; this has less acetic acid than the previous compound, and is much less soluble. It has a bluish-green colour. Verdigris and arsenious acid boiled together in water form the fine colour termed *emerald green*—an aceto-arsenite of copper.

**Copper Stearate** is obtained by adding stearate of soda to sulphate of copper in hot solutions. It is a light bluish-green powder used for colouring candles.

The pigment, *Brunswick green*, used in the arts, is an oxychloride of copper.

Copper in any liquid is easily discovered by placing in it a plate of polished iron, when it will be observed coating the metal with its well-known reddish tint, making its appearance over the part of the plate immersed in the fluid. If the quantity of copper is very small, the liquid should be concentrated till it half fills a watch-glass, and a bright steel needle used in place of an iron plate. Solutions of cupric salts have a blue or greenish-blue colour, but this on addition of ammonia in excess becomes an intense purplish blue.

*Native Copper*, although frequently met with wherever copper ores occur, is yet rarely discovered in sufficient quantity to admit of its being systematically worked. It is found crystallised in cubes and in modifications of this form; also in arborescent pieces, in thin laminae, and in irregular lumps or masses. Sometimes it forms a nucleus with first a layer of red oxide and then a second layer of carbonate of copper around it. The largest masses of native copper are obtained from mines in Russia, and from copper-bearing rocks in the neighbourhood of Lake Superior. One mass was mined at Minnesota in 1859, weighing 500 tons, which required the work of forty men for a year to extract it. A larger yet was got in 1866 at the Central mines, Lake Superior, and weighed 800 tons. Native silver occurs along with native copper.

The ores of copper are numerous. *Cuprite*, *ruby copper*, *cuprous oxide*, or *red oxide of copper*, is the richest ore. It contains, when pure, nearly 90 per cent. of copper. *Malachite* (q.v.), or *green carbonate of copper*, consists, when pure, of 57 per cent. of the metal. This ore occurs largely in Russia, South Australia, and in some localities in South America. *Chessylite*, *azurite*, or *blue carbonate of copper*, in a pure state contains 55 per cent. of copper. *Chalcopryite*, *copper pyrites*, or *yellow copper ore*, a sulphide of copper and iron, is, from its abundance, the most important of copper ores. Although containing, when pure, 35 per cent. of copper, yet on account of impurities, what is mined in England does not yield, on an average, more than 8 per cent. of the metal. Some of the auriferous copper pyrites of the western states of America and elsewhere is worked as an ore of gold (see GOLD). *Erubescite*, or *purple copper ore*, is also a sulphide of copper in which the proportion of the metal varies from 60 to 70 per cent. *Tetrahedrite*, or *gray copper ore*, is a sulph-antimonite of copper of very variable composition, but often containing from 30 to 40 per cent. of copper, &c. *Atacamite* (q.v.) is an oxychloride of copper mined in Chile, and found in other countries. *Melaconite*, or *black oxide of copper*, and *Chrysocola*, a silicate of copper, are sometimes smelted as ores of the metal.

**METALLURGY OF COPPER.**—*Smelting*.—In practice, the process of smelting copper from ore (copper pyrites) like the Cornish is somewhat complicated, but in theory it is comparatively simple. The main impurities of the ore are quartz, iron, sulphur, and very commonly arsenic. The process is conducted with a view to separating the iron and quartz as a fusible slag, and to dissipating the sulphur and arsenic, by converting them into sulphurous and arsenious acids, through oxidation in the furnace. Reverberatory furnaces are used, and these are of two kinds, calciners and melting furnaces. Gas is used to some extent for supplying heat to copper furnaces, but a stream of coal-dust is found to have greater advantages. There are never fewer than six operations in the 'Welsh' process of copper-smelting, and when so limited, a favourable admixture of ores, such as copper pyrites and copper carbonates, is necessary. In the *first*, the ore is calcined in a furnace for at least twelve hours, by which time the greater part of the sulphide of iron is decomposed, and much sulphurous and

other acids have formed and escaped in fumes—i.e. a partial oxidation of the iron and sulphur takes place. In the *second*, the calcined ore is melted along with siliceous slags obtained in later stages of the process. Here a fusible slag, consisting in great part of silicate of iron, is formed, and the sulphides of iron and copper are run off as a regulus, termed *coarse metal*, and granulated in water. In the *third*, the coarse metal is calcined again for twenty-four hours, during which time most of the sulphide of iron is converted into oxide. In the *fourth*, the calcined coarse metal is melted with slags rich in oxide of copper, and also with rich ores, as oxide and carbonate. These oxidise any sulphide of iron remaining, and a regulus called *white metal* is formed, consisting almost entirely of sulphide of copper, and containing about 75 per cent. of the metal. In the *fifth*, called 'roasting,' the regulus is very slowly melted, so as to allow of the gradual and thorough reduction of the sulphide by heated atmospheric air through the formation of oxide of copper. When oxide and sulphide of copper are heated together, they decompose each other, the sulphur escapes as sulphurous acid, and impure metallic copper, called *blister copper*, is produced, while other foreign bodies are for the most part removed in the slag. In the *sixth*, the copper from the previous operation is refined. To effect this, it is melted in a furnace, and exposed to the oxidising influence of the air for from fifteen to twenty hours, by which time it is full of dioxide, and this is in turn reduced by throwing pure coal on the surface of the molten metal, and then stirring it with a pole of green birch-wood.

Shaft or cupola furnaces, instead of those of a reverberatory kind, are used in some countries for smelting copper ores where these are highly ferruginous, or oxidised, or comparatively poor.

*Flotation*.—Of late, great developments have resulted from the application of improved methods in the use of so-called 'porphyritic' ores, in which the copper-bearing minerals are sparsely disseminated through a great bulk of rock. With modern mining methods and 'flotation' a very small proportion of copper may suffice to make a deposit pay. The ore is ground very small and mixed with water, a little oil, or some substance that behaves in a similar manner, and other chemicals. The mixture is then worked up into a froth. Whatever other forces may be at work, the differences of surface-tension separate the copper mineral from the other constituents of the rock. The water (with the help of the 'gangue-modifier') attaches itself to the gangue, while the copper-bearing particles, protected from wetting by the oil, adhere to the air-bubbles and rise to the surface. By flotation the concentration of copper sulphides can be much more satisfactorily effected than by merely gravitational methods.

*Wet Copper Extraction Process*.—Soon after iron pyrites (sulphide of iron) began to be used as the source of sulphur for the manufacture of sulphuric acid, it was thought desirable to recover the copper, amounting to a small percentage of the pyrites used. The burnt pyrites, consisting chiefly of oxide of iron, along with 4 or 5 per cent. of copper, is mixed with from 12 to 15 per cent. of crushed rock-salt and the mixture properly calcined, when the whole of the copper is converted into a soluble chloride. The roasted mass is then lixiviated, and the copper contained in the solution thrown down as metal by scrap iron. This precipitate contains about 75 per cent. of pure copper, and is mixed with the copper of the later stages of purification got in the dry process. A vast variety of more or less similar processes have been applied to different copper ores. The underlying principle is that some soluble salt of copper (as chloride or sulphate) has to be formed and dissolved out. Instead of precipitating

the copper by means of iron, it is advantageous where pure copper is wanted (as for electrical purposes) to remove it from the solution by electrolysis.

**APPLICATIONS OF COPPER.**—The metal is used for a great variety of purposes. It is most largely consumed along with zinc in the production of Brass (q.v.). To a less, but still considerable, extent it is made into bronze and gun-metal, in which it is alloyed with tin and other metals (see BRONZE). Alone it is employed for boilers, stills, cooking vessels, pipes, wire and wire-cloth, nails, and spikes. In the form of thin plates it has long been in demand for engraving and etching upon, and in the shape of strong rollers it is extensively employed for a like purpose by the calico-printer. Copper does not cast very well, but it is admirably adapted for producing works of art in electro-deposit instead of casting them. This process is extensively employed, and does even for objects as large as life-sized statues. In this way engravings and pages of type are also copied for the printing-press. For its use in coating other metals, see BRONZING. Copper is the metal usually chosen for lightning conductors, and for other purposes where high electric conductivity is an advantage. Writing-pens are made of an alloy consisting for the most part of copper, and for some purposes are better than those made of steel, as they do not corrode nearly so soon. These pens are usually white in colour. An alloy of copper, 'yellow metal,' is used for sheathing the bottoms of timber ships, so as to prevent molluscs and seaweeds from encumbering them. Copper, owing to its ductility, may be made into pipes, tubing, &c., by high pressure alone, without heat.

The copper-mines of the United Kingdom appear to have first risen into importance in the early part of the 18th century. According to Sir C. Lemon (*Journal of the Statistical Society*, vol. i.), the produce of the Cornish mines in 1771 was 27,896 tons of ore, yielding 3347 tons of copper. In 1856 (Hunt's *Mineral Statistics for 1856*) the returns were: Cornwall, 163,245; Devon, 42,025 tons of ore; together yielding 13,500 tons of metallic copper. After 1860, the year of their maximum yield, the quantity of copper obtained from mines of the United Kingdom steadily and rapidly declined from 236,696 tons of ore and 15,968 of metal, to 6792 and 532 tons respectively in 1901, and 136 and 72 tons in 1921.

The copper ore mined in other parts of the country besides Cornwall and Devon is negligible. Copper is chiefly smelted and refined at Swansea and its neighbourhood, but to some extent also in Lancashire. The English smelting works are now largely supplied with ore from Spain, South Africa (see CAPE OF GOOD HOPE), the United States, and Australia (q.v.). The entire quantity of metallic copper ore and regulus imported into the United Kingdom in the year 1922 was 33,169 tons.

The production of copper in the United States has increased rapidly since 1872. In that year the quantity obtained was 12,500 tons, while in 1921 it was as much as 505,586,098 lb. From the United States comes more than half of the world's production. The richest mine in the world is said to have been that at Laurium called Calumet (q.v.), on Lake Superior, in which region copper was mined by the ancient Indian or pre-Indian inhabitants. The states of Arizona and Montana are also productive; but copper occurs in several other parts of the Union.

**Copper Age**, a name sometimes given to a stage in culture leading on to the Bronze Age (q.v.), distinguished by the use of copper unmixed with tin. Such a stage seems to have occurred in some regions before tin was imported from Central Asia, &c. See METALLURGY (*Ancient*).

**Copperas**, or sulphate of iron, is used in dyeing black, in tanning, in making ink, and as a dressing for crops. See DYING.

**Copper Glance**, a mineral consisting of sulphide of copper ( $\text{Cu}_2\text{S}$ ), crystallises in the orthorhombic system, with pseudo-hexagonal symmetry, and is often twinned. It is of a lead-gray colour, with a black streak and metallic lustre sometimes rather greasy. It is soft (hardness  $2\frac{1}{2}$ ) and sectile.

**Copperhead** (*Trigonocephalus contortrix*), a venomous snake, allied to the rattlesnake, found in eastern North America. It has a thick body from 2 to 3 feet long, and a short tail without rattles, and is slow and clumsy in its movements; but, lurking in dark and moist places, and giving no warning, is more dreaded than the rattlesnake. The term was given to the peace party during the American civil war.

**Coppermine River**, so named, in common with the Copper Mountains to the west of it, from the metallic products of the vicinity, runs through the Mackenzie district of Canada, and after a course of 250 miles enters Coronation Gulf about  $68^\circ$  N. lat., and  $116^\circ$  W. long. It was discovered by Hearne in 1771. Its course is continually interrupted by falls and torrents.

**Copperplate Printing**. See ENGRAVING.

**Copper Pyrites**, or CHALCOPYRITE. See COPPER, PYRITES.

**Coppet**, a village of Switzerland, 8 miles N. by E. of Geneva, with a château, where Necker and his daughter, Mme. de Staël, are buried, and where the latter spent much of her life.

**Coppice**. See COPSE.

**Copra**, or COPPERAH, is the commercial name for the kernel of the coconut broken into small pieces and dried in the sun. From 500 lb. of copra 25 gallons of coconut oil should be obtained. The oil is used in making margarine. Marseilles and Hamburg are the chief seats of the copra-pressing industry. See COCONUT.

**Coprolites** (from Gr. *kopros*, 'dung,' and *lithos*, 'a stone') are the fossilised excrements of animals found in Palaeozoic, Mesozoic, and Tertiary strata. Their true nature was first inferred by Dean Buckland (1829), from their occurrence in the bodies of several species of Ichthyosaurus, in the region where was situated the intestinal tube. It has been since shown that they are the voidings chiefly of saurians and of sauroid fishes. They often contain portions of scales, bone, teeth, and shells, the indigestible parts of the food on which the animals lived. Occasionally they may be found exhibiting the spiral twisting and other marks produced by the conformation of the intestinal tube, similar to what is noticed in the excrement of some living fishes. These peculiar markings obtained for them the name, when their true nature was unknown, of 'larch-cones' and 'bezoar-stones.' Coprolites contain much phosphate of lime, and have thus been largely exploited for the manufacture of manure. Most of the so-called coprolites of commerce, however, are mere concretions and not fossil excrements.

**Copse**, or COPPICE, is a wood or plantation of broad-leaved trees, cut over every 10 or 12 years (as in hazel), or 16 to 18 (as in oak), or 25 to 30 (as in alder), and reproducing itself by means of new shoots thrown out from the stools or suckers sent out from the roots. No coniferous tree has sufficient reproductive power for coppice-treatment. Chestnut, oak, ash, hazel, lime, maple, sycamore, hornbeam, willow, and alder coppice better than beech, birch, and aspen, though the softwoods often become dominant on moist land. The best coppice crop for any given land and the best age

for cutting depend mainly on the local market for small wood. Copses may either be simple and pure or mixed, or they may be 'stored' with standard trees (preferably with light-demanding trees like oak, ash, elm, &c.) left to form an OVERWOOD over the coppiced UNDERWOOD, and to grow into timber-trees. Copse-woods were formerly worked under stringent regulations (see FORESTRY), and under the Statute of Woods (1543) '12 standills or stors of oak' were to be left per acre, or in default of oak, then 'elm, ash, asp, or beech.' It was in such copses and in hedgerows that most of the oak timber for the British navy used to be obtained. On good soil oak and ash are still the best standards, while, as in simple coppice, hazel, ash, and chestnut are usually the most profitable part of the underwood. Copse-woods used to be very profitable, but now they hardly pay. Oak coppice cut over every 16 to 20 years used to supply large quantities of tanning-bark and of charcoal, and ash and hazel cut over at shorter intervals supplied material for hurdles, thatching-rods, crates, agricultural implements, &c. In the Scottish Highlands most of the old coppices, now unprofitable, have reverted to the wild condition of 'natural woods' (See also WILLOW.)

**Coptis**, a genus of Ranunculacæ. *C. trifolia*, called Gold Thread on account of the appearance and colour of its rhizomes, is a native of swamps in the colder northern regions of both hemispheres. It has ternate leaves and solitary white flowers. The bitter rhizomes are used in America as a tonic, and as a yellow dye. That of *C. Teeta* of Assam is used in India as a bitter tonic.

**Copts**, the Christian descendants of the ancient Egyptians. The name (in Arabic, *Kubt*) is most probably derived from the same root as *Egypt*. The Copts form but a small part of the population of the country. A large proportion live in Cairo, but there are numerous populous settlements of Copts in Upper Egypt, notably at Girga, Negâda, Luksor, Asyût, Dendera, and Ikhmîm. They are essentially townsmen, engaged as clerks on account of their undoubted mathematical talents; or employed in the finer handicrafts, such as gold-smithery; and their occupations account for their paleness as compared with their Moslem neighbours. The few Copts who work in the fields do not differ perceptibly from the Moslems, and the resemblance to the 'ancient Egyptians' is visible in both, though the inbreeding of the Copt has, some think, retained the ancestral lineaments more faithfully. They are of middle stature, have black eyes, and black curly hair; dress like the Moslems, but are generally distinguished by a black or blue turban; the women are veiled. Their character is in general gloomy, deceitful, and avaricious; they are ignorant, drunken, and sensual. In religion they are Monophysites (q.v.) of the Jacobite sect; but a few are united to the Greek and Roman Catholic and Protestant churches. When the Council of Chalcedon in 451 pronounced the Jacobite opinion heretical, some of the Copts supported the verdict, and bitter jealousies ensued between these 'royalists' and the Jacobite Copts. The division of the Christians made the Moslem conquest in 640 a comparatively easy matter. They ascribe their conversion from heathenism to St Mark, whom they regard as the first patriarch of Alexandria. Their highest dignitary is the patriarch of Alexandria, whose residence, however, is in Cairo. Their other orders of clergy are twelve bishops, and archpriests, priests, deacons, and monks. The patriarch is named by his predecessor, or chosen by lot from among the monks of the convent of St Anthony.

He is not permitted to marry, and when he sleeps it is necessary to waken him every quarter of an hour. He nominates the metropolitan of Abyssinia (see ABYSSINIA).

The Copts are very strict in some of their religious observances, and hate other Christian sects even more than they hate the Moslems. They maintain the seven sacraments—baptism by tinea immersion; confirmation; penance or confession; orders; matrimony; unction; and the eucharist, administered in both kinds to all, even young children, and formed of leavened bread which has been dipped in wine. They keep Wednesday and Friday with great strictness as fast-days, and have besides an onerous fast of Nineveh, lasting fifty-five days, and lesser fasts of the Nativity, the Apostles, and the Virgin. Each fast is followed by a feast. Pilgrimage to Jerusalem is prized highly. A priest may be married to one virgin provided the ceremony takes place before ordination; if the wife die, he may not marry again, nor may the widow of a priest remarry. The Copts seldom marry outside their own sect; the wedding ceremonies are very peculiar, and may be read in L. Oliphant's *Land of Khemi*; the bride is expected to remain at home until confined, or for a year if barren (see Lane's *Modern Egyptians*). The Coptic ritual, liturgy, vestments, &c. are specially interesting as preserving unchanged very ancient Christian forms. The churches, of which the most celebrated are those built in the Roman fortress of Babylon at old Cairo, and those in the Nitrian valley, are remarkable for peculiarities of construction and plan, and for exceedingly beautiful carved ivory screens. An admirable account of them is given by Mr Butler. They have many schools, but only for boys, who learn the psalms, gospels, and apostolic epistles in Arabic, and then the gospels and epistles in Coptic. The Coptic, however, is not grammatically taught, and is not now a spoken language, having been everywhere supplanted by the Arabic. It has not been spoken in Lower Egypt since the 10th century, but lingered for some centuries longer in Upper Egypt. It is, however, still used by the Copts in their religious services, but the lessons, after being read in Coptic, are explained in Arabic. The Coptic language is the descendant of the ancient Egyptian, but the alphabet is Greek uncial, probably introduced soon after their conversion to Christianity. 'The romance of language could go no further than to join the speech of Pharaoh and the writing of Homer in the service-book of an Egyptian Christian' (Butler). There are two principal dialects of the language—the Sahidic or Upper Egyptian, and the Memphitic or Lower Egyptian, which is sometimes exclusively called Coptic. A third dialect, the Bashmuric, of which only a few remains exist, was spoken in the Delta, and is interesting from its points of resemblance to the language of the hieroglyphics. The literature is wholly religious. The last old man who spoke Coptic as his natural speech died in 1633.

See the article *EGYPT*; A. J. Butler, *The Ancient Coptic Churches of Egypt* (1884), and *The Arab Conquest of Egypt* (1903); Mrs Butcher, *The Church in Egypt* (1897); A. de Vlioger, *The Early Coptic Church* (1900); Montague Fowler, *Christian Egypt Past and Present* (1901); Dowling, *The Egyptian Church* (1909).

**Copyhold**, a species of estate or right of property in land, in Ireland and England. Copyhold is expressed technically as 'tenure by copy of court-roll, at the will of the lord, according to the custom of the manor.' This means that it is tenure of land, being part of a manor, the title being evidenced by the court-rolls of the manor, and the right of the owner being in conformity with the immemorial customs of the manor. The addition,

'at the will of the lord,' serves only as a memorial of the derivation of this species of estate from the estates granted in old times to the bondsmen or *Villeins* (see *SLAVERY*), which were of course resumable at the pleasure of the lord. But the will of the lord is now absolutely controlled by the custom of the manor, which forms the law of the tenure.

The custom of each manor varies. In some the lands are held for life only, generally, however, with a customary right to renewal or to appoint the successor; in some they descend according to particular rules; in most, however, they descend according to the ordinary rules of succession. But the custom, whatever it may be, cannot be altered.

Various money-payments are due by the copyholder to the lord. These are divided into the *rents*, an annual payment of the nature of the Scottish feu-duty, *fincs*, payments on particular occasions, such as alienation or succession; and *heriots*, or the best piece of personal property, to which, on the death of the copyholder, the lord becomes entitled.

In the case of an heir succeeding there is no surrender, but there is admittance only upon payment of the customary fine, and it is enforced by a customary penalty.

The inconveniences arising from the variety of customs to which copyhold lands are subject led to the passing of a long series of Copyhold Acts, having for their main object the gradual extinction of this tenure by the process of 'enfranchisement,' i.e. the conversion of copyholds into freeholds. The supervision of this process was entrusted to Copyhold Commissioners, who were subsequently amalgamated with the Inclosure Commissioners and the Tithe Commissioners under the name of the Land Commissioners for England, and, in 1889, the powers and duties of the Land Commissioners were transferred to the Board of Agriculture. Under the Copyhold Act of 1894, which consolidated, with various modifications, the earlier acts on the subject, copyholds may be converted into freeholds either voluntarily or compulsorily. In voluntary enfranchisement the compensation to be paid to the lord for the loss of his manorial rights is determined by mutual agreement. Compulsory enfranchisement may take place at the instance either of the tenant or of the lord. In the former case the compensation is a fixed sum of money; in the latter case, it takes the form of an annual rent-charge. In spite of these statutory provisions designed to put an end to copyhold tenure, this form of tenure still remains common in England.

The Law of Property Act, 1922, provides that, from the commencement of the act (1st January 1925) every parcel of copyhold land shall be enfranchised and become freehold, subject, pending payment of compensation, to manorial incidents having money values, such as fines and heriots, but free from other customary suits and services. Under the rules set out in Parts V. and VI. of the act, all manorial incidents, including rents, fines, heriots, and the like, are to cease either (a) when, within five years after the act comes into operation, the lord and tenant agree on compensation; or (b) when the lord or tenant, within the like period, serves a notice on the other to have compensation fixed by the Ministry of Agriculture under the Copyhold Act, 1894; or (c) at the expiry of ten years. Provision is made for making the compensation payable in twenty annual instalments, secured by a terminable rent-charge burdening the land. The act also provides a uniform system of succession.

**Copying** is a term in general use for a great many different processes, but may be described generally as the reproduction, usually either on an enlarged or reduced scale, of any drawing, map, or other work of art. A few of the methods employed

may be shortly described. If the copy is to be the same size as the original, the easiest way is to trace it. A piece of tracing-paper (which may be bought at any stationer's) is put over the drawing, and the principal lines gone over with pencil. The back of the tracing is then rubbed with black lead or ruddle, and put on the clean paper on which the copy is to be made; the traced lines are gone over with a hard point, and thus indicated faintly on the paper. Guided by the traced lines, the copy can then be drawn in. It is usual to have the ruddle or black lead on a separate piece of thin paper, and interposed between the tracing and the paper. When the copy is required of a different size from the original, the simplest way is to sketch it by hand and eye, but where more mechanical accuracy is required, the method of squares is very useful. The original is covered with squares of any convenient size by pencil lines or threads; a piece of paper for the copy is prepared with a corresponding number of squares, of a smaller or larger size, according as the copy is wanted smaller or larger. These squares must bear the same proportion to the squares on the original, as the copy is to bear to the original. It is then a comparatively easy matter to copy in each square the part of the original in the corresponding square. To avoid confusion if the squares are small, it is well to number them along each side of the drawing. If it is not convenient to cover the original drawing with pencil lines, or to tie threads over the face of it, a very good way is to draw the squares on a piece of tracing-paper, and put that over the original; the same tracing-paper will, of course, do any number of drawings. A pair of proportional compasses will be found very useful for fixing the proportional size of the squares. Any drawing consisting principally of straight lines, such as a plan, can be conveniently reduced by constructing a scale to suit the reduced size required. The lines of the original are measured by its scale, and the same proportion of the smaller scale gives the necessary measurement. The Pantograph (q.v.) is another means of making a reduction or enlargement, but is very seldom used now. It is only accurate in a general way. Perhaps the simplest and most exact method is to get the original photographed to the required size; the copy can then be traced on to clean paper as already described.

The copying of letters and other documents for commercial purposes is usually done by means of the ordinary copying-press. A letter written with specially prepared ink can be transferred to another piece of paper by means of damp and pressure. Common ink thickened with a little sugar will serve as copying-ink. Many modifications of this arrangement have been devised for producing copies of letters, circulars, &c. from written or typed copy. A document is transferred by pressure with the hand to a gelatinous slab, from which as many as fifty or sixty copies, more or less distinct, can be retransferred by rubbing with the hand. Many devices (cyclostyle, electric pen, &c.) apply the principle of the stencil. A very useful method of manifold writing is largely employed in telegraphic news work, and for duplicating invoices by retail tradesmen. Carbonised paper is put alternately with sheets of thin paper ('fimsy'), and thus, whatever is written on the top sheet by a hardish pencil is duplicated on the others. Carbon copies can be made in like manner with a typewriter. When an indefinite number of copies of any drawing or other subject is required, there are many printing processes which may be employed. Letters or circulars, if written with lithographic ink, can be transferred to stone, and any number printed. Engineers' or architects' drawings executed in *line* can be very successfully reproduced in any

size by photo-lithography; see the various processes described at LITHOGRAPHY, ILLUSTRATION OF BOOKS, PHOTOGRAPHY.

**Copyright**, in its most elementary form, is the exclusive right to multiply copies of a book. Some rudimentary notions of copyright may perhaps have existed before the introduction of printing; but such a right neither required nor received any definite recognition until the invention of the printing-press invested it with practical value. At first the right to publish was the subject of royal licenses and patents, granted as a rule not to the author but to the printer, and intended mainly as an instrument of the rigid censorship then exercised over the press. In England the publishers belonging to the Stationers' Company acquired a virtual monopoly under the operation of the Licensing Acts. When, at the end of the 17th century, the last of these acts expired and was not renewed, the publishers, dissatisfied with the doubtful protection of the common law, procured the passing of the Copyright Act of 1709, which was the earliest statutory recognition of authors' rights. Under this act authors acquired the sole right of printing their books during a term of fourteen years from first publication; and if the author should be living at the end of that time, during a further period of fourteen years. It was commonly supposed that in addition to the protection of this act the author had a copyright unlimited in time at common law; but in the celebrated case of *Donaldson v. Beckett* (1774), which led to a remarkable division of opinion among the judges, it was decided by the House of Lords that if any common-law right had existed in published works, it had been taken away by the statute. It became well settled, however, that the common law continued to protect the author against the unauthorised publication of unpublished works.

At the union with Ireland the Copyright Act was extended to that country, thus putting an end to the trade in cheap editions printed in Dublin and secretly imported into Great Britain. In 1814 the term of copyright in books was extended to twenty-eight years, and the residue of the author's life if he were living at the end of that term; while by the Copyright Act, 1842, which for seventy years remained the basis of the law as to books, it was extended to forty-two years from publication, or the life of the author and seven years, whichever period was the longer. In the meantime copyright had been successively extended by other acts to engravings and prints, sculpture, plays and lectures, while the act of 1842 applied it to music; it was not until 1862 that paintings, drawings, and photographs were made the subject of copyright. The addition of several acts, relating chiefly to international copyright, brought the number of statutes in force in 1911 to above twenty. Apart from their number, these statutes were very badly drawn, and totally lacked system; and the resultant confusion had been stigmatised by a Royal Commission as far back as 1878 in the following terms: 'The law is wholly destitute of any sort of arrangement, incomplete, often obscure, and even when it is intelligible upon long study, it is in many parts so ill-expressed that no one who does not give such study to it can expect to understand it.'

After many abortive efforts at reform, the law at length was placed on a clear and intelligible basis by the Copyright Act, 1911, which repealed nearly all the old statutes and consolidated the law, with numerous amendments, in a short code of thirty-seven sections; at the same time it abrogated the common-law right in unpublished works, copyright in which was henceforward to depend entirely on statute.

Apart from the great simplification thus achieved, the principal changes in the law made by the Act of 1911 were these:

All classes of works are treated on practically the same basis, and the term of copyright is in most cases very considerably extended; new classes of works are brought within the scope of copyright—e.g. works of architecture, entertainments in dumb show, cinematograph productions, and mechanical instrument records and rolls; registration of copyright and the requirement that a notice reserving performing right should be printed on music are abolished; the sole right to dramatise, to translate, or to reproduce on any kind of mechanical instrument is secured to the author; and the self-governing dominions are given a free hand in copyright legislation.

The main provisions of the act may be summarised as follows:

**Subject-matter of Copyright.**—Copyright subsists in every original literary, dramatic, musical, and artistic work, subject to certain conditions depending, in the case of published works, on the place of first publication, and, in the case of unpublished works, on the nationality or place of residence of the author when the work was made. Briefly it may be said that British subjects and residents in the United Kingdom have copyright in all their unpublished works, and all authors have copyright in works first published in the United Kingdom; colonial and foreign works also may enjoy copyright under analogous conditions.

**Rights.**—Copyright means 'the sole right to reproduce the work or any substantial part thereof in any material form whatsoever; to perform, or, in the case of a lecture, to deliver, the work or any substantial part thereof in public; if the work is unpublished, to publish the work or any substantial part thereof; and also includes the sole right to translate; to dramatise a novel, or *vice versa*; and to make any record, perforated roll, cinematograph film or other contrivance by means of which the work may be mechanically performed or delivered. It is also an infringement of copyright for any person to sell or let for hire, import for sale or hire, or, under certain conditions, to distribute or exhibit in public any work which to his knowledge infringes copyright. Certain acts are, however, expressly declared not to be infringements of copyright—viz. (a) any fair dealing with any work for purposes of private study, research, criticism, review, or newspaper summary; (b) the use of his original sketches, studies, &c. by an artist, within certain limits; (c) the making or publishing of paintings, drawings, engravings, or photographs of works of sculpture or artistic craftsmanship which are permanently situated in a public place or building, or of works of architecture; (d) the reproduction of short passages from published copyright works in school-books, under certain conditions; (e) the publication in a newspaper of the report of an address of a political nature delivered at a public meeting, or, unless the report is prohibited by notice in the prescribed manner, of any other address or lecture delivered in public; (f) the reading or recitation in public by one person of any reasonable extract from any published work.'

The sole right to make records, perforated rolls, and other contrivances reproducing musical works is subject to this limitation, that if the owner of the copyright allows one person to make such contrivances, or makes them himself, any other person may do so likewise, on certain conditions, which include the payment of a royalty of 2½ or 5 per cent. on the ordinary retail selling price of every contrivance sold by him.

**Term.**—The term of copyright is in most cases the life of the author and fifty years after his death; but after the expiration of twenty-five years (or, in the case of a work published before December 16, 1911, thirty years) after the author's death, any one

may reproduce the work for sale on certain conditions, which include the payment of a royalty of 10 per cent. of the published price. For works of joint-authorship the term is the life of the author who dies last, or fifty years after the death of the author who dies first, whichever period is the longer; while posthumous literary, dramatic, and musical works, and engravings, in which copyright subsists at the author's death, are protected until the expiration of fifty years from the date of first publication, performance, or delivery in public.

Photographs and records, perforated rolls and similar contrivances, are protected for fifty years from the making of the original negative or plate. Government publications also enjoy copyright for fifty years from first publication; but under the terms of a Treasury minute most Blue-books and other official documents may be freely reproduced.

If a work which has been published or publicly performed is withheld from the public after the author's death, the Judicial Committee of the Privy Council may grant a license for its republication or performance.

*First Ownership, Assignments, &c.*—The author is usually the first owner of the copyright in a work; but (1) the copyright in engravings, photographs, and portraits made to order belongs to the person giving the order, if there is no agreement to the contrary; and (2) similarly the copyright in a work made by a person in the course of his employment under a contract of service or apprenticeship belongs to the employer; but if the work produced under these conditions is a contribution to a newspaper, magazine, or similar periodical, the author may in general prevent its reproduction otherwise than as part of a newspaper, magazine, or similar periodical. This last-mentioned provision does not apply to encyclopædias, dictionaries, year-books, and similar works; and it may be observed that the complicated provisions under the old law as to the respective rights of author and publisher in the case of collective works, such as encyclopædias, magazines, &c. are all swept away. Subject to the exception just stated with regard to employers, the matter is left entirely to agreement; the author retains the copyright unless he parts with it in writing. The first owner of the copyright in photographs and in records, rolls, &c. is the owner of the original negative or plate at the time when it is made.

Assignments and licenses must be in writing signed by the person making them. The author cannot, however, in general assign, or grant any interest in, the copyright for the last twenty-five years of the term; the reversionary interest in this period forms part of the author's estate at his death, and may be bequeathed by his will. Articles in collective works are, however, an exception to this rule; the copyright in them may be assigned outright for the full term.

*Remedies.*—In cases of infringement, an action may be brought for an injunction (in Scotland, an interdict), damages, or an account of profits. Infringing copies, plates, &c. are forfeited to the owner of the copyright; this does not, however, apply to the case of architecture, nor can an injunction or interdict be obtained to restrain the construction of a building which has been commenced, or to order its demolition. If the defendant in an action for infringement proves that at the date of the infringement he was not aware and had no reasonable ground for suspecting that copyright subsisted in the work, the plaintiff cannot get damages or an account of profits, but only an injunction or interdict. Infringing copies made outside the United Kingdom may be seized on importation on notice to the customs. Infringements committed knowingly are

also offences punishable by fine or imprisonment on summary conviction. Civil actions must be brought within three years, and summary proceedings within six months, after the date of the infringement.

*Delivery of Books.*—The act also requires the publisher of every book published in the United Kingdom to deliver a copy free of charge to the British Museum, and also, if demanded, to the Bodleian Library, Oxford; the University Library, Cambridge; the Library of the Faculty of Advocates, Edinburgh; that of Trinity College, Dublin; and (with certain exceptions specified in Board of Trade Regulations) the National Library of Wales. Failure to deliver copies renders the publisher liable to a fine, but has no effect on copyright.

*Retrospective Effect.*—Works already in existence and actually entitled to copyright under the old law at the date when the act came into force (i.e. in the United Kingdom, 1st July 1912) enjoy the extended rights given by the act; the benefit of the extended term of copyright goes to the author or his representatives, subject to certain provisions safeguarding the interests of persons who had bought, or were otherwise interested in, the copyright under the old law.

*Unrepealed Acts.*—The 1911 act leaves unrepealed (1) the Musical Copyright Acts of 1902 and 1906, which provide stringent summary remedies for hawking pirated music; and (2) certain sections of the Fine Arts Copyright Act, 1862, which penalise the fraudulent marking of paintings, drawings, and photographs.

*Colonial Copyright.*—The Copyright Act extends to the British possessions generally, but not to any self-governing dominion which does not adopt it. All the self-governing dominions except Canada have adopted the act or passed substantially identical legislation. The old Copyright Acts, so far as they were previously operative (and also the local legislation on the subject), remain in force in Canada.

*International Copyright.*—Copyright may be extended by order in council to foreign works on conditions of reciprocity. Great Britain (with her colonies) is a member of the Berne Copyright Union, the other members being Belgium, Denmark, France, Germany, Hayti, Holland, Italy, Japan, Liberia, Luxemburg, Monaco, Morocco (French Protectorate), Norway, Portugal, Spain, Sweden, Switzerland, and Tunis. The union is regulated by the Berne Convention of 1886, the Acts of Paris of 1896, and the Berlin Convention of 1908; its fundamental principle is that each country undertakes to give to authors belonging to every other country of the union the same rights as it gives to its own authors. Great Britain also had before the war a copyright treaty of 1893 with Austria-Hungary.

*United States.*—Before 1891 copyright in the United States could only be obtained by American citizens or residents. The Chace Act of 1891 first permitted the extension of American copyright to foreigners on conditions of reciprocity; and by virtue of presidential proclamations issued under this act and the act of 1909 (which is the statute now in force), British subjects may obtain copyright in the United States on substantially the same footing as American citizens. All books in the English language, and books in any language by a citizen or domiciled resident in the United States, must be set up, printed, and bound there; moreover, all published works must bear the statutory notice of copyright (which in the case of books is 'Copyright, 19—, by—'), and must be registered and two copies deposited with the 'Register of Copyrights, Library of Congress, Washington, D.C.' The term of copyright is in

the first instance twenty-eight years from first publication, which may, however, be extended for a further twenty-eight years. Citizens or residents of the United States have copyright in the United Kingdom for their unpublished works, and for works first published in the United Kingdom or published simultaneously there and in the United States.

**Other Foreign Countries.**—It is not possible here to give details of foreign copyright laws. The general term of copyright in some of the principal countries may, however, be shortly stated, as follows: life of the author and eighty years, Spain; life and fifty years, Belgium, Denmark, France, Hungary, Norway, Portugal, Russia, Sweden; life and thirty years, Austria, Germany, Japan, Switzerland; life and forty years, or eighty years from publication, whichever is the longer (but subject during the last forty years to a general right of reproduction on payment of a 5 per cent. royalty), Italy.

**Copyright during the War.**—The effect of the war was to suspend the Berne Convention as between belligerents, and to suspend or destroy the treaty with Austria-Hungary, and therefore to deprive of copyright works produced during the war in enemy countries. The Enemy (Copyright) Act, 1916, conferred copyright on such works and vested it in the Public Trustee; other legislation allowed copyright subsisting before the war, but belonging to enemies, to be vested in the Public Trustee. Licenses to publish could be granted by the Board of Trade. The peace treaties provide for the resumption of copyright protection.

See the works of MacGillivray, Oldfield, Robertson, Copinger, and Briggs on the subject of copyright; also the articles BOOK-TRADE, PATENTS, TRADE-MARKS.

**Coquelin**, BENOÎT CONSTANT, actor, born in 1841 at Boulogne, where his father was a baker, was admitted to the Conservatoire in 1859, and having gained the second prize for comedy, made his début at the Théâtre Français, December 7, 1860, as Gros-René in the *Dépit Amoureux*. For over a quarter of a century he played here with unbroken success, both in classical pieces and in rôles created by himself; in the broader aspects of comedy, standing without a rival. From 1897 to his death, 27th January 1909, he was director of the Porte St Martin.—His brother, ERNEST ALEXANDRE, 'Coquelin cadet' (1848-1909), was also an admirable actor.

**Coquerel**, ATHANASE LAURENT CHARLES, an eloquent minister of the French Reformed Church, was born in Paris in 1795. He studied theology at Montauban, and became in 1818 minister of the French church in Amsterdam, but came to Paris in 1830 on the invitation of Cuvier, and preached here until his death, 20th January 1868. In 1848 he was elected a delegate to the National Assembly by the department of the Seine. His writings, all marked by earnestness and liberal sympathies, include a reply to Strauss (1841), six collections of sermons (1842-56), and *Christologie* (1858).—His son, ATHANASE JOSUÉ LAURENT (1820-75), also a Protestant pastor of liberal tendencies, was born at Amsterdam. A still more 'advanced' theologian than his father, he found himself at variance with the Protestant Consistory and the predominating influence of Guizot in his somewhat rigidly orthodox old age. Among his works were an edition of Voltaire's letters on toleration (1863) and *Jean Calas et sa Famille* (1857).

**Coquilla Nut**, the fruit of the Piassava palm, *Attalea funifera*. On account of their large size (3 to 4 inches long) and the hard texture and beautiful mottling of their dark-brown endosperm, they are imported by turners. See FIBROUS SUBSTANCES.

**Coquimbó**, the port of La Serena, 9 miles distant from it, stands on a bay near the mouth of the river Coquimbó, and is connected by rail with Valparaíso and Santiago. It has a good harbour and exports copper, silver, and manganese ores, wool, cattle, hay, and cobalt; pop. 15,000. The province of Coquimbó occupies the entire breadth of the country from the sea to the Andes. Its area is 14,000 sq. m.; pop. 160,000. The rainfall is small save in the south, where some farming is carried on. The main occupation is mining. See CHILE.

**Coracias.** See ROLLER.

**Coracle** (Celt. *corug*, Gael. *curach*), a boat made of a slender frame of wood or wickerwork, and covered with skins, used by the ancient Britons. A coracle covered with tarpaulin is still used on some Welsh rivers and on the Irish west coast.

**Coracoid**, an important paired-bone in the breast-girdle, forming along with the scapula the articulation for the fore-limb, and always lying ventrally. In the lower fishes the entire girdle is cartilaginous; in the bony fishes distinct coracoids first appear; they are well seen in Amphibia and in all reptiles except snakes; they are very large and strong in birds; but become mere processes of the scapula in mammals. They very often exhibit a special anterior portion known as the pre-coracoid. See BIRD, SKELETON.

**Corais** (Fl. CORAY), ADAMANTIOS. See KORAES.

**Coral**, a term loosely applied to any animal in the class Coelenterata which forms a hard skeleton. The tubular organ-pipe coral, the noble or red coral of commerce, and the reef-building madreporal corals, are familiar examples. Presuming an acquaintance with the general features of the class, as summed up in the article COELENTERATA, we may notice at the outset the fact that the formation of hard supporting structures is exhibited in very varied degrees, in manifold styles of architecture, and in widely separated forms.

**Different Kinds of Coral.**—(1) Among the Hydrozoa the skeletal investment of the polyp

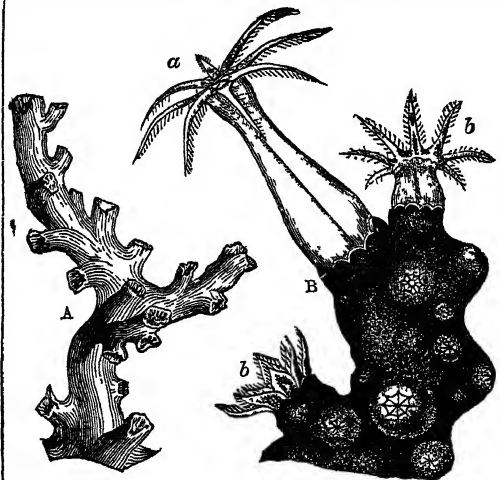


Fig. 1.

A, branch of *Dendrophyllia*; B, part of a stock of red coral with (a) fully extended polyp, and (b, b) two polyps, partly extended.

types, when present, is usually horny. In one subdivision, however, the supporting framework is limy, and to these forms—Millepores and Stylasterids—the title Hydrocorallina is fitly applied. (2) It is, however, in the other sub-class

of Coelenterates—the Actinozoa—that the formation of coral structure becomes emphasised and perfected. In many simple and in most colonial forms, a skeleton is formed, as isolated spicules or continuous. When continuous it may be horny, or limy with an organic basis, or to all appearance entirely limy. (a) Among the Alcyonaria, of which Alcyonium (q.v.) is a convenient type, Tubipora, with the spicules united to form tubes and crossing platforms; Corallium, with a branched axis of fused spicules; Isis, with a jointed axis alternately limy and horny; Heliopora, with limy cups inclosing the individual animals, and traversed as they grow by successive horizontal floors at slight intervals, are examples of different forms of coral occurring in distinct groups. (b) Among the Zoantharia, of which Actinia or any sea-anemone is a familiar example, the Actinaria have no skeleton, and therefore include no coral forms; the Antipatharia have a varied non-calcareous supporting skeleton, and include some forms known as 'black corals'; the third subdivision, the Madreporaria, always have a continuous limy skeleton, and include the best-developed corals. Most madrepores are colonial, and the common connecting skeleton is either solid (apart from mere gaps) or perforated by canals which establish community of life between the individual members. Hence it is usual to distinguish two sections of Madreporas as Aporosa and Perforata. (3) The earliest corals of Palaeozoic strata—the Rugosa or Tetracoralla—are distinguished by four primary partitions.

**General Structure.**—In discussing further the general structure, it will be convenient to leave the widely separated Hydrocorallina out of account. The most general fact that can be stated at the outset is, that with the possible exception of the sea-pens, the cells which form the skeleton are at least originally epidermic. Free spicules, connected lattice works, solid cups, illustrate various degrees of lime deposition; while supporting axes, ensheathing tubes, and what look like tolerably

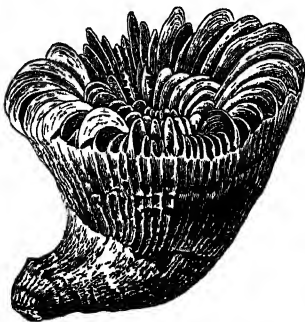


Fig. 2.—*Caryophyllia borealis*, single individual.

complete casts of the entire animal, are the main types of coral architecture. In detail, however, those main types vary widely, and in the cup-corals especially, the structure is often very complex. In a simple madre-pore coral, representing a single individual, the following structures are at once obvious. The main cup-like mass, known as the *theca*, is usually attached by its base to some foreign object. A terminal depression—the *calyx*—contains the animal, the soft parts of which extend more or less over the lips. Within the cup, when the animal has died away, radial partitions are seen, forming various systems of *septa*. Some of these often meet in the middle of the cup to form a central pillar or *columella*. When the coral is colonial, as is generally the case, complications arise by the fusion of individuals. The deeper parts of growing corals are sometimes separated off by cross partitions (*tabulae*), but this is rare in the Zoantharia. In large masses of madre-pore certain portions of the skeleton are often left behind by the animals, and being exposed to the water,

become corroded and altered. In regard to the development of corals, it is hardly possible yet to make any useful general statements. For the animals themselves, it must be enough here to refer to the articles on ALCYONIUM and ANEMONE, which, though not themselves 'corals,' are good examples of the two sub-classes to which most corals belong.

**General Life.**—Corals are predominantly passive forms, and are much modified by their environment (currents, &c.); the great majority are permanently fixed, except in embryonic life. Flabellum may be noted as an instance of a coral-cup which becomes free as an adult. The limy material which forms the skeleton seems, in many cases at any rate, to be derived not from the water, but from the minute animals which constitute the food. The great majority are colonial, yet cases of division of labour are very rare. Many corals are richly coloured, but the meaning of the numerous pigments is still imperfectly known. Masses of corals furnish browsing ground for crowds of animals, not a few of which intrude into the colonies, while others have become established parasites. Some corals also include parasitic Algae (see SYMBIOSIS). Semper describes some very interesting cases of the constant association of worms and corals, and notes how the guest has permanently modified the host (see COMMENSALISM). It is interesting to notice, apart from actual modification of form, how various worm-organisms act upon the 'sea-meadows of coral' much as earth-worms do upon land-meadows (see Huxley's *Invertebrates*, p. 171).

In most corals the sexes are separate, and even the colonies may be entirely male or female. In Corallium, hermaphrodites may occur, or different branches be of either sex. As is common in sessile passive organisms, asexual or vegetative reproduction is a marked feature. Semper considers the budding of the Fungia colony as illustrating 'alternation of generations.'

**Distribution.**—Of the madre-pore corals, the 'solitary' forms, which never form great masses, are for the most part widely distributed deep-sea animals, while the reef-builders are as markedly dwellers in shallow water, from the low-tide mark to about 20 fathoms, and are limited to warm waters. They are not found on the western coasts of Africa and America. In the waters of the Central Pacific reef-corals are found in greatest profusion and variety; but those of the Red Sea, Indian Ocean, and East Indies are not far behind. Over eighty fossil genera of the Palaeozoic Rugosa are known, and of the other Actinozoan corals, about 1800 fossil, and as many living species. Of these, the vast majority are madrepores, and only a small number Alcyonarian. Both sets begin in Silurian times, but were for long outnumbered by the Rugosa. Most existing genera date only from the Tertiary period. The 'areas of past distribution of coral-reefs in no way correspond with those distinctive of the modern seas.' See Heilprin, *Distribution of Animals* (1887).

**Important Forms.**—The most important corals are the reef-builders (Poites, &c.). The delicate colour, exquisite architecture, and labyrinthine complexity make the limy skeletons beautiful objects. Yet more beautiful, however, is the wealth of colour often exhibited by the living forms. Caryophyllia is a simple and solitary cup-coral found on the south coast of England. Bathyactis and Deltocyathus are almost world-wide. Antipathes—the black coral—has a valuable hard axis like ebony. Fungia is worth noting on account of its flat mushroom-like shape and Semper's observation (see above) in regard to alternation of generations; among Alcyonarian

forms may be noted the blue coral (*Heliopora cerulea*) of many Pacific coral-reefs, the horny and beautifully coloured sea-fan (*Gorgonia flabellum*), and the familiar organ-pipe coral (*Tubipora musica*).

More important, however, in practical interest is the red coral (*Corallium rubrum*) of commerce. In this coral the limy spicules are fused to form the familiar solid axis. The most important banks are those of Algiers and Tunis, and off the Sardinian, Sicilian, and Balearic islands. Great quantities are fished near Naples, and at Sciacca in Sicily. The coral is roughly dredged, freed from its rind, assorted according to colour, and manufactured in Naples, Leghorn, Genoa, &c. Pale rose-coloured coral, not spoilt by the boring of worms and other intruders, fetches very high prices. The industry is a very important one, though in recent years it has seriously declined. The most important markets are in Asia, Africa, parts of Russia, Japan, and South America.

CORAL ISLANDS is the name given to certain low islets which are composed for the most part of the calcareous skeletons of various kinds of corals. An atoll or typical coral island consists of a somewhat ring-shaped reef inclosing a lagoon. Such reefs vary in size from less than a mile up to 90 miles long and may be 10 miles wide—the breadth of the annular reef being on an average about a quarter of a mile. *Barrier-reefs*, which have a similar breadth, are found surrounding islands or bordering mainlands, from which they are separated by a navigable channel. *Fringing-reefs*, on the other hand, extend outwards from the shore, with no separating lagoon-channel. In the case of atolls and barrier-reefs there is generally a navigable passage through the reef into the lagoon or lagoon-channel, which is kept open by the scour of the tide. It is upon atolls or barrier-reefs that islands occur. Only very rarely, however, are these islands co-extensive with the reef—generally they appear as longer or shorter belts, forming a series of islets straggling along its surface. As reef-building corals do not flourish in water having a lower temperature than 68° F., they are necessarily restricted to tropical and subtropical seas—from many regions of which, however, they are excluded by the presence of cold currents coming from extra-tropical latitudes, by the muddy character of the water opposite the mouths of large rivers, and by other causes.

The rock of a coral-reef is a white limestone composed chiefly of masses of corals, coral debris, and sand, together with the hard parts of molluscs, echinoderms, bryozoans, and calcareous algae. Not infrequently this rock has been changed by the chemical action of percolating water into a compact or crystalline mass, which has lost all, or nearly all, trace of its organic structure. Chamisso (q.v., known also as a poet), the naturalist who accompanied Kotzebue the Russian navigator in his voyage of discovery into the South Sea in 1815-18, appears to have been the first to show how such reefs are converted into dry land. He describes how the polyps cease to grow when they reach the surface of the sea, and how the reef, exposed at low-tide, by and by becomes disintegrated, while broken coral debris is heaped up by the action of the breakers so as eventually to form a high bank which can only be covered during spring-tides. This bank of coral blocks and debris solidifies in time, and remains exposed to the fierce heat of the sun, so that the mass shrinks and cracks, and flakes are detached from it, and raised one upon another by each returning tide. 'The always active surf throws blocks of coral (frequently of a fathom in length and 3 or 4 feet thick) and shells of marine animals between and upon the foundation-stones; after this the calcareous sand lies undisturbed, and offers to the seeds of trees

and plants cast upon it by the waves a soil upon which they rapidly grow to overshadow its dazzling white surface. Entire trunks of trees, which are carried by the rivers from other countries and islands, find here at length a resting-place after their long wanderings: with these come small animals, such as lizards and insects, as the first inhabitants. Even before the trees form a wood, the real sea-birds nestle here; strayed land-birds take refuge in the bushes; and at a much later period, when the work has been long since completed, man also appears, builds his hut on the fruitful soil formed by the corruption of the leaves of the trees, and calls himself lord and proprietor of this new creation.' According to Professor L. Agassiz, the large blocks torn off by the breakers are loosened not by shrinkage under the sun's heat, as Chamisso supposed, but by the innumerable perforations of various boring molluscs.

The origin of coral-reefs is a question which has at various times given rise to discussion. According to Chamisso, the corals commenced to grow on shoals in the sea—on the tops of submarine mountains in short. The circular form of the atoll and its basin-shaped lagoon he believed to be due to the natural growth of the coral. The most vigorous growth took place upon the outward edges of the reef, where the largest and most massive corals flourished. In the interior the coral growth was hindered by the accumulation of shells, coral debris, and sand swept forward by the waves. The reef, therefore, as it approached the surface would gradually assume a basin-shape—the outer edges, or peripheral and actively growing portion, forming the reef—the interior part, where growth was retarded or prevented by sediment, &c., forming the lagoon. Other writers attempted to account for the annular form of atolls by supposing that the reefs had grown upwards from the crests of submarine volcanic craters. The not infrequent occurrence of volcanoes and volcanic islands in the coral regions of the Pacific Ocean was thought to favour this supposition, but the enormous diameter of many atolls seemed to preclude the possibility that these larger atolls, at all events, could be founded on the lips of submarine craters. And when at length it was discovered that reef-building corals flourish only in comparatively shallow water, this hypothesis was rejected, since it was extremely unlikely that so many submarine volcanic mountains should rear their summits just to the limits within which the corals could begin their superstructures.

Darwin, during the famous voyage of the *Beagle*, was naturally fascinated by the problem of the origin of these remarkable reefs, and while he admitted that certain atolls might very likely have been formed in the manner described by Chamisso, yet he could not believe it possible that a broad mountain-summit lay buried at the depth of a few fathoms beneath every atoll, and nevertheless that throughout the immense areas occupied by many of those reefs not one point of rock should project above the surface. The theory of subsidence which he subsequently advanced seemed to account for all the phenomena, and until recently it commanded nearly universal assent. According to Darwin, each atoll has passed through the successive stages of fringing-reef and barrier-reef. Since reef-building corals do not thrive at greater depths than 100 feet or thereabout, it is evident that the foundations of a coral reef could not have been laid in deeper water. And as such moderate depths occur only round islands and off the shores of continents, the reef-builders would begin their work by forming at first a fringing-reef. Slow subsidence of the sea-bottom is supposed to have supervened; but while the foundations were being carried down, the corals continued to grow upwards, the

rising of the reef keeping pace with the sinking of the sea-bottom. Thus by-and-by the fringing-reef is converted into a barrier-reef. We have now only to suppose that the movement of subsidence and the labours of the corals continue until the reef-encircled island disappears below the waves, and a complete atoll will be the final result. Darwin's views were illustrated and strongly supported by Professor J. D. Dana, who accompanied the Wilkes exploring expedition round the world in 1838-42, while MM. Couthouy and Beete Jukes likewise upheld the hypothesis of subsidence. The researches of Professors L. Agassiz and Le Conte amongst the reefs of Florida have shown that Darwin's views are there inapplicable. They attribute the formation of the southern portion of Florida, which consists of a series of concentric barrier-reefs, to the natural growth of the coral alone aided by the mechanical action of the sea—a view which, stated generally, is the same as that held by Chamisso. Professor Karl Semper likewise, after examining the reefs of the Pelew Islands, came to the conclusion that the form of these reefs had been determined by the natural growth of the corals, modified by local conditions, which is just Chamisso's explanation. But Darwin had already expressly stated that some reefs might have originated in the manner suggested by Chamisso; and geologists apparently recognised that the conditions of the great Florida reef were hardly analogous to the isolated atolls which rise from profound depths in the open ocean.

In 1880, however, Dr (afterwards Sir) John Murray of the *Challenger* expedition, published another explanation which has given rise to considerable discussion. He returns to the old views of Chamisso, maintaining that reefs have grown up from the tops of submerged and partially submerged banks and mountains. To the objection that it is hard to believe that so many banks and cones should occur just at the proper depth from the surface, Sir J. Murray replied that it was not necessary to suppose that all the submarine eminences were of equal or nearly equal height. Some may have risen at first above the level of the sea, and subsequently have been reduced by the waves and breakers to the condition of shoals; while others that did not reach to the limits within which reef-builders live may have been brought up to that zone by the accumulation upon them of the hard parts of pelagic organisms. For these forms of life flourish in extraordinary numbers in the surface-waters of the tropics where reefs abound, and as they die, their hard parts falling to the bottom will accumulate there along with the exuviae of creatures living at such depths, until they come to form considerable deposits. This levelling-up of submarine banks to the zone within which coral-builders thrive is the most marked feature in Sir J. Murray's hypothesis. His further account of the mode in which atolls and barrier-reefs have been formed is a more particular and scientific development of Chamisso's explanation. The growth of a reef is regulated by the food-supply of the corals; those growing on the external parts of the reef are most favourably placed in this respect, consequently they thrive best, and have the advantage over those that are growing in the centre of the reef; and this difference in the rate of growth of the outer and inner areas will be intensified as the reef approaches the surface. Eventually the corals of the interior die, and the dead coral rock is gradually removed by the solvent action of the sea-water which contains carbonic acid. In this manner the reef assumes a basin-shaped form. Fringing-reefs, according to Sir J. Murray, are converted into barrier-reefs by the simple outward growth of the coral upon a talus of its own debris, forced off from the

edge of the reef by the breakers. The lagoon-channel that eventually separates the reef from the land is formed in the same way as the lagoon of an atoll—namely, by the dissolution and removal of dead coral rock. Professor A. Agassiz published in 1882 an account of his detailed examination of the Tortugas and the Florida reefs, in which he shows how the bottom of the sea in those regions has been gradually raised by the accumulation of the exuviae and skeletons of massive organisms which flourish in prodigious numbers on the sea-floor, forming the submarine plateaus known as the Florida, Yucatan, and San Pedro banks. He thought it was by the gradual upward growth of such accumulations that the sea-bottom was eventually raised to the zone in which reef-builders thrive. He thus arrived independently at the same general conclusion as Sir John Murray.

In his work on the Solomon Islands (1887) Dr Guppy supported the hypothesis advocated by Murray. He showed that we have there elevated reefs which exhibit the very structure which we should expect to find on that hypothesis. He found some of those islands largely composed of earthy calcareous deposits having the same character and origin as the various volcanic muds and organic oozes which the *Challenger* expedition dredged at depths varying from 100 to 2000 fathoms. These deposits reached to heights of over 1000 feet, and in some cases denudation had exposed an underlying nucleus of volcanic rock. The earthy calcareous beds were covered with a comparatively thin crust of true coral rock.

In 1910 Mr F. Wood-Jones put forward a theory arrived at from a study of the Cocos-Keeling Islands. Sir John Murray sees in the deposition of fine sediment the agent that brings the sea-floor up to the level at which corals can thrive. Mr Wood-Jones sees in this same deposition the agent that prevents corals from thriving at greater depths. In other words, sedimentation makes the growth of coral possible simply by making further sedimentation impossible; and it does this by bringing up the bottom to the region disturbed by waves and currents. The form of the reef is attributed to a similar cause. Against the theory of solution within the atoll, Mr Wood-Jones urges that not removal but deposition is there going on; that more coral sand enters than leaves the lagoon. He maintains that the ring-form is characteristic even of reefs below the surface, and of many separate colonies on the reef. The latter take the form of a dome, which flattens as it grows. Its increasing size and flatness enable sand to accumulate on the top, so that the rim grows while the centre dies off. The same process is held to occur in the atoll as a whole, and a similar principle explains the departure of the Cocos-Keeling atoll from circularity.

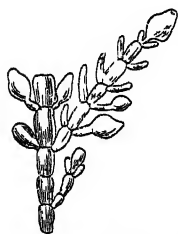
See COELENTERATA, ANEMONE (SEA), ALOYONIUM; text-books of Zoology—Huxley, Claus, &c., Darwin, Dana, Murray, Guppy, &c. on Coral-reefs; Milne-Edwards and Haime, *Hist. Nat. des Coralliaires* (1857-60); Mrs. E. David, *On a Coral Island* (1899); *The Atoll of Funafuti*, based on Mr C. Hedley's collections (1898); Wood-Jones, *Coral and Atolls* (1910); and Semper's *Animal Life*; Moseley and Quelch, *Challenger Rep.*, vols. ii. and xvi.; for skeleton, Von Koch, *Morphologisches Jahrbuch* (1879-86); for red coral, Lacaze-Duthiers, *Histoire Naturelle du Corail* (1864) for fossil forms, Zittel's *Paläontologie*; systematic works—Dana, *Zoophytes* (1848-49); S. J. Hickson, *Introduction to the Study of Recent Corals* (1924).

**Coral Fishes** (*Squamipennes*), a name applied to a family of bony fishes in the spiny-rayed or Acanthopteron order. They are tropical forms, abundant about coral reefs, usually small, with short, deep, often brightly coloured bodies. The family includes the Archer-fish (q.v.), the very beautiful *Chaetodon*s, the genus *Chelmo* with

peculiarly elongated snout, and other interesting forms.

**Coral Flower**, or CORAL TREE (*Erythrina*), a tropical and subtropical genus of papilionaceous trees and shrubs, with long racemes of beautiful flowers of a rich dull crimson or a scarlet colour, resembling coral. Some species are thorny, and are hence used for hedges, notably *E. corallodendron* in the West Indies, and *E. indica* in the East. The wood is so light and spongy that it is used not only for portable objects, such as ladders, but even as a substitute for cork.—*Jatropha multifida*, a totally different plant, of the order Euphorbiaceæ, is also sometimes called Coral Tree.

**Coralline** (*Corallina officinalis*), a limy seaweed, exceedingly common on British coasts, where it adds much to the beauty of the rocky pools. In spring it appears as a thin crust, with a fresh delicate pinkish or purplish colour. With the increasing sunshine it grows into prettily jointed and branched tufts, spreading like brushwood over the surface of the rock. Its purple colour increases in depth, till the plant grows old and begins to die; then the brightness pales, and the limy incrustation finally remains as a white skeleton. The purple colour soon fades on exposure; a bright white light is produced by holding a piece of the alga in a candle flame; an unpleasant smell lingers for years about the dried specimen. The coralline was formerly regarded as an animal, 'since all lime,' Linnæus said, 'is most truly a product of animals.' But neither for this, nor for its supposed medicinal (vermifuge) virtues was there any warrant. The common coralline, along with a few other species, forms a genus of the



Portion of Branch of *Corallina officinalis* magnified.  
(From Lundsborough.)

family Corallinææ, of the Rhodophycæ, or Floridææ. Melobesia is an allied form of similar stony character. It is sometimes used for manuring fields, and is said to have been one of the principal constituents in the mortar of Iona cathedral. Certain Hydrozoa (q.v.) are sometimes called corallines.

**Coralline Crag**. See CRAG and PLIOCENE.

**Coral Rag**, or CORALLIAN, a group of the Oxford or Middle Oolites. See JURASSIC SYSTEM.

**Coral-root**, a name given (1) to the cruciferous plant *Cardamine* (or *Dentaria*) *bulbifera* (see DENTARIA); and (2) to a genus of orchids, *Corallorhiza*, whereof one, the rare *C. innata*, occurs in boggy woods in Scotland. They are rootless saprophytes, with scale-leaves, and a fleshy root-stock which branches like coral.

**Coral Sea** is that section of the Pacific which stretches between Australia on the west and the New Hebrides on the east. In 1874 the *Challenger* expedition found parts of it to be 14,700 feet deep. See PACIFIC.

**Coral Snake** (*Elaps*), small venomous snakes in the same family (Elapidae) as the Cobra (q.v.). The typical species (*E. corallinus*) frequents woods and thickets in South America. Their very small mouth makes them less dangerous. The usual colour is rich red with black and yellow transverse bands, and it is an interesting fact that besides the venomous Elaps, at least two other genera occur which are quite harmless. These, Mr Wallace suggests, probably derive advantage from their close resemblance to the venomous forms.

**Coram**, THOMAS, philanthropist, was born at Lyme Regis, Dorsetshire, in 1667 or 1668. He was

bred a seaman, and rose to be a merchant captain. Already in 1694 we hear of him as settled at Taunton, Massachusetts, and engaged in benevolent work of various kinds. A few years after he seems to have returned to sea, and to have settled in London, after suffering shipwreck off Cuxhaven in 1719. In London he interested himself in the settlement of Georgia, and in planting English artisans in Nova Scotia; but he soon began his long agitation for the foundation of a foundling hospital. Children were first admitted in 1741. Coram's portrait was painted by Hogarth, a warm patron of his scheme. More thoughtful for others than for himself, Coram fell into poverty, from which he was relieved in 1745, by an annuity of £161 contributed by his friends. He died 29th March 1751. See Life by Compston (1918).

**Cor Anglais**, a wind-instrument of the reed species, similar in construction to the Oboe (q.v.), to which it has the same relation as the Bassett-horn (q.v.) has to the Clarinet (q.v.). It is usually made in the key of F, a fifth lower than the ordinary oboe, and has the same range—viz. from E in the bass stave to B<sub>4</sub> above the treble stave.

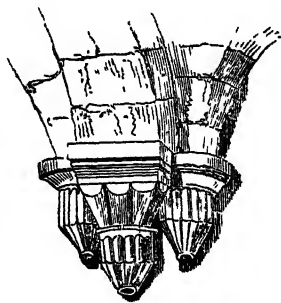
**Corato**, a town in southern Italy, on a fertile and well-cultivated plain, 25 miles west of Bari; pop. 50,000.

**Corban**, properly an offering to God in fulfilment of any vow. This might either be of some possession devoted to God, redeemable by an equivalent in money, or it might be a pledge to deprive one's self of something lawful in itself, as wine, for a longer or shorter period. A man might so interdict himself by vow, not only from enjoying anything himself, but also from giving it to others, and thus many of the old Jews juggled their consciences into getting rid of natural responsibilities, as the support of decayed parents, and the like. It was this miserable selfishness, under the thin garb of religious hypocrisy, that our Lord rebukes in the Scribes and Pharisees (Matt. xv. 5; Mark, vii. 11).

**Corbeil**, a town in the French department of Seine-et-Oise, on the Seine, 20 miles S. of Paris, with manufactures of clocks, cotton, and paper, and large flour-mills and granaries, for the supply of Paris; pop. 10,000.

**Corbel**, in Architecture, a projection of stone or wood from the face of a wall, used for supporting pillars or other superincumbent weights.

Corbels proper were originally plain on the sides and carved on the front only. Such were the Romanesque corbels, which are so numerous and so richly ornamented. The carving at first resembled the end of wooden beams, but gradually all sorts of figures were introduced, chiefly heads of men and animals. Corbels of great size were likewise used to carry the projecting parapets of castles.



Corbel:  
Kirkstall Abbey.

**Corbet**, RICHARD, poet and bishop, was born in 1582, son of a gardener in Ewell, Surrey. From Westminster School he passed to Broadgates Hall (now Pembroke College), next to Christ Church, Oxford. He took orders, and had already enjoyed preferments at Cassington, Oxfordshire, and Stewkley, Bucks, as well as a prebend in Salisbury,

when in 1620 he was made Dean of Christ Church at thirty-seven. In 1624 he was appointed to the see of Oxford, and translated to that of Norwich in 1632. Here he died in 1635, and was buried in his cathedral. Corbet was famous for his conviviality and wit, and his poetry reflects his cheerful and genial temper. His longest piece, *Iter Boreale*, describes a holiday-tour of four students; the best, and best known, is the *Fairies' Farewell*. See J. E. V. Crofts in *Essays and Studies*, x., 1924.

**Corbey**, or **CORBIE**. See **CORVEL**.

**Corbie-steps**, or **CROW-STEPS**, the stepped slopes of gables. This is a Scottish term, derived



Corbie-steps, from a house formerly in the Castle-wynd, Edinburgh.

no doubt from the *corbelled* or projecting character of the steps, and afterwards corrupted into crow-steps from the resemblance of corbelled to corbie or crow. The origin of this mode of finishing a gable probably arose from the steps used for passing from one side of the roof to another — the parapet

defending the passage being stepped in conformity with the slope of the stairs. Crow-steps were the almost invariable finish of Scottish gables from the 14th to the 17th century, and they were also much used in the Low Countries.

**Corbridge**, a town of Northumberland, near the confluence of the Cor with the Tyne, 4 miles east of Hexham, was a parliamentary borough in 1295. Near it is Corstopitum, an important Roman station excavated in 1907 and following years.

**Corchorus**, a genus of Tiliaceæ. *C. olitorius* is widely diffused in tropical countries, being cultivated both as a pot-herb (Jew's Mallow) and on account of its fibre. For the closely allied *C. capsularis*, see **JUTE**. The Japanese shrub, common in gardens on account of its double yellow flowers, called by gardeners *C. japonicus*, belongs to the Rosaceæ, and is correctly known as *Kerria japonica*.

**Corcyra**. See **CORFU**; also **CURZOLA**.

**\*Corday d'Armans** (perhaps better **DE CORDAY D'ARMONT**), MARIE-ANNE CHARLOTTE, known as CHARLOTTE CORDAY, was born at St Saturnin, near Sées (Orne), 27th July 1768. The descendant of a noble family, with Corneille's blood in her veins, she yet welcomed the Revolution, for from Voltaire she had imbibed 'philosophic' theories, from Plutarch ideas of antique heroism. But she was horrified at the monstrosities of the Jacobins; and her hatred of their acts was intensified by converse with a party of proscribed Girondists, who had fled to Caen in Normandy. She resolved to rid her country of one of the heads of the Jacobins, and came with that view to Paris. Whether to slay Robespierre or Marat was an open question; but while she debated the matter with herself, a demand of the latter for two hundred thousand more victims, marked him out for her weapon. Twice she failed to obtain an audience, but on the evening of 13th July 1793 she was admitted on the plea that she had important

news from Caen to communicate. She found Marat in his bath, and her pretended denunciation of the fugitive Girondists, some of whom were her own friends, called forth the remark: 'They shall receive their reward; I will have them all guillotined at Paris.' Straightway she drove her knife to his heart; he died with a stifled cry. Charlotte was at once arrested, and brought before the Revolutionary Tribunal, where she gloried in the act. In the Conciergerie she sat to the artist Hauser; on the evening of 17th July she was guillotined. The executioner held up her head to the multitude, and slapped it; in the sunset the beautiful dead face seemed to blush. See works on her by Vatel (3 vols. 1872), Mrs Van Alstine (1889), R. Focke (1895), and DeFrance (1909); also Austin Dobson's *Four Frenchwomen* (1890).

**Cordeliers** ('cord-wearers'), the name applied in France to the Observantists, or strictest branch of the Franciscans (q.v.), on account of their wearing a girdle of knotted cord. During the Revolution the name was applied to the members of a political club which was instituted in 1790, and assembled in the chapel of a Franciscan monastery. Its leaders included Danton, Hébert, Camille Desmoulins, and Marat, and for a time it rivalled the more famous club of the Jacobins (q.v.). The height of its influence was the period of Camille Desmoulins' journal, *Le Vieux Cordelier*. Soon after the fall of Danton, the Cordelier club lost its influence, and it was insignificant when closed by the Convention in August 1795.

**Corderius**, the Latinized name of Mathurin Cordier, grammarian, born in Normandy in 1478, who taught at Paris (where he had Calvin for a pupil), and, becoming a Protestant, settled at Geneva. There he died, famous as a skilful teacher of youth, on the 8th September 1564. He wrote a long series of grammatical works, of which the best known throughout Europe was the *Colloquia Scholastica* (1564).

**Cordia**, a drupaceous genus of Boraginaceæ, trees or shrubs. Some species are valued for their fruit, their timber, or both.

**Cordierite**, **DICHOITE**, or **IOLITE**, a natural silicate of magnesia, alumina, and ferric oxide. It crystallises in stout orthorhombic prisms, and is of various shades of blue, sometimes with a tinge of gray or brown. It exhibits the property of dichroism very clearly, often appearing deep blue when viewed in the direction of the vertical axis, but red or yellow when seen by transmitted light at right angles to that direction.

**Cordilleras** (lit. 'chains'), a name applied in America to various chains of mountains. The Cordilleras of South America are described under **ANDES**; and the Rocky Mountains are the Cordilleras of North America. Those of Central America extend from Darien to the north of Mexico. See **AMERICA, MEXICO**.

**Cordite**, a smokeless powder (see **GUN-COTTON**) invented by Sir Frederick Augustus Abel, and used in the British Army since 1892, is made of a mixture of gun-cotton, nitro-glycerine, and vaseline; and is named from its string-like or cord-like appearance. See **RIFLES**.

**Córdoba**, or **CORDOVA**, a city of Spain, capital of the province of Córdoba, 74 miles ENE. of Seville. It stands on the right bank of the Guadalquivir, here crossed by the Moorish 'Puente Viejo' of sixteen arches, and occupies a slope connected with the Sierra Morena. The old turreted walls inclose gardens and vineyards; but the interior shows narrow and dirty streets. Córdoba was from the 9th to the close of the 12th century a Moorish town of the first rank, renowned for its

rich mosques and palaces, and still more for its university. Among the principal buildings is the cathedral, built as a mosque in the 8th century, the most magnificent Mohammedan temple in Europe, and converted (1236) into a Christian church. Córdoba was at one time celebrated for its manufacture of goat leather, called *cordovan*, whence the term *cordwain*, but that industry is now almost entirely gone from it. Cordovan, still prepared in the Levant, is used in bookbinding and for finer boots and shoes. Córdoba has a bishop's palace, a lyceum, a theatre, a fine casino, museum, &c. It manufactures silverware, silk fabrics, paper hats, &c. Called by the Carthaginians the 'gem of the south,' Córdoba was (152 B.C.) founded by the Romans as Corduba. Taken by the Goths in the 6th century, it fell (711) to the Moors, in whose hands it remained till 1236, when Ferdinand III. of Castile struck it a blow from which it has never recovered. In 1808 Córdoba was taken and plundered by the French. Córdoba was the birthplace of the Latin poet Lucan, the philosopher and dramatist Seneca, and the Arabian philosopher and heretic Averroes. Pop. 74,000.—The province of Córdoba has an area of 5300 sq. m., and a pop. of 565,000; see ANDALUSIA.

**Córdoba**, a central province of the Argentine Republic, mostly pampa land, rising to the Sierras de Córdoba and de Pocho in the west. Area, 67,000 sq. m.; pop. 800,000. Cattle-raising is the chief industry. The climate is healthy, but very dry; the temperature ranges from 18° to 107° F.—The capital, Córdoba, lies 240 miles WNW. of Rosario. It has a cathedral, a handsome city-hall, the old university building, with walls from 4 to 6 feet thick, a national observatory, and noble baths. The university (1613) sank greatly after the expulsion of the Jesuits (1767), until in 1870 several German professors settled here. The town possesses also a national college, a school of art, a school of agriculture, and an academy of sciences, which publishes a valuable *Boletín*. Founded by Cabrera in 1573, the town was famous during the Spanish occupation as a seat of learning and the centre of the Jesuit missions in South America. It was afterwards falling into decay, but the opening of the railway in 1870 brought transit trade, and greatly restored its prosperity. In the hot months of December, January, and February, however, the place is a very trying residence. Pop. 150,000.

**Córdoba**, a town of Mexico, 54 miles WSW. of Vera Cruz, in a fruitful valley, 3045 feet above the sea. Formerly important, it sank greatly after the revolution; but in later years it has in some degree recovered its trade. It is surrounded by rich coffee-plantations. Pop. 10,000.

**Cordon**, in military operations, is a line of sentries within sight of each other inclosing or guarding any particular space of ground, to prevent the passage of unauthorised persons. If intended to guard against contagious diseases, it is called a *cordon sanitaire*.

**Cordon Bleu**, originally the 'blue ribbon' which in France supported the insignia of the Order of the Holy Ghost; but playfully transferred to good cooks, who after examination received a medal, also suspended from a 'blue ribbon.'

**Córdova**. See CÓRDOBA.

**Cordova**, a port and mining village on the south coast of Alaska, 440 miles WNW. of Juneau, terminus of the Copper River railway, produces copper, coal, petroleum, and gold; pop. 1000.

**Corduroy**, a ribbed kind of Fustian (q.v.), a cotton stuff made after the fashion of velvet.

**Cordus**, VALERIUS (1515–44), greatest of the early German botanists, was born at Simtshausen, near Fraunkenberg, son of Euricius Cordus (1486–1535), a native of the same place, also notable for a botanical work (*Botanologicon*, Cologne, 1534), as well as Latin poems and medical books. Valerius Cordus studied at Marburg and Wittenberg, made extensive botanising journeys in Germany and Italy, discovering many new species, and died suddenly in Rome. For his *Dispensatorium pharmacorum* see PHARMACOPŒIA. His great work is his *Historia Stirpium*, edited after his death by Gesner (1561). See E. L. Greene, *Landmarks of Botanical History*, vol. i. (Washington, 1909).

**Cordyceps**, a genus of fungi (Pyrenomycetes), parasites on insects and spiders. *C. militaris* attacks caterpillars, filling the whole body (whose outward shape is preserved) with a dense mass of fungus-threads (sclerotium). From this sprout bright orange-red, club-shaped stromata, whose perithecia contain asci which produce spores. *C. Taylori* has an antler-shaped stroma. See FUNGI.

**Cordyline**, a genus of Liliaceæ, resembling *Dracæna*, inhabiting warm countries. The leaves of some yield fibre.

**Corea**. See KOREA.

**Coregonus**, or WHITEFISH, a genus of palatable, herring-like Salmonidæ. They differ from salmon and trout in having larger scales, a smaller mouth, and teeth absent or very minute. In Arctic regions the whitefish are marine, except when they ascend rivers to breed; elsewhere they are like char, mostly imprisoned in lakes—relics of ice ages. They probably illustrate the origin of species in isolation. The British and Irish forms are known as Vendace, Pollan, Powan, Schelly, Gwyniad, and Houting; and *Coregonus sapidus* or *albus* is a much-esteemed American species.

**Corella**, a town of Spain, in Navarra, 49 miles SSW. of Pamplona, trades in wine, grain, oil, almonds, esparto, and brandy; pop. 7000.

**Corelli**, ARCHANGELO (1653–1713), surnamed 'il divino,' Italian composer and violinist, was born at Fusignano in the Bolognese. He visited Germany (probably Bavaria and Hanover) and Paris as a violinist, but about 1685 had settled in Rome, where he spent the rest of his life, warmly befriended by Cardinal Ottoboni. He was the first of the great violin virtuosos, and founded the technique of violin-playing. His compositions, including concertos, sonatas, and minor pieces for the violin, mark an epoch in chamber music, and had great influence on later composers, as Bach.

**Corelli**, MARIE (1864–1924), adopted daughter of Charles Mackay (q.v.), was trained in a French convent for a musical career. Though not favoured by the critics, she secured high popularity amongst novel-readers and the 'general public.'

**Corentyn**, a river of South America, forms the boundary between British and Dutch Guiana, and enters the Atlantic by a broad estuary. Its upper course is remarkable for the beauty of its scenery, especially of its great cataracts. It is navigable for 150 miles from the sea.

**Corfe Castle**, a village-borough of Dorsetshire, in the 'Isle' of Purbeck, 4 miles SE. of Wareham. Its famous castle, dating from early Norman times, is the traditional scene of the murder of King Edward the Martyr by his step-mother Elfrida (978); and more than twenty knights, 'most noble and valorous in arms,' were done to death within its walls by King John. In 1643 it was gallantly defended by Lady Banks for six weeks against 600 Roundheads. Taken through treachery two years later, it was dismantled; and its beautiful ruins, with their 'hanging towers,' cover nearly 3½ acres.

**Corfinium**, capital of the Peligni, was selected by the allies in the Social War to be capital of Italy. See **ROME**, vol. viii. p. 772.

**Corfu**, the most northerly and second in area of the Ionian Islands, at the entrance to the Adriatic, separated from the mainland of Greece and Albania by a channel from 2 to 12 miles broad, is 40 miles long from north-west to south-east by  $3\frac{1}{2}$  to 20 miles broad; area, 227 sq. m.; pop. of the nome, 138,400. The island is traversed by mountains, bare and rocky in their upper slopes, culminating in Pantokratoras, 3000 feet high, at the north-east end. The surface is largely covered with luxuriant groves of olive, cypress, and ilex. The winters are rainy, the summers hot and dry. The principal products are olives and wine, oranges, citrons, figs. Maize is the chief cereal, but yields only about a quarter of the consumption. Olive-oil is the principal export. Wine is also exported to Italy and Central Europe. There is little agriculture. Fishing, too, is left to the Albanians and Italians. The principal town, Corfu, having 38,600 inhabitants, is finely situated on the east coast, with some good streets and a fine esplanade, and has a good anchorage and is in direct steam communication with Alexandria, Athens, Italy, and England. Corfu is the seat of a Greek and of a Catholic archbishop, and has a palace. An Ionian Academy, founded by Lord Guildford in 1823, lost its importance after the foundation of Athens University. The town underwent great improvements during the British protectorate. The ancient name of the island is Kerkyra or Corecyra, but from its shape it was also called Drepane, or 'sickle.' It has been incorrectly identified with the Homeric *Scheria*. About 734 B.C. the Corinthians planted a colony here, which, by its commerce, growing rich and powerful, fought with the mother-city (665 B.C.) in a sea-battle. After many vicissitudes, Corfu fell under the Roman dominion (229 B.C.). For the more modern history, see **IONIAN ISLANDS**.

**Cori**, a small town of South Italy, 30 miles S.E. of Rome. It preserves the name and occupies the site of *Corā*, one of the oldest cities of Latium. The ancient remains still existing include those of the old walls, temples of Hercules and of the Dioscuri, and a fine bridge.

**Coriander** (*Coriandrum sativum*), an annual plant of the natural order Umbelliferae, with branching stem, 1 to 2 feet high, the lower leaves bipinnate, the upper leaves more compound, and globose fruit. It is a native of the south of Europe and of the East, and has long been cultivated for the sake of its fruit; and has thus become naturalised in some parts of England, although its fruit (coriander seed) is much less used in Britain than in Germany and some other European countries. The whole plant, when fresh, has a very offensive smell; but the ripe and perfectly dry fruit has an agreeable aromatic smell and a sweetish aromatic taste. It is used in medicine as a carminative, and as a corrective of certain purgatives; also in domestic economy as an aromatic, being very often mixed with bread in the north of Europe; spirituous liquors are flavoured with it; and confectioners cover it with sugar to make a well-known kind of comfit. In the south of England it is common to sow coriander and caraway together, the coriander yielding a crop in the first year, and the caraway in years following. Coriander delights in a rich soil, and is much cultivated and used in India.

**Corigliano**, a town in the Italian province of Cosenza, on the slopes of a castle-crowned hill, 4 miles from the Gulf of Taranto. Pop. 15,000, mostly employed in cultivating the vine and corn.

**Coringa**, a seaport in Godavari district, Madras, stands at the northern mouth of the Godavari River, 8 miles S. of Cocanada. It has declined much owing to the obstruction of its harbour by a bar, and to its having been twice overwhelmed by a tidal wave—in 1787 and 1832.

**Corinna** (surnamed *Muia*, 'the fly'), a Greek lyric poetess, a native of Tanagra, in Boeotia, who flourished about 500 B.C. She is said to have instructed Pindar, and to have vanquished him in a poetic contest. Only a few fragments of her work remain, collected by Bergk in his *Lyrici Poetae Graeci* (Leip. 1843).—Madame de Staël's *Corinne* was an Italian improvisatrice. For her, see **Vernon Lee's Studies of Italy in the 18th Century**.

**Corinth**, a city of Greece, celebrated in antiquity, situated on the rocky isthmus of Corinth ( $3\frac{1}{2}$  miles wide, and 262 feet high), which connects the Peloponnesus with the mainland. The city lay under the northern declivity of the mountain (1886 feet high, and forming one of the strongest natural fortifications in the world) on which stood its citadel (Acrocorinthus), and had three harbours, Lechaëum, to the west, on the Gulf of Corinth; Cenchreæ and Schœnus, to the east, on the Saronic Gulf. Its position, midway between the Ægean and Adriatic Seas, was exceptionally advantageous for trade. It was as easy to transport goods across the narrow isthmus—called by Pindar 'the bridge of the untiring sea'—as it was difficult to round the Peloponnesus. In its western harbour lay the ships of Italy, Sicily, and Spain; and to Cenchreæ came Egyptian papyrus, Libyan ivory, Syrian perfumes, Phœnician dates, Eubœan fruits, and Phrygian slaves. The exports of Corinthian manufacture were chiefly productions of art, such as statues, pictures, vases, pillars, and vessels of metal and earthenware. Syracuse, Molycria, Sollium in Acarnania, Ambracia, Anactorium, Leucas, Corecyra, Epidamnus, Apollonia, and Potidæa were among the colonies of Corinth. At its most flourishing period it is said to have had a population of 300,000, with more than half a million slaves employed in the fleet and in the colonies in the Mediterranean. It was at Corinth that the first triremes were built, and the first naval battle of the Greeks was fought between the fleets of Corinth and its colony Corecyra (see **CORFU**).

According to legend, the city of Corinth (anciently called *Ephyra*) was founded about 1350 B.C. by the Æolian Sisyphus, whose descendants ruled the country round till conquered by the Dorians under the Heraclid Aletes in 1074. Monarchy was abolished in 748, and an oligarchy of 200 families lasted till 657, when it was overthrown by Cypselus. He and his son Periander (629–585) greatly extended the city's industry and trade. In 582 the old Dorian constitution was restored. Corinth, which had formerly been the ally of Athens, after the Persian wars became jealous of the increasing power and commerce of the Athenians, and joined the league of the Dorian states. It waged an unsuccessful war on Athens in 458, and incited the Peloponnesians to begin (431) the Peloponnesian war (see **GREECE**). In 395, at the instigation of Persia, it entered into an alliance with Thebes, Athens, and Argos against Sparta, and the 'Corinthian War' began, which ended with the Peace of Antalcidas (387), dividing the supremacy of Greece between Persia and Sparta. Timophanes made himself master of Corinth in 366, but was overthrown and murdered by his patriotic brother Timoleon. The assemblies of the Greeks that appointed Philip and Alexander of Macedon the leaders against Persia, were held at Corinth in 338 and 336. Under the Macedonian supremacy it was occupied by a strong garrison. After the expulsion of the Macedonians it

joined the Achæan league (243), of which it formed part down to 146 B.C., when it was utterly destroyed by the Romans under Mummius. Exactly a century afterwards Corinth was rebuilt by Julius Cæsar, new-named *Colonia Julia Corinthus*, and peopled with veterans and the descendants of freedmen; and under Augustus and his successors it quickly became once more 'the citadel and star of Greece.' It reached almost its old importance as a trading and manufacturing town, and centred in itself the traffic that had formerly belonged to Athens and Delos. About sixty or seventy years before its completion by Hadrian, it was visited by St Paul, who, during a sojourn of a year and a half, planted a Christian church in Corinth, to which he addressed two of his epistles. The city was (from 27 A.D.) the seat of the pro-consul of the Roman province of Achaia, and the restoration of the Isthmian Games brought to it multitudes of Greeks from all parts of the Roman empire.

The Corinthians were devoted to the worship of the deities of love and of the sea. Aphrodite's temple was the oldest and the holiest in Greece. In her rites at Corinth, Phœnician influence is distinctly traceable. According to Strabo, in the most flourishing period of the city more than 1000 *hierodouloi* were kept there—'a source of much danger to strangers as of lustre and credit to the service of the goddess.' It was at Corinth, where unbridled licentiousness received such religious consecration, that the Apostle Paul wrote his description of heathen corruption in the Epistle to the Romans. Nowhere in the Hellenic world was licentiousness so prevalent. 'The vices of the Greeks were notorious in the Roman empire, the Corinthian vices even in Greece.' With all the artistic skill and culture of the Corinthians, and the lavish expense at which they adorned their wealthy city, they showed but little creative power. Yet Corinth produced the painters Ardicæ, Cleophantus, and Cleanthes; the statesmen Periander, Phidon, Philolaus, and Timoleon; Arion, the inventor of the dithyramb; and was the abode in later life of Diogenes. The ancient city has been excavated since 1896 by the American School at Athens.

Corinth was spoiled by Gothic hordes at the end of the 3d century, by Alaric in 396, and by the Slavs in the 8th century. In 1205 it was taken by the Franks, and from them it fell back into the hands of the eastern emperors, from whom in 1459 it was wrested by the Turks. It was held by the Venetians from 1699 to 1715, when it was retaken by the Turks, under whom it sank to a miserable village. After being delivered from Turkish domination in 1822, Corinth slowly increased from 1830 till the 21st February 1858, when it was utterly destroyed by an earthquake. The town has since been rebuilt in a more convenient position, 3 miles to the north-east. Its population is now 6000. A mile and a half east-north-east of New Corinth, on the Gulf of Lepanto (or Gulf of Corinth), is the western mouth of the canal through the isthmus. Two new towns have been laid out at its east and west mouths, the eastern named Isthmia, the western Posidonia. See CANAL.

**Corinth**, capital of Alcorn county, Mississippi, on two railways, 93 miles E. by S. of Memphis. Here General Rosecrans gained a decisive victory over the Confederates on the 3d and 4th October 1862. Pop. 5500.

**Corinthians**, FIRST AND SECOND EPISTLES TO THE, two letters written by the Apostle Paul to the church at Corinth in 57-58 A.D. (or, according to Harnack's Chronology, in 52-53 A.D.). The First Epistle deals in the main with the practical problems and difficulties which arose in connection with the

work and life of the Christian Church in the 1st century. Three motives led to its composition: (a) News had been brought to Paul that divisions existed in the Church; (b) Paul had written a previous letter to the Corinthians which had not been well received, and had occasioned some criticism; (c) Paul had received a letter from Corinth asking advice on certain points of difficulty which had arisen in the Church—e.g. the dress of women in public worship, the right of Christians to enter pagan temples and eat meat that had been offered to idols, &c.

1 Corinthians gives us the best picture we possess of the interior life of an apostolic church. From it we derive material of the greatest value with regard to the membership, the worship, the sacraments, the discipline, and the organisation of the early church.

Modern scholarship has exercised itself on the critical problems connected with the Second Epistle and its relation to the First, and reached the conclusion that the Second Epistle is probably not a unity, but a combination of two letters written by Paul at different times. These two letters are to be found in (a) 2 Cor. i.-ix.; (b) 2 Cor. x.-xiii. The last four chapters, it is maintained, constitute the intermediate epistle between 1 Corinthians and 2 Corinthians, referred to in 2 Cor. ii. 4, where it is described as a letter written 'out of affliction and anguish of heart with many tears,' and also in vii. 8-12, where it is said to have made the Corinthians 'sorry.' If the modern reconstruction is right, Paul wrote four letters to Corinth: (1) the lost letter referred to in 1 Cor. v. 1; (2) our present 1 Corinthians; (3) 2 Corinthians, x.-xiii.; (4) 2 Corinthians, i.-ix. There is more tension and emotion, and more impassioned denunciation in our 2 Corinthians than in any other writing of Paul. 'The order of ideas,' as Bishop Robertson says, is 'emotional rather than logical. A subject is not taken up, dealt with, and disposed of, but, like some strain in a piece of impassioned music, occurs, is lost in a maze of crowding harmonies, and recurs again and again.'

See Introductions to the New Testament by Julicher, Moffatt, and Peake; Commentaries by Robertson and Plummer (International Critical), T. C. Edwards (1 Cor.), Menzies (2 Cor.), Denney (Expositor's Bible); articles in *Hastings's Bible Dictionary* and *Encyclopædia Biblica*.

**Corinto**. See NICARAGUA.

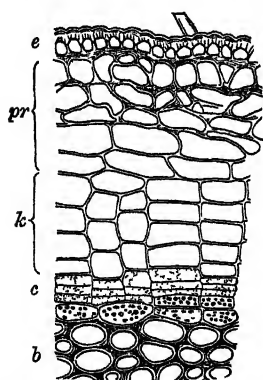
**Coriolanus**, CAIUS or CNÆUS MARCIUS, a Roman patrician, surnamed *Coriolanus* from his heroism at the capture of the Volscian town of Corioli (493 B.C.). Of a proud and haughty spirit, he was strongly opposed to the plebeians, who refused to elect him when a candidate for the consulship. After this, during a time of famine, he argued in the senate against a gratuitous distribution of the corn which had arrived from Sicily, unless the plebeians should give up their tribunes, but lately instituted. For this he was impeached, and banished. He took refuge among the Volscians, whom he aided in their war with the Romans. His victories at the head of his Volscian troops alarmed the Romans, who, on his approach to their city, sent a variety of deputations to plead with him. He was deaf to every entreaty. At last, the noblest matrons of Rome, headed by his old mother Veturia, and his wife Volumnia, leading her two children, came to his tent. (Shakespeare follows Plutarch in calling the mother Volumnia, while the wife is Virgilia.) Their tears cooled his fierce desire to be revenged on those who had dishonoured him, and he led back the Volsci to their own territories. Shakespeare's *Coriolanus* is a stately and impressive drama, its hero a magnificent creative realisation of the haughty but noble aristocrat of Plutarch's story.

**Cork** (Span. *corcho*, from Lat. *cortex*) is the extraordinarily developed corky layer (see below, and article BARK) of the bark of the Cork-tree or Cork-oak (*Quercus suber*) of the Mediterranean. Spain and Portugal chiefly supply the world with cork. The cork-tree is not of great size, generally 20 to 60 feet high, the trunk often 3 feet in diameter, much branched, with ovate-oblong evergreen leaves, entire or serrate. The acorns are edible, and resemble chestnuts in taste. The tree is usually twenty or twenty-five years old before it yields a gathering of cork, and attains an age of 150 years. The first produced (Virgin Cork) is of little value, but is removed in order that the next production may be better, for every successive formation is superior to that which preceded it, and it is not till the third gathering that cork of the highest quality is obtained. About every eight or ten years a crop is taken; but the improvement is being introduced of leaving the loosened cork-layer for some months as a protective jacket upon the tree. The cork-cambium is thus protected from the sun and the attacks of insects, and the new growth is thus both more rapid and of finer quality. In stripping off the cork, longitudinal and transverse incisions are made to the proper depth, and each piece is then cut away from the tree by a curved knife with two handles, like that of a cooper. The pieces are soaked in water, pressed flat, dried, and superficially charred, to remove decayed parts and conceal blemishes, before they are packed in bales for the market. Besides the use of cork for stopping bottles, casks, &c., it is much used, on account of its lightness, for floats of nets, life-belts, &c.; and on account of its impermeability to water, and its being a slow conductor of heat, inner soles of shoes are made of it. All these uses are mentioned by Pliny; but the general employment of corks for glass bottles appears to date only from the 15th century.

The *Spanish Black* used by painters is made by burning cork-parings in closed vessels. Cork-waste is also utilised for many objects, and most largely in the manufacture of linoleum.

The cork-tree is occasionally planted in England; it has been found to do well in some parts of the United States.

The wood of some trees possesses the cellular sponginess, lightness, and elasticity of cork in such a degree as to be sometimes substituted for it in many of its uses, as that of the *Anona palustris* (Corkwood



Formation of Cork in a branch of Black Currant, one year old (mag. 350 diameters):

*e*, epidermis; *b*, bast-cells; *pr*, cortical parenchyma; *k*, the cork-cells formed from *c*, cork-cambium. (Sachs.)

or Alligator Apple) in the West Indies, &c.

As already mentioned under Bark (q.v.), cork is by no means botanically the exceptional product it seems from the practical or popular point of view. The epidermis being usually only a single layer of definitely formed cells, it is insufficient either for covering or protection in almost all conditions of continuous growth and exposure to climate (the mistletoe being rather a less developed type than a true exception among woody plants, since its deeper ordinary epidermic cells never lose the power of multiplication). In sections of the young shoots of

dicotyledonous trees or shrubs this provision for replacing the epidermis can be beautifully traced; a layer of cells just outside the cellular envelope, the so-called cork-cambium, is seen to have already formed an appreciable thickness of cork-cells, easily recognised by their prismatic shape, tolerably regular vertical series, and thin walls. As the stem grows older the epidermis wears off and the cork-layer thickens, while the access of air to the living cellular envelope below is permitted by the occurrence of spaces empty or filled only with looser tissue, the *Lenticels* (see BARK), which, of course, become represented by the deep air-channels so obvious in the inferior quality of cork.

**CORK-CUTTING.**—The bark, after being cut into square pieces or sheets, is pressed to remove its natural curvature and flatten it. If it is found that simple pressure has not flattened it sufficiently, it is heated on the convex side, and the contraction thus produced straightens it. It is then cut into slips, and these slips into squares, according to the required size of the corks. These are rounded by the cork-cutter by means of a broad shap knife; the cork is rested against a block of wood, and the knife pushed forward, its edge at the same time being made to describe a circular curve. The knife requires continual sharpening; the workman has a board before him on which the knife is rubbed on each side *after every cut*. But cork-cutting is now largely done by machinery; in the United States the process has been carried to great perfection. Corking-machines are ingeniously contrived to force the cork into the neck of the bottle, and, if necessary, to wire it down. For *rock cork*, see ASBESTOS.

**Cork**, a maritime county in Munster, the south-most and largest of the Irish counties. Greatest length from east to west, 110 miles; greatest breadth, 70; average, 34. Area, 2900 sq. miles. Cork is hilly, with great variety of surface. The west part is rocky, mountainous, wild and boggy; the east and south, rich, fertile, and picturesque. The ranges run east and west, except the Boghra Mountains, between the Lee and Blackwater. The coast is bold and rocky, and from its indentations, 250 miles long; the bays, which run 3 to 25 miles inland, admitting large vessels. The chief bays are Bantry, Dunmanus, Baltimore, Glendore, Clonakilty, Kinsale, Cork Harbour, and Youghal. There are many isles off the coast, including Cape Clear Island, which lies in 51° 25' N. lat., and 9° 30' W. long., and, with the exception of a rock 4 miles to the SSW., is the southmost point in Ireland. In the west, Cork is divided from Kerry by a range of Silurian clay-slate running north-east and north, the chief points being 1200 to 2240 feet high. This range sends offshoots to the east, which divide the county into the parallel basins of the three chief rivers of Cork, the Blackwater, Lee, and Bandon: the lower parts of these basins are well cultivated and productive. The Lower Carboniferous limestone forms the largest lowland tracts and valleys of the county. Part of the Munster coalfield occupies 400 sq. m. in the north-west. Cork has many small lakes in the west. One of these lies at the source of the Lee, amid wild, picturesque scenery, with the ruins of a chapel on an islet frequented by pilgrims. The chief mineral productions are coal and iron, copper, barytes, limestone, fine dark-gray and also red marble rich in fossil shells, fullers' earth, brick-clay, marl. There is a thermal magnesian spring at Mallow. The climate is moist, but genial. The soils are calcareous, loamy, and moory. The dairies are extensive, and Cork butter stands in high estimation. The cattle are small in size, but yield large quantities of milk. Of the total area, about 25 per cent. is under crops. Among the manufactures

are leather, tweed, whisky, porter; and the chief exports provisions. Pop. (1841) 854,118; (1871) 517,076; (1911) 392,104 (including the county borough of Cork), of whom 90 per cent. are Catholics. Formerly Cork county sent two members to parliament, besides two for the city, and four for minor boroughs. In 1885-1922 the county returned seven members, the city two; and Bandon, Mallow, Kinsale, and Youghal were absorbed in the county. The county returns eleven members to the Free State parliament, the city four. The antiquities of Cork are stone circles and altars, two round towers, circular earthworks or raths—all relics of the days of paganism; ruins of abbeys and churches, chiefly built by descendants of the English invaders under Henry II.; and many ancient castles or square towers.

**Cork**, a city (with a Lord Mayor since 1900) and parliamentary borough of Ireland, capital of County Cork, and a county in itself, on the Lee, 11 miles above its mouth, and 166 SW. of Dublin by rail. Standing in the centre of a picturesque valley, it is built in part on an island, or group of islands, formerly a swamp, which the word *Cork*, *Corcoch*, or *Corcaig* implies; in part on the north and south slopes of the river-banks. The houses are generally of old red sandstone. Nine bridges cross the river to the central islands. There is a spacious public park of about 400 acres, the chief use of which is as a racecourse, and a walk known as the Mardyke, above a mile long, lined by noble elms, on the west of the city. There is also a beautiful public cemetery. Cork has a pleasant picturesqueness from its uneven ground, irregular streets, intersecting river, and overhanging heights. The chief buildings are St Anne Shandon's Church; the Protestant Cathedral (Early English), erected in 1865-75 at a cost of £100,000; the Catholic Cathedral, and several Catholic churches, monasteries, and nunneries; the bishop's palace; the city hall; the Carnegie Library; Queen's College; the Schools of Science and Art; and University College (a constituent college of the National University of Ireland), in buildings that would, as Macaulay said, be a credit to Oxford, while its engineering laboratories claim to be the best equipped in the country. By way of reprisal almost the entire centre of Cork, including the city hall and the Carnegie Library, was destroyed by fire on the night of December 11-12, 1920. The Lee in both branches is navigable to a mile above the city, and ships of 2000 tons reach the quays. Cork harbour, noted for its size and safety, is a basin of 10 sq. m., formed by the estuary of the Lee, and has been the main source of the rise and progress of the city. The estuary contains several large isles, rising abruptly and high above the water, with narrow channels between them. The entrance is by a channel two miles by one, defended by batteries, Carlisle Fort on the east side, and Camden Fort on the west, while Spike Island, now called Fort Westmoreland, commands the entrance. Spike Island, when disused as a convict establishment, became a military depot. Haulbowline Island was formerly an extensive store, naval dockyard, and military station of the British government. On the shores of the estuary are the towns of Passage and Queenstown (q.v.), a great Atlantic port of call, formerly called Cove of Cork. Cork harbour, outside the island on which Queenstown stands, is much frequented by wind-bound ships and ships waiting orders. The chief manufactures are leather, woollens, iron goods, gloves, gingham, friezes, flour, malt liquors and whisky, motors, and chemical manures. The chief exports are grain, provisions, butter, live-stock, leather, fish, and tweeds. Pop. (1871) 78,642; (1881) 80,124; (1901) 76,122 (parl. bor. 99,693); (1911) 76,673

(parl. bor. 102,435), five-sixths Roman Catholics. Cork returns four members to the Free State parliament.—Cork grew up around an abbey founded in 600 by St Finbar. The Danes in the 9th century built the city walls. Dermot MacCarthy, king of Cork or Desmond, surrendered it to Henry II. in 1172. Cromwell besieged and took it in 1649, and Marlborough in 1690. James II. landed at Cork in 1688. In Cork, William Penn became a Quaker. There is a statue of Father Mathew (q.v.), who laboured here many years. See Miss Cusack's *History of Cork* (1875). For the Earls of Cork, see BOYLE.

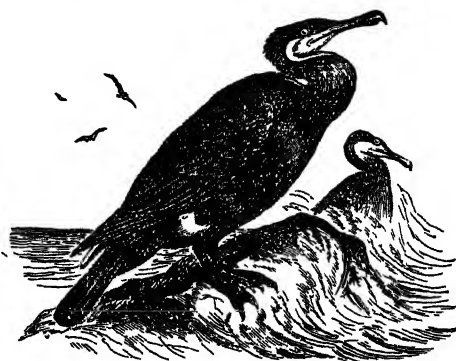
**Cork-oak, Cork-tree, Cork-wood.** See CORK and OAK.—The name Cork-tree is also given to various trees with light corky wood, as the East Indian *Millingtonia hortensis* (Bignoniaceæ) and the New Zealand *Entelia arborescens* (Tiliaceæ). The West Indian and American *Ochroma Lagopus* (Bombacaceæ), *Leitneria* (Leitneriaceæ), and *Anona* (Anonaceæ: see CORK) are called Cork-wood.

**Corkwing** (*Cremilabrus melops*), a species of Wrasse (q.v.).

**Corleone**, a town of Sicily, 21 miles S. of Palermo; pop. 16,000.

**Corm** (Gr. *kormos*, 'a stump')—sometimes called a *solid bulb*—the short and bulb-like subterranean stem of many monocotyledonous plants, e.g. crocus, gladiolus, tuberose, and arising through the annual storing of starch to be consumed by the next year's bud and flower. In functions, as in general appearance, the corm resembles the Bulb (q.v.); a vertical section, however, shows that while in each we have indeed a stem and leaves, the thickening is confined in the former case to the stem, in the latter to the leaves. Transitional forms occur, indeed, in most bulbs; the thickened leaves arise from a more or less thickened and shortened—i.e. corm-like—base. While a section of a corm shows the origin of its usually membranaceous leaves, and many corms produce new subterranean buds in the axils of their leaves, in either case they arise on the upper surface or sides of the parent corm, and there thicken as new corms. When borne on the upper surface, the new corms then gradually approach the surface of the ground as in crocus.

**Cormorant** (Gr. *Phalacrocorax*, 'bald-headed raven'), a genus of web-footed birds in the order Steganopodes, beside pelicans, solan-geese, and frigate-birds. They are familiar birds, frequenting islands in most parts of the world. They vary



Cormorant.

greatly in size, but have the following characters in common. The head is relatively small, and is naked behind the eyes and at the root of the beak. At the breeding season some forms exhibit a crest

and wattles. There is a dilatable membrane beneath the lower jaw, showing incipiently what becomes exaggerated in the pelicans. The bill is moderately long, straight, rounded above, and strongly hooked at the end; the nostrils are linear and inconspicuous. The neck is long, snake-like, and naked on the throat. The wings are of moderate length; the tail is rather short and rounded, but with stiff feathers, which are used as aids in progression. The unfeathered lower leg is very short; all the toes are united in a web; the middle claw is serrated and apparently used in trimming the plumage.

The numerous species live on the shores of islands, or sometimes inland by rivers—e.g. the Danube—and lakes. They feed exclusively on fishes, and are proverbial for their voracity. They do not dive when in flight, but from the surface of the water. The smaller of the two British species has been caught in a crab-pot at a depth of 120 feet. When the prey is inconveniently seized, it is often tossed in the air and more adroitly recaptured. Eels are said to form a favourite prey. Their haunts are often peculiarly dirty. The nests are usually built of seaweed, and are strong though rude; they are sometimes found on mangrove and other trees. The egg is bluish-green, but the colour is much obscured by thick incrustations of lime. When attacked, the larger species, at anyrate, fight vigorously and to purpose. The flesh is dark and fishy, but that of the young birds of some species is said to be eatable.

The Common British Cormorant (*P. carbo*) is an almost cosmopolitan bird about 3 feet long, for the most part of a blackish-green metallic colour, with brownish feathers on the shoulder region. When in full breeding plumage it has a crest on the head, white plumes on the throat, and a white patch on the lower flanks. The bill is black, the face yellow, the feet also black. It was formerly trained in England, as still in China, for fishing purposes. At first a ring is put round its neck to keep the bird from swallowing the fish it catches, but it soon learns to bring its prey to its master, being afterwards allowed to fish on its own account. The smaller species (*P. cristatus* or *graculus*) found on our coasts has a more decided green colour. The Dwarf Cormorant (*P. pygmaeus*), from South-eastern Europe, North Africa, Southern Asia, and the Florida Shag (*P. floridanus*) are other well-known species. Along with the genus *Urile*, the cormorants form a family (Phalacrocoracidae) including about three dozen species.

**Corn**, a general term for the seeds of cereal plants, thus including all the kinds of grain which form the food of men or horses. But it has also a specific sense, and denotes in any country that grain which furnishes the prevalent bread-stuff of the people. Thus, in England, corn generally means *wheat*; in the United States, *maize*; and in Scotland, *oats*. The word not only occurs in all the Teutonic tongues, but is seen also in Lat. *granum*, and Russian *zerno*. See CEREALS and special articles WHEAT, &c. See CORNS for a different word.

**Cornaceæ**, the cornel or dogwood order, are archichlamydeous dicotyledons, nearly allied to Umbellifere, containing about eighty species, mostly trees and shrubs, chiefly natives of the north temperate zone. The fruits of some are eatable; the bark and leaves of some are medicinal; some are valued as ornamental plants. See CORNEL, DOGWOOD, AUCUBA.

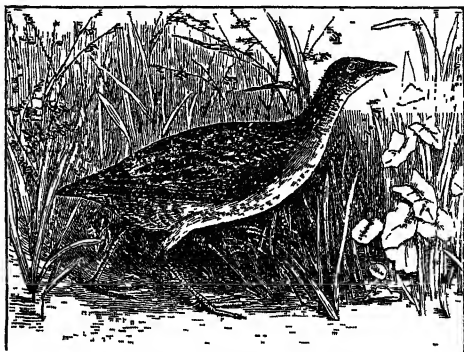
**Cornaro**, the name of a Venetian noble family, of which the most illustrious members were: (1) Caterina (1454–1510), married King James II. of Cyprus in 1472, after whose early death she was kept in mild imprisonment by the Venetians until

1489, when she set up a kind of court for poets and scholars at Assolo, near Bassano.—(2) Luigi, born 1467, an instructive example of temperance. Delicate by constitution, at forty he found his health so much impaired by his intemperance that an immediate change of life was absolutely necessary. He at once adopted strict rules of temperance both in meat and drink, by which means he prolonged a cheerful old age almost to a hundred years, dying in 1566. At eighty-three he published his famous *Discorsi della Vita Sobria* (Padua, 1558), which was translated into most European languages (Eng. 1779).

**Cornbrash**, a member of the Lower Oolites. See JURASSIC SYSTEM.

**Corn-cockle** (*Agrostemma Githago*), a tall beautiful caryophyllaceous weed, well known on account of its large purple flowers. It is often so common in cornfields as to be mischievous, especially on the Continent, and this not only because of its rankness and abundance, but also because of the deleterious nature of its seeds, which are injurious to man and poisonous to most domestic animals, and which sometimes require to be separated from the grain by a special kind of sieve.

**Corn-crake** (*Crex pratensis*), one of the true rails, in the old order of Grallatores, whose cry at least is very familiar in Britain. The bird itself is seldom seen; it is about a foot in length, and has colours varying from brownish-gray to red. The bill is shorter than the head, and slightly bent, the tail is very short, the legs are long and powerful. As a summer visitor to Britain, coming in May and leaving in autumn, the bird is well known by the harsh cry of the male, which is sometimes imitated for decoy purposes by running the thumb-nail along the teeth of a small comb. The cry is



Corn-crake (*Crex pratensis*).

mostly uttered in the evening and throughout the night, and is much less frequent after the young are hatched. Unlike the nearly related water-rails, the corn-crake frequents dry corn and hay fields. It can, however, swim well on occasion. Its running powers are very great, but it flies rather heavily. It is very prone to trust to concealing itself rather than to flight. The females are very faithful to the young birds, which are covered with black down when hatched. The species is widely distributed in Northern Europe and Central Asia, but its headquarters are in Africa. The flesh is very good eating. See RAIL.

**Corneæ**, one of the coats of the eye; so called from its resemblance to horn (Lat. *cornu*). See EYE.

**Corneille**, PIERRE, the greatest tragic dramatist of France, and the forerunner of Molière in genuine comedy, was born at Rouen on June 6,

1606. The son of a legal official, he was trained for the bar, and for some time tried with but slight success to obtain a practice in his birthplace. In 1629 he removed to Paris, where his comedy *Mélite*, which had already been performed at Rouen, proved so successful as to be run at the same time in two theatres, the Marais and the Hôtel de Bourgogne. It was followed by *Clitandre*, *La Veuve*, *La Galerie du Palais*, *La Suivante*, and *La Place Royale*. In these early pieces intricate and extravagant plots are handled with considerable ingenuity, but the writer's poetic genius only flashes out in occasional verses. For some time Corneille was numbered among Richelieu's 'five poets,' the others being Rotrou, Colletet, Bois-Robert, and L'Étoile. These writers were engaged to compose plays on lines laid down by the cardinal. Each of the five wrote an act, which was then criticised, altered, and paid for by their employer; among the pieces thus produced being *Les Tuileries*, *L'Aveugle de Smyrne*, and *La Grande Pastorale*. Corneille, however, was too independent to retain Richelieu's favour, and his dismissal followed at once on his proposing to alter a plot of the cardinal's devising. *Médée*, a tragedy which appeared in 1635, showed a marked advance on his earlier works, both in dramatic power and in style; and in 1636 the *Cid*, his most famous if not his best play, took Paris by storm. Richelieu ordered his literary retainers to write down the piece, and Scudéry called on the Academy to vindicate French letters in the eyes of Europe by passing formal censure on Corneille. The Academy, which had lately been founded by Richelieu, thereupon issued a hostile *examen* of the play; but adverse criticism was powerless against the general enthusiasm, and the phrase *beau comme le Cid* passed into the language. The result of the struggle between the minister and the dramatist is happily summed up in Boileau's famous couplet:

En vain contre le *Cid* un ministre se ligue,  
Tout Paris pour Chimène a les yeux de Rodrigue.

The story of the play was taken from *Las Mocedades del Cid*, a Spanish work by Guillem de Castro (q.v.), but Corneille's treatment of the subject was thoroughly original. With the appearance of the *Cid* the poetic drama took possession of a stage hitherto occupied by broad and shapeless farces, wooden imitations of Seneca, and the extravagant and off-hand pieces of Hardy. The graceful and heroic figures of the lovers, Rodrigue and Chimène, the nobility of the sentiments, the power and harmony of the verse, justify the enthusiasm which the play excited. It may not be its author's greatest effort, but there is a charm in the spirit of youthful ardour and tenderness which animates it such as is hardly to be felt again in Corneille's work, until we come to the exquisite lyric love-scene which he contributed in his old age to the opera of *Psyché*.

The *Cid* was followed in 1639 by *Horace*, a play which was founded on the story of the Horatii and Curiatii as told by Livy, and which contains, in the *tirade* spoken before her death by Camille, the most magnificent burst of invective in the French classical drama. *Cinna* appeared in 1639; *Polyeucte*, one of Corneille's noblest tragedies, in 1640; and *La Mort de Pompée* in 1641. *Le Menteur*, which was produced in 1642, entitles Corneille to be called the father of French comedy as well as of French tragedy. The play is a masterpiece. The character of Dorante, the liar, is drawn with admirable humour and insight, and the style, at once easy, graceful, and pointed, reaches a level of excellence which Molière did not surpass in his earlier works. *Théodore* was brought out in 1645, and *Rodogune*, perhaps the most impressive and

thrilling of Corneille's tragedies, in 1646. Between 1647—when he was made an academicien—and 1653 Corneille produced *Héraclius*, *Don Sanche d'Aragon* (an imitation of Lope de Vega's *Palacio Confuso*), *Andromède*, *Nicomède*, and *Pertharite*. These pieces, of which the last named was damned, show a decline in dramatic and poetic power. After the failure of *Pertharite* in 1653, Corneille ceased for a time to write plays, and occupied himself with making a verse translation of the *Imitatio Christi*. He returned to the stage in 1659 with *Œdipe*, which had considerable success, and which was followed by *La Toison d'Or*, *Sertorius*, *Sophonisbe*, *Othon*, *Agesilas*, *Attila*, and *Tite et Bérénice* (1670). In 1671 he joined Molière and Quinault in writing the opera of *Psyché*, and the loveliest verses which he ever penned are to be found in the scene between Psyche and Cupid (act iii. scene 3). His last works were *Pulchérie* (1672) and *Suréna* (1674).

His work did not bring him wealth, for he never received more than 200 louis for a piece. His private fortune was not large, and the pension which was granted him was not regularly paid. After his marriage in 1640 he lived habitually in Rouen until 1662, when he settled in Paris. His domestic life seems to have been a happy one. He and his brother Thomas married two sisters, and dwelt for a long time in contiguous houses. During his later years he had to compete with Racine, an inferior poet but a more dexterous playwright, and one who could cater more shrewdly for the public taste. The veteran dramatist spoke contemptuously of his rival's 'sighs and flames,' but his popularity waned before that of the younger writer, whose cause was espoused by Boileau and the king. Corneille died in Paris in the Rue d'Argenteuil on October 1, 1684.

Corneille and Racine are the chief dramatists of the classical school which held command of the French tragic stage from the middle of the 16th century down to the Romantic movement of 1830. The works of this school were modelled on the plays of Seneca—that is to say, on plays cast in the mould of Greek tragedy, but having even less action and more diffuse moralising. The writer who adopts this form of drama is bound down by a set of rigid rules which allow him to present only a few idealised personages in certain stereotyped situations. He cannot exhibit the development of character and the interaction of human passions. He is almost denied the use of incident, and the slow progress of his play to its climax is mainly brought about through the agency of messengers and confidants. Before Corneille the classic school had failed to produce a single good acting play; its adherents, nevertheless, succeeded in diverting him from the path on which he had entered when he produced the *Cid*, and in thereby cramping his rich and vigorous genius. 'Corneille,' says Mr Walter Pollock, 'was one of the first to make a move in the direction of the romantic drama, and wanted nothing but courage and self-sacrifice to carry out his intention.' (See his admirable articles on Victor Hugo and Romanticism in *French Poets*, 1879). Unfortunately, instead of disregarding the academic criticism of his day, Corneille turned from Spain to a 'Castilian Rome, remote from the world of romance, and set himself to compose plays of so severe and uneventful a type that he failed, save in one or two cases, to invest them with a strong sustained interest. In reading these plays we yield alternately to admiration and fatigue. The characters have a simplicity and grandeur which recall the work of the sculptor, but they have also something of its immobility. We can grasp them at once; they are not developed in the course of the drama. Corneille's heroes bear their fate with an inflexible

self-reliance which seems more than human, and therefore moves us the less. His heroines, his 'adorable furies,' resemble one another closely. 'Their love,' says Sainte-Beuve, 'springs from the head rather than the heart. We feel that Corneille knew little of women.' Where he excels his rivals is in the grandeur of his morality, in the eloquence and passion of certain scenes and speeches, in the splendid flashes of poetry with which he illumines the pale world of classic tragedy, in the power and music of his verse. Victor Hugo alone has made the Alexandrine move with the same swelling harmony and variety of cadence. The monotony which so often weighs on Corneille's readers was not due to any coldness or narrowness inherent in his genius. To be convinced of this it is enough to recall the brilliant comedy of the *Menteur*, the martial stir and glowing passion of the *Cid*, the lyric grace and chastened ardour of the central love-scene in *Psyché*. But his powers were in a measure misdirected. His place in literature must always be a very high one; but readers—other than French readers, at least—can hardly doubt that it would have been still higher had he been free to select and develop his characters at will, to exercise his humorous faculty and give full scope to his tragic powers in the fields of romantic drama.

See Guizot's *Corneille et son Temps* (1852; Eng. trans. 1857); Jules Taschereau's *Histoire de P. Corneille* (1828; new ed. 1870); Sainte-Beuve's *Portraits Littéraires et Port Royal*; Brunetière's *Époques du Théâtre Français* (1892); books on Corneille by Trollope (1881), Bouquet (1888), Lemaître (1888), Lodge (1891) Liéby (1892), Faguet (new ed. 1896), and Lanson (1898); editions by Lefèvre (1854) and Marty-Laveaux (1862-67); and Picot's *Bibliographie Cornélienne* (1875).

**Corneille**, THOMAS, younger brother of the great Corneille, was born at Rouen on August 20, 1625. He was a dramatist of considerable merit, was made a member of the Academy in 1685, and died at Andelys on December 17, 1709. His tragedies, *Cinna*, *Laodice*, *Pyrrhus*, *Bérénice*, *Timocrate*, *Ariane*, *Bradamante*, &c., are in general superior to his comedies. He wrote a verse-translation of Ovid's *Metamorphoses*. See a study by Reynier (1893).

**Cornel**, or CORNELIAN CHERRY (*Cornus mas*), the *Cornus* of the ancients, a small tree of the order Cornaceæ, is a native of the middle and south of Europe, and of great part of Asia. It is not found wild in Britain, although it is common in shrubberies, and was formerly much cultivated as a fruit-tree, as it still is in Germany and other parts of Europe. It has oval leaves, and small yellow heads of flowers, which appear before the leaves in spring, and which are much frequented by bees. The fruit is oblong, a little larger than a sloe, shining, red, or rarely yellow or white. It is late in ripening, and until quite ripe is very austere; but when perfectly mellow has an agreeable vinous acid taste; it is also made into a preserve, or gathered unripe and pickled like olives. It was formerly also fermented for a beverage. In Turkey it is much used in making sherbet. The wood of the cornel is extremely hard and tough, and was used by the ancient Greeks for lance-shafts; it is still valued by joiners, turners, and instrument-makers.—Dwarf Cornel (*C. suecica*), a native of mountain-pastures and bogs throughout the north of Europe and in Britain, is a herb about 6 inches high, with its umbels surrounded by four white bracts. The small sweetish red fruit is tonic, and is said to increase the appetite, whence the Gaelic name *Plant of Gluttony*. Dogwood (q.v.) belongs to the same genus.

**Cornelia**, the mother of the Gracchi.

**Cornelian**. See CARNELIAN.

**Cornelisz**, LUCAS, a Dutch subject and portrait-painter, was born at Leyden in 1495, the son

of Cornelis Engelbrechtsen, the master of Lucas van Leyden. Driven by lack of patronage at home to act as cook (hence his sobriquet *Kok*), he came to England and was court painter to Henry VIII., afterwards (1535-47) working in Ferrara.

**Cornelius**, PETER (1825-74), lyricist and composer, was a nephew of the painter (see below), and from 1864 professor of harmony at Munich. His *Barbier von Bagdad* is one of the great comic operas of the 19th century, ranking perhaps next after Wagner's *Meistersinger* and Goetz's *Tamung of the Shrew*. His *Literarische Werke* were edited in 1905-7.

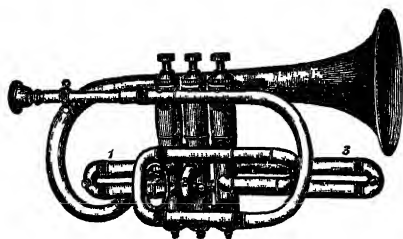
**Cornelius Nepos**. See NEPOS.

**Cornelius**, PETER VON, one of the first masters of the modern German school of painting, was born at Dusseldorf, 23d September 1783, and studied in the academy of his native town. When only nineteen years of age, he painted some remarkable frescoes for the old church of Neuss. A few years later he gave still more unmistakable proofs of a creative fancy in his illustrations of Goethe's *Faust* and the *Nibelungen Lied*. In 1811 he went to Rome, and joined the group of Veit, Schadow, and other Germans who were there at work, Overbeck being his chosen friend. This journey exercised a profound influence on the whole of his future career. The great importance of the early masters became ever clearer to him as he studied their choicest productions. While at Rome he aided in the decoration of the Casa Bartoldi, and gained wide reputation by two cartoons, 'Joseph's Interpretation of the Dream' and 'Joseph's Recognition of his Brethren.' From Rome he passed to Dusseldorf, where he became director of the academy, which he remodelled; in 1819 he was called to Munich, and entered the service of the then crown-prince of Bavaria. Here he remained till 1841, and executed those grand works on which his fame mainly rests, and which may be divided into two classes, Pagan and Christian, the former of which comprises the large frescoes in the saloon of the Glyptothek, all illustrating stories of the Greek gods and heroes; while the latter, or Christian series, begun after the completion of the former in 1830, consists of frescoes of New Testament scenes, extending from the 'Incarnation' to the 'Judgment,' and decorates the 'Ludwig's Church' in Munich, which was built for the purpose of affording scope for the genius of Cornelius. The 'Judgment' is the largest fresco in the world, larger even than Michael Angelo's 'Judgment' in the Sistine Chapel. In 1841 Cornelius was invited by the king of Prussia to Berlin, where he was appointed director of the Berlin Academy. Among his productions in the Prussian capital are the frescoes for the Campo Santo, or royal burial-place, where his 'Four Riders of the Apocalypse' display an impetuous and daring power which he had not hitherto evinced. Opinion is divided regarding the merits of Cornelius. By his own countrymen he is much admired; and certainly the importance of the impetus which he gave to mural decoration in Germany cannot be overestimated. French critics, on the other hand, regard him as more a thinker than an artist. He is admitted to have been a profoundly creative genius, but without mastery in manipulation or great power as a colourist. He formed, however, a school, from which have gone forth many illustrious pupils; but he lived to see it losing hold on public sympathy. A series of his cartoons is preserved in the National Gallery, Berlin, and his works have been reproduced by Amsler, Schoefer, Eberle, and the best German engravers. He died in Berlin, 6th March 1867. See his *Life* by Förster (2 vols. Berlin, 1874).

**Cornell University**, named from its founder, Ezra Cornell (1807-74), who desired to found a university where any person could find instruction in any subject, is pleasantly situated on the outskirts of the town of Ithaca, New York, and was opened in 1868 on a thoroughly unsectarian basis. Since 1872 it has been co-educational. One of the largest institutions of higher learning in the United States, it has numerous well-appointed buildings; the number of instructors is now about 950, and of students 7000 to 8000. By the terms of its charter the university must educate, free of all fees, one student annually from each of the 128 assembly districts of the state of New York, besides providing instruction in 'agriculture and the mechanic arts,' in return for the income derived from the sale of 990,000 acres of public lands, which was transferred to it by the state. The library is very extensive. The university comprises the Graduate School, College of Arts and Sciences, College of Law, Medical College (in Ithaca and New York), New York State Veterinary College, New York State College of Agriculture, College of Architecture, College of Engineering (civil, mechanical, and electrical). Besides ordinary subjects, instruction is given in mechanic arts, military science and tactics, and journalism.

**Cornet** (Ital. *cornetto*, Fr. *cornet à piston*), a brass treble wind-instrument, with a cup mouth-piece, is a comparatively modern modification of the Trumpet (q.v.). The tube, which is more tapered than in the trumpet, is less so than in the Bugle (q.v.), giving the cornet a tone intermediate between these, and more in harmony with other brass instruments of the trombone and saxhorn kind. It has the usual open notes, C (below the treble stave), G, C, E (stave), G, B $\flat$ , C (above the stave). It has also four higher notes, D, E, F, G, and a fundamental note, C (octave below the stave), but they are almost never used. To provide the connecting notes and half notes of the scale, it has three slides (1, 2, 3 in the fig.), the first, lengthening the tube to the extent of one tone; the second, a semitone; the third, three semitones. In playing, the air is diverted through these slides by means of three valves or pistons, which are depressed by the fingers of the performer, singly or in combination.

Although the cornet, from its recent invention, has not a place in classical music, it is sometimes used to play trumpet parts; and in modern orchestral music it is a useful and popular solo instrument.



Cornet.

In military reed and brass bands it is a solo and leading instrument respectively.

Originally the cornet or *cornopean*, as it was then called, was provided with 'crooks' (pieces of tube to insert between the instrument and the mouth-piece), to alter the pitch, which is naturally B $\flat$ , to A, A $\flat$ , G, and others, but it is now only used in B $\flat$  and A. Smaller cornets in E $\flat$  and D $\flat$  are sometimes used in military brass bands. The cornet-stop in the organ is named after an obsolete wind-instrument of the oboe species.

**Cornet** (Ital. *cornetta*, 'a small flag') was, until 1871, the lowest grade of commissioned officer in the cavalry, equivalent to *ensign* in the infantry, one of his duties being to bear the standard, which, however, is only carried by heavy cavalry regiments in the British army. With the lieutenant he assisted the captain in the daily duties connected with the troop to which he belonged. Before the abolition of purchase in 1871 a cornet's commission used to cost £450; but much larger sums were habitually paid in celebrated or fashionable corps. The pay was 8s. per day, with 1s. or 1s. 6d. extra for field allowance. In 1871 cornets were abolished, sub-lieutenants (probationary lieutenants, now called second lieutenants) being substituted.

**Corneto**, a picturesque, medieval-looking town of Central Italy, 12 miles N. of Civita Vecchia by rail, 3 miles from the Mediterranean. Pop. 7000. Corneto rose out of the ruins of the Etruscan city of *Tarquinnia*, whose remains, within a mile and a half of Corneto, are amongst the most important for the student of Etruscan history. The painted tombs, of which some twenty are specially interesting, were known in the 18th century; but it is mainly since 1842 that they have been examined; valuable new discoveries were made during excavations in 1881-82. See ETRURIA.

**Corn-flour** is the name applied to the finely ground flour of Maize (q.v.) or Indian corn.

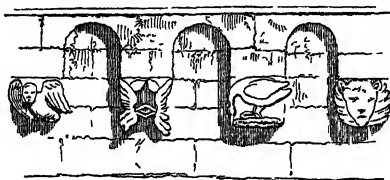
**Corn-flower** (see CENTAUREA) is a well-known composite weed of cornfields, universally known

Corn-flower, or Blue-bottle (*Centaurea cyanus*).

and admired for the beauty of its wreath-like circle of outer barren florets, and the splendid deep azure of their hue. It was formerly of some little medicinal repute, and its blue flowers were used in domestic dyeing; from early times, too, it has been used for decoration in wreaths and garlands. This use became specially prominent in Germany after 1870, on account of its being represented to be the Emperor William I.'s favourite flower.

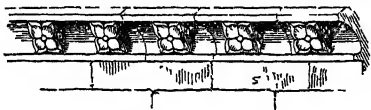
**Cornice**. In classical architecture the cornice is the uppermost member of the entablature, surmounting the frieze. Each of the orders has its peculiar cornice; but these, with their relation to the other portions of the entablature, will be better understood when explained in conjunction with that term (see ENTABLATURE). In the Gothic styles the form of the cornice varies greatly. In Provence and countries where Roman work abounded, the classic cornice was closely imitated (see ROMANESQUE ARCHITECTURE). In other

districts a row of corbels, carved in the grotesque Teutonic spirit, and bearing the parapet, forms the cornice. A series of small arches frequently rests on the corbels. This is the prominent style of cornice in all Rhenish and Lombardic structures.



Corbel Table.

In Early Gothic the small arches become ornamental—taking the form of trefoils with moulded edges, and the corbels become less uncouth. The decorated and perpendicular cornices are chiefly horizontal mouldings, with flowers or heads inserted



Cornice:

Eynsham Church, Oxon, circa 1450.

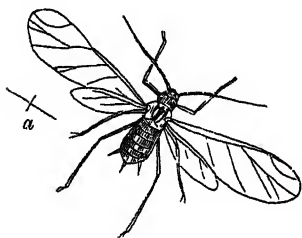
as enrichments. The term cornice is also applied to the plaster mouldings seen round the ceiling of rooms at its junction with the walls.

**Corniche.** See RIVIERA.

**Corniferous Formation**, name given in North America to a subdivision of the Devonian system. It embraces the Onondago (Corniferous) limestone, the Schoharie grit, and the Esopus grit. The name *corniferous* (Lat. *cornu*, 'horn,' *fero*, 'I bear') has reference to the common occurrence in the limestones of nodules of hornstone or chert.

**Corning**, capital of Steuben county, New York, on the Chemung River, 10 miles WNW. of Elmira, with glassworks, foundries, and other industries, and trade in tobacco and coal. It was named in honour of Erastus Corning (1794–1872), a capitalist interested in railways. Pop. 16,000.

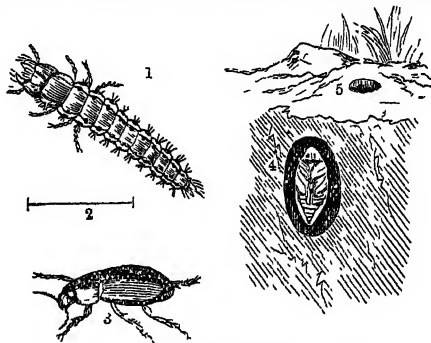
**Corn Insects.** While numerous insects are of great importance in carrying the fertilising



Corn Aphid:  
a, natural size.

pollen from one flower to another, and others are in themselves of direct use to man, there remains a vast crowd of more or less injurious forms. Of these some attack man and domestic mammals; others do damage quite as effectively by injuring fruit and forest trees, vegetables and crops. The following is a list of the more important species which attack our common cereals: (1) The Corn Ground Beetle, *Zabrus gibbus* (Coleoptera, Carabidæ), a dark bronze beetle, abundant in central Europe, less common in England. The adults devour the soft grain, most commonly of wheat, while the larvæ live on the leaves. (2) The Cockchafer (q.v.), *Melolontha vulgaris*. (3) The Midsummer Chafer, *Rhizotrogus solstitialis*, a beetle nearly related to the last, of

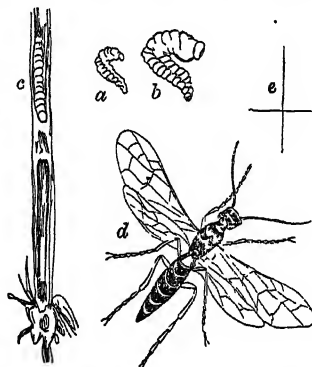
generally similar habit, the larvæ sometimes injuring the seed. Chafer grubs attack all cereals, as well as other plants. (4) Wireworms, the larvæ of Skipjack or Click beetles, *Agriotes lineatus* and other species, injuring all crops (see WIREWORM). (5) The Corn Saw-fly, *Cephus pygmaeus* (Hymenoptera, 'Wood Wasps'), a long, thin-bodied, small insect of brilliant black colour. The larvæ attack wheat, rye, and oats, feeding on the inside of the stalk, and eventually cutting it through near the ground. It rarely becomes a serious pest in Britain.



Corn Ground Beetle (*Zabrus gibbus*):

1, larva, magnified; 2, natural size of larva; 3, perfect insect, female, slightly magnified; 4, cell containing pupa; 5, a burrow.

(6) *Cecidomyia destructor*, the Hessian Fly (q.v.). (7) The Wheat Bulb-fly, *Hylemyia coarctata* (Diptera, Muscidæ), which is occasionally a source of serious loss to wheat-growers, the maggots feeding on the young shoots in spring. (8) The Gout-fly, *Chlorops taeniopus* (Diptera, Muscidæ), the maggots of which feed on the stems, causing a stunted growth and imperfect ears. Barley, wheat, rye, and many grasses are attacked, serious outbreaks being commonest on the first. Two broods are hatched each year, the mature flies appearing in May and September. The flies are yellow, with three black longitudinal stripes on the back, the abdomen greenish black, with black cross-bands. *Chlorops lineata* is a related species, also destructive. (9) Wheat-midge or Red Maggot, *Cecidomyia tritici* (Diptera, Cecidomyidæ), is an occasional source of serious damage to wheat, the eggs being laid inside the florets at the flowering period, and the maggots feeding on the developing grain. (10) Grain Aphid, *Aphis cerealis* (Homoptera, Aphidæ), sucks the sap from the stems and leaves of cereals, and sometimes does serious damage. (11) Cornthrips, *Thrips cerealium* (Thysanura, Thripidæ), a very minute insect which sucks the sap from the ears, generally of oats and wheat, and causes the grain to shrivel. (12) Leather-jacket or 'Grub', the larva of the Daddy-



Corn Saw-fly (*Cephus pygmaeus*):

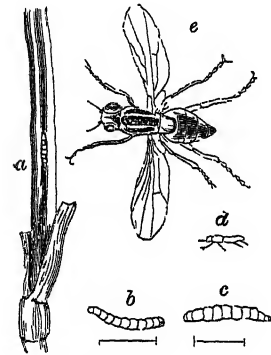
a, maggot, natural size; b, maggot, magnified; c, the maggot in its ear in the stem of the corn; d, female insect, magnified; e, female insect, natural size.

source of serious damage to wheat, the eggs being laid inside the florets at the flowering period, and the maggots feeding on the developing grain. (10) Grain Aphid, *Aphis cerealis* (Homoptera, Aphidæ), sucks the sap from the stems and leaves of cereals, and sometimes does serious damage. (11) Cornthrips, *Thrips cerealium* (Thysanura, Thripidæ), a very minute insect which sucks the sap from the ears, generally of oats and wheat, and causes the grain to shrivel. (12) Leather-jacket or 'Grub', the larva of the Daddy-

long-legs (q.v.) or Crane-fly, is a frequent source of damage, generally to grain sown on ploughed-up grass land. (13) Frit-fly, *Oscinus frit*, is a serious pest on oats, and occasionally attacks the other cereals. The maggots eat into the young stems in spring, and a second generation live on the developing grain, while a third live on wild grasses or winter corn during the winter.

Of a somewhat different habit from the above is *Tmea granella*, the Corn-moth (Lepidoptera,

Tineidae), in the same genus as the Clothes-moths. This form lays its very small eggs among stored grain or on the sheaves. The larvæ, or Corn-worms, appear among the grain on the granary floor, and when care is not taken to keep things clean and the grain well shovelled, often do much damage. From its voracity it is known as the wolf. It spins a web round several grains, and gradually devours them. Another of the granary pests is *Calandra granaria*,



Gout-fly (*Chlorops tenuipus*):

a, a portion of a culm or stem of wheat with a swollen joint, caused by larva of corn-fly; b, larva; c, pupa; d, fly, natural size; e, fly, magnified.

the Corn-weevil or brown Corn-worm (Coleoptera, Curculionidae), a small reddish-black insect, not quite two lines long, and without wings. It seems to have come to Europe from the East, but is now common in the southern regions. The female lays an egg in each of a number of grains, the larvæ soon develop, and a second brood is produced the same summer. The most successful method of arresting the mischief is fumigation with carbon bisulphide. The grain must be put in closed bins, or at least placed in tolerably airtight rooms. The liquid is placed in saucers on top of the corn, and the bins kept closed for at least twenty-four hours. 1 lb. carbon bisulphide is sufficient for 100 bushels.

For detailed accounts, see numerous leaflets published by the Board of Agriculture and Fisheries, London; also Miles, *Injurious and Useful Insects*; Petherbridge, *Fungoid and Insect Pests of the Farm* (1916); *Standard Encyclopædia of Modern Agriculture*; and Sorauer, *Handbuch der Pflanzenkrankheiten*, vol. iii. (1913).

**Cornish**, the ancient language of Cornwall (q.v.), for which see also CELTS.

**Cornish**, CHARLES JOHN (1858-1906), naturalist, born near Sidmouth, was a classical master in St Paul's School. Besides many articles in *The Spectator* and *Country Life*, he wrote *Life at the Zoo* (1895), *Nights with an Old Gunner* (1897), *The Naturalist on the Thames* (1902), *Animal Artisans* (1907, with memoir by his widow), and other books.

**Cornish Chough**. See CHOUGH.

**Cornish Moneywort** (*Sibthorpia Europæa*), a rare plant of the south of England, the only British representative of a small but widely distributed genus of Scrophulariaceæ. It is a small prostrate plant, found in damp shady places. It has crenately lobed reniform leaves and small, almost regular, yellowish flowers.

**Corn Laws**, the name popularly given to certain statutory enactments which had for their object a restriction of the trade in grain. The English corn laws date as far back as the year 1360, in the reign of Edward III. Before this

period, there seems to have been a general rule carried into effect by the crown against the exportation of any grain; and the Act of 1360 enacts the prohibition, but at the same time excepts certain places which the king may appoint by license. An Act of 1436 permitted exportation when the price of wheat did not exceed 6s. 8d. per quarter. Hitherto, there seem to have been no prohibitions against importation; but in 1463 an act was passed prohibiting it so long as the price at home was below the 6s. 8d. at which there was free exportation. The next change was in the reign of Henry VIII., when an Act of 1534 prohibited all exportation except by license specially granted under the great seal. This act was not found to work well; and twenty years later the previous arrangement was adopted of allowing exportation when the price stood below a certain point. In 1562 exportation was permitted when the price was under 10s. a quarter. Export duties of varying amounts were imposed from 1570 to 1689, when they were altogether abolished. The subsequent legislation for some time merely changed the price at which exportation might begin, generally enlarging it. After the Restoration, the policy of increasing the duties on importation, for the protection of agriculture and the landed interest at home, begins to be perceptible. At the same time the effect of that event on the relations of Scotland and England towards each other forms a curious illustration of such fiscal regulations. Under the Protectorate they were one country, with free intercommunion of trading privileges. Scotland was increasing in wealth under this arrangement; but the countries were separated by the restoration of Charles II., and became the same to each other as foreign nations. The English duties restricted the importation of grain from Scotland; and in 1663 the Scots parliament, in retaliation, laid heavy duties on the importation of English and all other foreign grain. Had not the union of 1707 made the two countries one again, England and Scotland would probably have continued a corn-law contest against each other, as was the case with the French provinces under the old regime.

The agricultural interest continuing powerfully to control this department of legislation, an act was passed in 1670 for virtually prohibiting importation into England until the home price had reached 53s. 4d., and laying a heavy duty on it above that point. This law had, however, little effect in favour of the landed interest, from the circumstance that then, and for long afterwards, Britain was an exporting, not an importing country—that is to say, it generally produced more corn than its population required. A new device was adopted at the Revolution of 1689, a bounty being awarded on exportation—i.e. a sum of 5s. was paid for every quarter of wheat sent abroad when the price fell below 48s., so that if the price in the foreign market would not induce people to export corn, the bounty, in addition to that price, might. For upwards of a century the numerous enactments in this department will be found to be a mere shifting, according to circumstances, of the incidence of the bounty on the one hand, and of the import duty on the other. In 1773 a permanent adjustment was supposed to be reached by Burke's act, which provided that the bounty should cease when the price reached 44s., prohibited exportation when the price was above that figure, and allowed importation at a nominal duty of 6d. at a price of 48s. In 1791, and during the wars of the French Revolution, further alterations in the corn laws favourable to the landed interest were effected. The bounties, however, were abolished in 1814. In 1815, after the conclusion of the wars, a law was

passed prohibiting importation of foreign corn when the price was below 80s. a quarter.

The principle of the sliding-scale which had been more or less followed in previous enactments was systematically carried out in the year subsequent to the great wars, in 1822, and particularly in 1828, when Wellington's sliding-scale was passed. The object of the device called the sliding-scale was to reduce the import duty as the price of grain increased, for the purpose of virtually prohibiting the importation when the price was low, and encouraging it when the price was high, so that at famine-prices grain might come in duty free. By the Act of 1828, the price of 62s. a quarter on wheat was taken as the turning-point. At that price the import duty was £1. 4s. 8d. For every shilling less in the price a shilling was added to the duty. When the price rose above this point a different gradation ruled, the duty decreasing by a larger ratio than the rise. Thus, when the price was 69s. the duty was 15s. 8d.; and when it rose to 73s. the duty sunk to its minimum of 1s. The effect of such fluctuation in rendering the trade a gambling one is obvious, and yet this was not acknowledged until it had been proved by a series of ruinous instances. Thus, an importer who, when the price of grain was 73s. a quarter, bought a cargo, if the price sunk 4s. before he could accomplish a sale, had not only to sell at that reduced price, but with a further reduction of 14s. 8d. a quarter paid as duty. What was still more important, the supplies to this country being so capricious and irregular, foreign countries did not grow corn habitually for the British market. In 1842 Sir Robert Peel tried a modification of the sliding-scale, which did not in the least degree mitigate the growing hostility to the corn laws.

The basis of this hostility to the corn laws was found in the population which had now grown up in the large towns. The effect of the industrial revolution connected with mechanical invention and the utilisation of steam had been to transform Great Britain from an agricultural into a manufacturing and commercial country. The new interests thus created were rapidly rising to supremacy. But the nation did not, till the very last, earnestly unite in calling for repeal. There was a powerful party who defended the corn laws, and represented, with great plausibility, that these restrictive statutes were for the public good. Their arguments might thus be summed up: (1) Protection was necessary, in order to keep certain poor lands in cultivation. (2) It was desirable to cultivate as much land as possible, in order to improve the country. (3) If improvement by that means were to cease, we should be dependent on foreigners for a large portion of the food of the people. (4) Such dependence would be fraught with immense danger; in the event of war, supplies might be stopped, or our ports might be blockaded, the result being famine, disease, and civil war. (5) The advantage gained by protection enabled the landed proprietors and their tenants to encourage manufactures and trade; so much so, that if the corn laws were abolished, half the country shopkeepers would be ruined; that would be followed by the stoppage of many of the mills and factories; large numbers of the working-classes would be thrown idle; disturbances would ensue; capital would be withdrawn; and what would happen then, the wisest could not foresee. Such arguments had great weight with the labouring-classes, the small-town shopkeepers, almost all the members of the learned professions, and an immense majority of both Houses of parliament. Those who endeavoured to represent the impolicy of a restricted trade in corn were generally set down as little better than mischief-makers. In the House

of Lords in 1839, Lord Melbourne, a Liberal premier, said, 'To leave the whole agricultural interest without protection, I declare before God that I think it the wildest and maddest scheme that has ever entered into the imagination of man to conceive.'

Meanwhile the ANTI-CORN-LAW LEAGUE concentrated the efforts of the free-trade party in Britain, and ultimately enabled them to carry the repeal of the corn laws, and to establish in practice the principle of free trade. In 1836 a number of philosophical radicals, among whom were Grote, Joseph Hume, and Roebuck, had formed an association for repealing the corn laws. In 1838 seven Manchester merchants formed an association of the same kind. The latter was soon joined by Cobden, who threw all his energy into the agitation, and secured for it also the eloquent advocacy of John Bright. Charles Villiers, who led their cause in the House of Commons, moved in February 1838 that the House resolve itself into a committee of inquiry on the corn laws. The motion was rejected by 342 to 195; and immediately the famous League was formed, with a central office at Manchester, its constitution dating from the 20th March 1839.

This was the beginning of a remarkable agitation, supported by lectures, verses, pamphlets, and popular oratory, which had a great influence on the economic and political education of the country. Large sums of money were raised, and a vast mass of popular literature bearing on the corn laws was diffused. In 1843 the League raised £50,000; in 1844, £100,000; in 1845, £250,000, for continuing the agitation. At a great meeting at Manchester in 1845, £60,000 were subscribed in an hour and a half.

The opposition to the corn laws steadily increased. Roused by the addresses of Mr Cobden, Mr Bright, and other leaders of the League, the people poured in petitions to parliament. The failure of the potato crop and the famine imminent in Ireland gave an overwhelming weight to the arguments of the League. At length the Conservative premier, Sir Robert Peel, became a convert to Free Trade (q.v.), and in 1846 carried a measure to put an end to the corn laws. By this act, the duty on corn was at once greatly reduced, and was to cease altogether in 1849, with the exception of a registration duty of 1s. a quarter, which terminated in 1869.

The repeal of the corn laws did not lead to a very great fall in the price of corn, nor did it result in the ruin of the agricultural interest. The vast expansion of industries, attended with a large increase of population and the growing demand for food, kept prices up to a tolerably high level. A markedly increased consumption of butcher-meat specially tended to enhance prices in that department and to raise the rent of land. With the development of American competition, about the year 1876, however, a new period set in. English agriculture *has* suffered severely, a fact which has largely contributed to the formation of a Fair-trade Party demanding among other things what they consider a moderate and reasonable protection for our landed and cultivating classes.

The pressure of American competition has also of late years led to the establishment of a corn-law system for the protection of agriculture in Germany. In France the duties on importation had been greatly reduced, but since 1881 things have followed the same course as in Germany. The greatly increased national expenditure caused by the Boer war led to the imposition in Britain of a revenue duty of 1s. per quarter on imported grain and flour, remitted again in 1903; and by that time Mr Chamberlain's scheme of preferential tariffs, including a tax of 2s. on non-colonial imported grain, was fairly, before

the country. See BRIGHT, COBDEN, FREE TRADE, PROTECTION, CHAMBERLAIN.

**Corno, MONTE.** See GRAN SASSO D'ITALIA.

**Corno Inglese.** See COR ANGLAIS.

**Cornouaille,** a district of Brittany, included within the modern department of Finistère. It is one of the most barren and desolate parts of France; the chief town is Quimper. The identity of the name with Cornwall is obvious. See BRITTANY.

**Corns** (Lat. *cornu*, 'horn,' through the French) are small hard growths, resulting from an increase in the thickness of the cuticle or epidermis, which is generally caused by the irritation of some excessive pressure or friction on the part. They occur most commonly on the feet as a result of tight or ill-fitting shoes. Corns are either hard or soft; the structure of both classes is essentially the same. A *hard corn* begins as an ill-defined thickening of the epidermis at one point. As irritation continues, the excessive growth of epidermis increases, and the papillæ (see SKIN) beneath also enlarge, giving the deeper part of the growth a fibrous appearance, popularly described as the 'roots' of the corn. Pressure upon the sensitive nerves of these papillæ causes the usual pain of corns. Old corns often have a bursa or sac developed beneath them, which in part protects the underlying structures. Excessive irritation sometimes causes this bursa, or in its absence the connective tissue beneath a corn, to inflame and suppurate; and the little abscess thus formed, confined by the hardened epidermis, gives rise to intense suffering. In so-called *fibrous corns*, more allied to warts, the enlargement of the papillæ predominates, and the pain is greater than in ordinary hard corns. *Soft corns* occur between the toes, where the warmth and moisture promote early separation of the epidermis, and growth of the papillæ; they are therefore more vascular than the other forms, and often extremely painful.

The treatment of corns consists in the removal of all undue pressure or friction, either by removing the shoe altogether, or protecting the corn by surrounding it with a border of some soft material, as Amadou (q.v.) or soft leather; or the hardened cuticle may be pared or filed away, the central part most deeply. Of late years a simple and convenient remedy has been introduced, now sold everywhere as a 'certain and painless cure for corns.' It consists of a solution of salicylic acid in collodion, one drachm to one ounce, with a small proportion of extract of Indian hemp. It is painted over the corn once or twice daily, and allowed to dry, with the effect of so softening the epidermis that, usually after six or eight applications, it can readily be peeled off with the aid of hot water. Soft corns should be freely dusted with oxide of zinc powder, and the affected toe isolated from its neighbours by means of medicated cotton-wool. If suppuration occur beneath a corn, the matter must be let out by a puncture, after the corn has been pared down. Those subject to corns should avoid patent leather boots, and wear large shoes, with thick, frequently changed socks, into which a talc and boracic powder may be daily dusted.

Corns affect horses as well as men. In the foot of the horse they occur in the heels in the angle formed between the bars and the wall, and consist in a bruise of the sensitive sole. Some forms of feet are especially subject to them. Corns constitute unsoundness; cause a short, careful, tripping gait; are a frequent cause of lameness amongst roadsters; are common in badly shod horses, and usually occur in the inside heels of the forefeet, these being more especially subjected to weight, and hence to pressure. The discoloured spot indicating the recent corn must be carefully examined.

If it is acutely painful and the animal very lame, a poultice will have the twofold effect of allaying irritation and relieving the sensitive parts by softening the hard unyielding horn. When less painful the discoloured horn should be carefully thinned with a fine sharp drawing-knife, but on no account must the bars or outer crust be removed; they are required for bearing weight, which may be further kept off the injured part by the use of a bar-shoe. A horse with a bad corn will often be enabled to go sound by cutting off about an inch and a half of the inner branch of the shoe at the heel, opposite the corn, and after the corn has disappeared, if carefully shod he may go all right with an ordinary shoe.

**Corn Salad,** or LAMB'S LETTUCE (*Valerianella*), a genus of Valerianaceæ, humble annual weeds, of which some are used as spring salads, especially in France and Germany. The commonest species is *V. oleracea*, which is naturalised in the United States, and often called Petticoat or Vetticost. There are several native American species.

**Cornstone,** an arenaceous or siliceous limestone, often mottled, and not infrequently concretionary. It usually occurs in those systems which are largely composed of reddish sandstones.

**Cornucopia** (Lat. *cornu*, 'a horn,' and *copia*, 'plenty'), in classical antiquities, the horn or symbol of plenty placed in the hands of emblematical figures of Plenty, Liberality, and the like, who are represented as pouring from it an abundance of fruits or corn. It is frequently used in architecture, sculpture, and heraldry.

**Cornwall,** a maritime county, forming the south-western extremity of England, and the southernmost part of the British Isles. It is peninsular, tapering westward from Devonshire to the Land's End, bounded on the E. by Devonshire, on the N. by the Bristol Channel, on the W. by the Atlantic, and on the S. by the English Channel. No part of the county is more than 20 miles from the sea. The total length from Welcombe to the Land's End is 81 miles, and the extreme breadth from Morwenstow to the Rame Head 45 miles. The Scilly Isles, 24 miles W. of the Land's End, form part of the county. The area is 1360 sq. m., of which 63·4 per cent. is under cultivation. There are very extensive stretches of moorland, much rocky and barren, but a large proportion useful as mountain pasture. The surface of the county is very irregular, and a ridge of rugged, bleak, rocky hills, interspersed with moors, stretches from the Tamar to the Land's End, a continuation of the Dartmoor upland, and forming the watershed. Brown Willy (1368 feet) is the loftiest point in the county. As this range is nearer the north of Cornwall than the south, the principal rivers are on the southern side, and empty themselves into the English Channel. With the exception of a few unimportant creeks, there are only two harbours on the north coast—the estuary of the Camel, on which is Padstow, and the bay of St Ives. For nearly the whole of its length this north coast is formed of bold and picturesque cliffs; but at Peranzabuloe and Gwithian there are hills of blown sea-sand, which have buried much good land. The southern coast is also for the most part bold and rocky, but indented with many headlands and bays. Between the Land's End (5° 41' 31" W.) and the Lizard Point (49° 57' 30" S.) is the deep indentation named Mount's Bay, from St Michael's Mount, with the harbour-works of Penzance. East of the Lizard is Falmouth Bay, into which opens Falmouth Harbour, one of the finest in Britain. On the eastern boundary of the county is another of the great havens of the kingdom, Plymouth Sound. The estuary of the Fowey also affords a small but per-

fectly sheltered deep-water harbour—of considerable importance in the middle ages. The chief river is the Tamar, which practically divides Cornwall from Devon, rising within 3 miles of the north coast at Wooley Barrows. It is tidal, and navigable for 19 miles (total length 59) from its embouchure in Plymouth Sound. Its principal Cornish tributary is the Notter, which enters it through the estuary of the Lynhir, and is navigable for 5 miles. The lower part of the estuary of the Tamar is called the Hamoaze. The Fowey is 30 miles long, and navigable for 6. The Fal is 20 miles long from its source to Falmouth Harbour, into which several smaller streams empty themselves through tidal creeks. The Camel (also called the Alan) is 29 miles long, 10 miles being tidal. There is a tradition that a large tract of land between the Land's End and the Scilly Isles was submerged by the sea. This is the fabled Lyonesse.

Cornwall is mainly composed of clay-slate, provincially called *killas*, which is broken along the higher ground by the protrusion of bosses of granite, in five larger and many smaller masses, probably connected beneath the surface. Associated with the granite are schorl and allied rocks, and there are many dikes of quartz- and felspar-porphry, locally termed *elvans*. The slates are interspersed with igneous rocks, interbedded and intrusive, and there has been much alteration. The Lizard district presents the most complex series in the kingdom. Serpentine and gabbro are the most distinctive rocks here; but there are schists and gneisses and porphyries in singular variety. The stratified rocks of the east of the county are recognised as Devonian; in the central region Silurian are largely represented; the western may be still older; and the Lizard are believed to be partly Archaean. Mining has been carried on in Cornwall from prehistoric times, and the county has been regarded as the Cassiterides (q.v.) of the Phœnicians and Greeks. The most profitable mines are near the junctions of the granite and *killas*, and the most important mining area at the present day is around Camborne and Redruth; the deepest and richest mine is Dolcoath, wrought to a depth of about half a mile. The county yields tin, copper, lead, iron, zinc, silver, cobalt, antimony, manganese, bismuth, tungsten, and arsenic in commercial quantities; and a greater variety of minerals (some unique) than any other part of the United Kingdom. Gold has been found in alluvial tin works or 'streams,' the largest nugget over two ounces. Of late years mining has been very much reduced, and almost all the mines now existing are tin, of which Cornwall yields nearly all that is raised in the kingdom. Radium has given a new importance to pitch-blende. Next to tin, the most important mineral product is china clay (*kaolin*), the decomposed felspar of granite which has undergone the natural process of kaolinisation. The chief centre of this industry is the district north of St Austell. Here also is found a peculiar kind of granite called china-stone (*petuntze*).

The fisheries of Cornwall are extensive and important, and in favourable seasons large quantities of pilchards are caught by seining, cured, and exported to the Mediterranean, where they form a common Lenten food. Herring and mackerel fisheries are also extensive, and enormous quantities are sent by rail to London and various inland markets. The climate is generally mild, but damp. In the extreme west of the county snow seldom lies, and the winter temperature is such that plants live and flourish in the open air that require protection almost anywhere else in England. At Trevarrick, near St Austell, and Lamoran and Penjerick, near Falmouth, many foreign trees and shrubs have been successfully acclima-

tised. Camellias grow and flower in the open air as luxuriantly as the common laurel in sheltered localities. The gardens at Tresco, Scilly, are quite tropical in character, from the variety and beauty of their tropical contents. This favourable climate has been turned to good account in the Scilly Isles and the Penzance district, by the development of market-gardening for the supply of early vegetables to the leading markets, particularly broccoli and potatoes, of which double crops are raised annually. With the exception of the peach, nectarine, and apricot, nearly all fruit-trees thrive and mature; and the banks of the Tamar are specially favourable to the growth of cherries and strawberries, for rail supply. As a general agricultural county (its moorlands excepted), Cornwall stands high: the soil is rich; crops are abundant, and in some localities very early.

There are very few manufactures; and most of the inhabitants, since the falling off in mining, are employed in agriculture. Pop. (1881) 329,484; (1921) 320,559. Cornwall returned 40 members to parliament prior to 1832, 14 till 1867, 12 till 1885, 7 (including the parliamentary borough of Falmouth and Penryn) till 1918, and now 5, for county divisions only. The bishopric of Cornwall, merged in that of Exeter since Saxon times, was restored in 1876, and the see fixed at Truro.

Cornwall remained in the hands of its Celtic inhabitants, and under the rule of the British Church, with more or less completeness, until it was finally subjugated by Athelstan in 936. The ancient Cornish language belonged to the Cymric or Brythonic group of the Celtic tongues (see CELTS), and was akin to Welsh and Breton. It was generally spoken until the reign of Elizabeth, and it was not until 1673 that it finally ceased to be used in public worship. It lingered in the extreme west of the county probably well into the 19th century; Bernard Victor (d. 1875) of Mousehole is by some regarded as the last who spoke it; while words and phrases have been handed down to the present day. The literature comprises a vocabulary dating probably from the 13th century, and some sacred dramas not earlier than the 14th. See Norris's *Ancient Cornish Drama* (1859); Whitley Stokes's editions of *The Life of St Meriasek* (1872), of *The Mystery of the Creation* (1864), and of the *Glossary of Cormac* (1864); the glossary of words still in use in Cornwall, published by the English Text Society in 1880; a paper by Laci-Szyima in the *Journal of the Royal Institution of Cornwall* for 1883; Jago's *English-Cornish Dictionary* (1887); and Jenner's *Handbook of the Cornish Language* (1904).

Cornwall abounds in rude stone and allied monuments—circles, remains of huts, menhirs, cromlechs, artificial caves or fogous, cairns and barrows, inscribed stones, and early crosses. The medieval antiquities are less important, the most noteworthy being the remains of the castles of the ancient earldom, created into a duchy in 1337 for the Black Prince. The eldest son of the reigning sovereign is Duke of Cornwall; and the revenues derived from the duchy by the Prince of Wales average £86,000 a year. In the management of the affairs of the duchy the Prince is assisted by a council, the chief officer of which is the warden of the Stannaries, by whose vice-warden the Court of the Stannaries, which has the local regulation of mining affairs, is held. See Tregellas's *Cornwall* (7th ed. 1891), works cited there, and the *Victoria History* 1906, *et seq.*

**Cornwall**, a port of entry of Ontario, at the mouth of the Cornwall Canal, and separated by the St Lawrence from New York state. It is on the Grand Trunk Railway, 67 miles SW. of Montreal, and has, among other factories, one of the principal woollen-mills in the Dominion. Pop. 7400.

**Cornwall**, BARRY. See PROCTER.

**Cornwallis**, CAROLINE FRANCES, was born on the 12th July 1786, the daughter of the rector of Wittersham and Eltham, in Kent. She acquired a thorough knowledge of Latin and Greek, and making herself conversant with nearly every study which occupies thoughtful men, from an early age she carried on a correspondence with many eminent persons. Her refusal to accept the hand of Sismondi did not forfeit his friendship, and she lived much in Italy. Her first work, *Philosophical Theories and Philosophical Experience, by a Pariah* (1842), was the first of a series of twenty 'Small Books on Great Subjects,' the said subjects including the Connection of Physiology and Intellectual Science, Ragged Schools, Criminal Law, Greek Philosophy, and the History and Influence of Christian Opinions. Miss Cornwallis also published in 1847, *Pericles, a Tale of Athens*. She died at Lidwells, in Kent, 8th January 1858. See her *Letters and Remains* (1864).

**Cornwallis**, CHARLES, MARQUIS, an English general and statesman, son of the first Earl Cornwallis, was born in London, December 31, 1738, and was educated at Eton and the Military Academy of Turin. He served as aide-de-camp to the Marquis of Granby during part of the Seven Years' War; in 1776 he was made a colonel, four years later Constable of the Tower, and the year after a major-general. In 1760 he had been returned to parliament for the family borough of Eye. Though personally opposed to the policy of forcing taxes upon the American colonists, he accepted a command in the war, and with an inferior force gained a victory over General Gates at Camden in August 1780, and more than held his own against General Greene at Guilford, March 1781. But his operations were hampered by the incapacity of his superiors, Howe, and after him, Clinton; and at length he was forced to surrender with all his troops at Yorktown, Virginia, 19th October 1781. This disaster proved the ruin of the British cause in America, and was the occasion of much dissatisfaction, resulting in a change of ministers at home. Cornwallis, however, who was high in favour with the king, escaped censure. In 1786 he was appointed governor-general of India and commander-in-chief, and in this double capacity distinguished himself by his victories over Tippoo Saib, and by unwearying efforts to promote the welfare of the natives, that proved less successful than they deserved. He returned from India in 1793, when he was raised to the rank of Marquis. As lord-lieutenant of Ireland, with Castlereagh as his secretary, he crushed the '98 rebellion, and showed a rare union of humanity and vigour in his measures for the pacification of the country. As plenipotentiary to France he negotiated the peace of Amiens in 1802, but showed little skill in diplomacy. Reappointed governor-general of India in 1804, he died at Ghazipur, in the province of Benares, October 5, 1805, on his way to assume the command of the army in the Upper Provinces. See his Correspondence, ed. by Charles Ross (1859); and the Life (in 'Rulers of India') by Karr (1890).

**Coro**, a town of north-western Venezuela, lies about 210 miles WNW. of Caracas, near the Golfete de Coro. It has a fine aqueduct, and a college; but it has greatly declined since the period 1527-78, when it was the capital of the Spanish province. Pop. 15,500. There are valuable coal-mines near. The port is La Vela, 7 miles NE. by rail.

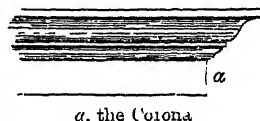
**Corolla**. See CALYX, FLOWER.

**Corollary**, a proposition the truth of which appears so clearly from the proof of another proposition as not to require separate demonstration.

**Coromandel Coast** is a name used vaguely for the major part of the eastern coast of what is now the province of Madras, on the west shore of the Bay of Bengal. It has hardly a single safe place of refuge for large vessels. The name is probably a corruption of *Cholamandalam*, 'country of the Cholas,' an old Dravidian people.

**Coro'na**, or CROWN, in Botany, an appendage of the corolla in some flowers; sometimes developed as a crown-like circlet within the petals, as in the common white narcissus, or prolonged like an internal united corolla, as in the daffodil. Much discussion has taken place as to its morphological nature, at first as to whether it was to be regarded as composed of modified stamens or supernumerary petals. But in many Caryophyllæ (e.g. *Lychnis*) each petal is seen to bear a *ligule*, so called from its resemblance to that of a grass-leaf (see GRASSES). These are regarded as of stipular origin; and in this way we come to look at the corona of a narcissus as composed neither of modified petals nor stamens, but of the united petaline stipules. See LEAF.

**Corona** (Lat., 'a crown'), in Architecture, the drip, or lower member of the projecting or upper part of a classical cornice (see ENTABLATURE). The term CORONA is also applied to the apse or semicircular termination of the choir. Corona is also applied in ecclesiastical nomenclature to a chandelier, in the form of a crown or circlet, suspended from the roof of a church.



a, the 'corona

**Corona**. See SUN, HALOS.

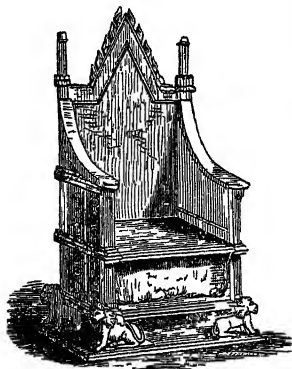
**Corona Borëalis**, a small and bright constellation near Hercules.

**Coronach**, a name formerly used for the funeral dirge amongst the Irish and the Scottish highlanders. The dirge, disused in Scotland, is in Ireland now commonly known as the *keen*.

**Coronation**. The practice of placing a crown on the head of a monarch at the commencement of his reign is very ancient, and there is probably scarcely any country in which it has not been followed in one form or another. Generally it has been accompanied by what was regarded as the still more solemn rite of anointing with oil, a ceremony which, from the times of the ancient Hebrews to our own, has been peculiarly significant of consecration or devotion to the service of God. In England, before the Norman Conquest, the term was more usually 'hallowing' or consecration than coronation; but it would seem that the ceremony as then performed at Kingston-on-Thames or Winchester was in all essentials the same as that which now takes place in Westminster Abbey, though now the ceremony is a mere pageant. Detailed accounts of many English coronations, from Richard I. downwards, have been preserved.

There have been considerable variations from time to time in the oath. Originally the king pledged himself to three things—peace and reverence to God and the church, justice to the people, the upholding of good and abolition of bad laws. In Edward II.'s time it became more precise, and assumed the form of question and answer. By the form settled after the Revolution of 1688—and amended in 1911 to spare offence to the feelings of Roman Catholics—the sovereign, in response to the Archbishop of Canterbury, swears to govern according to the statutes in parliament agreed on; to cause law and justice, in mercy, to be executed; and to preserve and maintain the Protestant religion established by law. This oath was held

both by George III. and George IV. to prevent them from granting Catholic Emancipation, and was also by many regarded as an obstacle to the disestablishment of the Irish Church (see Bishop Phillpotts, *The Coronation Oath*, 1828). The treaty of Union between England and Scotland provides that the oath of the preservation of the



Coronation Chair of the Kings of England.

government, worship, and discipline of the Church of Scotland should be taken not at coronation but at the accession of the sovereign. For the ceremonies connected with coronation, see CHAMPION, and books by Planché (1838), Jones (1883), and Woolley (1916).

The Scottish coronation stone, the *Lia Fail*, or 'Stone of Destiny,' was reputed to have been the stone which Jacob used for a pillow, and to have been brought

to Ireland, and from Tara to Scotland, where it lay at Scone, till in 1296 Edward I. carried it to Westminster. It now forms part of the coronation chair. Skene, in his monograph (1869), asserts it to have been quarried from the rocks near Scone. Irish antiquaries (e.g. Petrie) have insisted that it was at Tara four centuries after the alleged removal to Scotland, and is probably there still-buried, according to Dr Joyce.

**Coronea**, a town of Boeotia, SW. of Lake Copais, where in 447 B.C. the Boeotians defeated the Athenians, and in 394 Agesilaus the allied Greeks.

**Coronel**, a port of Chile, 12 miles S. of Concepción. Here are important mines of coal, which is exported. The place gives its name to a naval battle (1st Nov. 1914) of the Great War (q.v.). Pop 5000.

**Coronella**, a genus of non venomous snakes in the family (Colubridæ) to which the English Ringed Snake (q.v.), *Tropidonotus natrix*, also belongs. The genus is well represented in dry regions in Europe and North Africa. *C. levis* or *austriaca* is a very common European species between two and three feet in length.

**Coroner** (Lat. *coronator*, *corona*, 'a crown'), a very ancient officer, in England, at the common law. The coronator is mentioned in a charter of King Athelstan, 905 A.D.; and the office is said to be of Saxon origin. But Bishop Stubbs (*Constitutional History*, vol. i. chap. 17) finds the origin of the office of the modern coroner in an ordinance of 1194 A.D. for the election in every shire of officers to keep the pleas of the crown, whence the name. In this light, the Lord Chief-justice of the King's Bench is the principal coroner in the kingdom, and may exercise jurisdiction in that capacity in any part of England. There are, however, particular coroners in every county in England, and in some counties three or four, or even more. Every borough having a separate court of Quarter Sessions has a coroner; but since 1888 boroughs have ceased to have a separate coroner unless the population amounts to 10,000. Coroners were formerly paid by fees on each inquest, but now by salary out of the county rate. The coroner is chosen for life, and the election, which formerly lay with the freeholders, rests, under the Local Government Act

of 1888, with the county-council, or with the town-council of a borough having the right to appoint one. A coroner may, however, be dismissed by the Lord Chancellor for inability or misbehaviour in his office. By the statute of Westminster the first (3 Edw. I. chap. 10), it was enacted that none should be chosen but lawful and discreet knights; and in the time of Edward III. there is an instance of a man being removed from the office because he was merely a merchant. Subsequently it was thought sufficient if a man had lands enough to entitle him to be made a knight; and Blackstone complains that in his time it had come to be sought for the perquisites, and not for the honour of serving the country. This motive has now ceased. The coroner is now usually a professional man, frequently a solicitor or a doctor of medicine.

The office of coroner is to some extent the only one in England charged with the investigation of crime. When the coroner cannot act, there is no authority to examine witnesses until a suspected person has been actually charged or accused before a magistrate. But even the coroner's duties are very limited. They are defined by 50 and 51 Vict. chap. 71, which consolidates most of the previous statutes. The coroner can inquire only into the causes of violent or sudden death, and into these only when the body has been found. When such a death happens, it is the duty of the constable to give notice of it to the coroner, who then summons a jury from the body of the county for the purpose of making an inquisition into the matter. The coroner presides over the inquisition, and the court thus constituted is a court of record. The jury consists of twelve men at least, who are sworn and charged by the coroner; and the verdict must be found by twelve. The inquest is to be held before the coroner in whose district the body shall be 'lying dead.' If any be found guilty by such inquisition of murder or other homicide, the coroner is to commit them to prison or take bail for their appearance at the assizes, according to the gravity of the offence, and he must certify the inquisition under his own seal and the seals of the jurors, together with the evidence thereon, to the court in which the trial is to take place. The accused may thereupon be put on his trial without other indictment. The coroner is empowered to summon medical witnesses, who are liable to a penalty for non-attendance. He has power to pay a medical witness one guinea for a simple examination, and two guineas if a *post-mortem* examination of the body has been made. Coroners are required to appoint deputies in case of absence from illness or other reasonable cause. Another branch of the coroner's office was to inquire concerning shipwrecks and treasure-trove; but the former has been superseded by the provisions of the Merchant Shipping Acts 1854-1894. He is a conservator of the king's peace, in which capacity he is mentioned in the oldest treatises on the common law. As such, he may cause suspected felons to be apprehended, whether an inquisition has found them guilty or not. The coroner has likewise ministerial functions as the sheriff's substitute, in making out the panel of jurors, and in executing process in suits in which the sheriff is related either to the plaintiff or defendant. Beside county and borough coroners there are certain 'franchise' coroners, such as the coroner of the king's household.

Coroners or crowners, as they were also called in England, are mentioned in many old Scottish statutes; and there is no doubt that the office, as well as that of alderman and mayor, existed in those parts of the country that were peopled by persons of Teutonic race. But it was abolished or fell into desuetude, probably in consequence of

the succession war and the French connection; and in Scotland the duties are now chiefly performed by an officer appointed by the crown, styled the Procurator-fiscal (q.v.). In Ireland the office of coroner is regulated by 9 and 10 Vict. chap. 37. See Jervis, *Office and Duties of Coroner* (new ed. by Melsheimer, 1898).

In the United States the coroner is generally elected for a specified term by the voters of each county. He is authorised to employ deputies, assistants or clerks, as well as a legal adviser, and a physician to examine the cases which come before him. His powers and duties relating to the inquiry into cases of sudden or violent death are substantially the same as those of an English coroner. But he is confined to this function. Nor does the inquisition found before the coroner dispense with the necessity of an indictment found by the grand jury, as in England. In cases where the sheriff is absent or disabled, the coroner may sometimes act as an executive officer in his stead. He must in each term make a report under his official seal to the Court of Common Pleas of the state.

**Coronet**, an inferior sort of crown worn by persons of princely or noble rank, as a crown properly so called is worn by a sovereign. In England, coronets were worn by peers as far back as the reign of Edward III.; but the definite form given to the coronets of the different orders of the peerage is of later date, as is also the practice of placing within the coronet a cap of crimson velvet lined with ermine and surmounted by a gold tassel. The use of coronets by barons began in the reign of Charles II. Peers wear their coronets on the occasion of the coronation of a sovereign; and they are placed over representations of their arms, this being done even in the case of peers by courtesy. In 1665 Charles II. granted warrants to the Scottish and Irish kings of arms for the peers of those kingdoms to wear coronets similar to those of peers of England.

The following are the distinctive forms of the coronets in use in the United Kingdom: The coronet of the Prince of Wales differs from the royal crown only by the absence of one of the

points of more considerable height, with a pearl set on each, alternating with as many strawberry-leaves on the rim below. A viscount's coronet has sixteen, and a baron's six pearls set directly on the rim. The so-called pearls are always made of silver. No coronet belonging to a peer not of the royal family should be adorned with jewels.

The term *ducal coronet* is sometimes applied in heraldry to a decorative coronet like that of a duke, but with only three leaves, and without the cap, out of which (in place of out of a wreath) the crest issues.

The coronets of continental nobility are without caps, and otherwise differ somewhat from those in use in Great Britain. They are only used in blazonry, and are not worn on state occasions. The coronet of a French duke is like that in use in England, that of a marquis has three strawberry or parsley leaves alternating with three pearls, while a count's coronet has nine pearls. German dukes arch their coronets, and German counts often elevate their pearls. The coronet of the Dauphin of France was heightened with fleurs-de-lis, and arched with four or sometimes eight dolphins.

**Corot**, JEAN BAPTISTE CAMILLE, landscape-painter, was born at Paris, 28th July 1796, the son of a hairdresser who became a draper. Educated in the Lycée at Rouen, he became an assistant in a drapery establishment in Paris, and it was not till his twenty-sixth year that he was able to yield to his natural inclinations and begin the systematic study of art. He was instructed by Michallon and Victor Bertin, and in 1825 he settled in Rome, his small view of the Coliseum in the Louvre bearing that date. Here he studied under Aligny, '*L'Ingres des arbres*,' and in 1827 he returned to Paris, and contributed his '*Vue prise à Narni*,' and his '*Campagne de Rome*' to the Salon, where he constantly exhibited till the year of his death. His main sketching ground was at Barbizon, in the forest of Fontainebleau; but he made two other visits to Italy in 1835 and 1843. His earlier productions are careful and precise in execution, and it was not until about 1840 that he asserted his full individuality, and developed that style, characterised by great breadth and delicacy, and sacrificing accuracy of detail to unity of impression and harmony of general effect, which marks the works of his maturity. He was not an artist of great variety or of very extended range in subject and effect. He was the painter of misty lakes and vaporous rivers, of the quiet of moonlight, of the tender moments of pure sunrise, or of softly coloured evening; and these he has treated in the spirit of a true poet, introducing very appropriately his figures of peasants, or more frequently of nymphs and classical personages, who take their place most fittingly in scenes like his which tend towards the ideal and the idyllic. His works made their way slowly with the public, but wealth and fame came to him in the end. At the Salon he won medals in 1833, 1848, 1855, and 1867. In 1846 he received the Cross of the Legion of Honour, and in 1867 he became an officer of the order. He exercised a most powerful and clearly marked influence upon the younger French artists, with whom his genius, his frank kindliness, and his openhanded generosity rendered him the most popular of men and painters. In 1874, when the medal of honour of the Salon, which they expected to be bestowed on him, was awarded to Gérôme, they subscribed for a medal of their own, which they presented to '*le père Corot*,' as they were fond of calling him, only three months before his death, which occurred at Paris, 22d February 1875. Among his masterpieces may be named '*Danse de Nymphes*,' '*Macbeth*,' '*Homère et les Bergers*,' '*Orphée*,' '*Souvenir de Montefontaine*,' '*Joueur de Flûte*,' '*Un Matin à Ville*



PRINCE OF WALES



PRINCE OF BLOOD ROYAL



DUKE



MARQUIS



EARL



VISCOUNT



BARON

Coronets.

arches. The coronets of other princes, sons of the sovereign, are without arches. Princes, sons of the above, have a similar coronet, with strawberry-leaves substituted for fleurs-de-lis. The coronet of a duke has above the rim of gold eight strawberry-leaves, of which five are shown in pictorial representation. That of a marquis has four strawberry-leaves, alternating with as many large pearls upon short points. The coronet of an earl has eight

d'Avray, 'Dante et Virgile.' He is well represented in public and private collections in Britain and the United States. See Lives by Dumesnil (1875), Robaut (1880), Rousseau (1884), and Roger-Miles (1891); the monograph by D. C. Thomson (1892, republished from his *Barbizon School*, 1891); and books by Meier-Gräfe (1913), Moreau-Nélaton (1913), and Thomson (1914).

**Corozo.** See IVORY (VEGETABLE), BUTTONS.

**Corporal**, in the British army, is the grade of non-commissioned officer next below that of sergeant. On parade he falls in as a private soldier, but in barracks or camp he exercises certain disciplinary control over the privates, commands small guards, and does orderly duty. The distinctive badge is two Chevrons (q.v.). There are nine corporals to each squadron of cavalry, and five to each Company (q.v.) of infantry. A lance-corporal is an acting corporal, and wears one chevron only. In the artillery there is a special grade of non-commissioned officer below that of corporal, called a bombardier, with pay equal to the lowest rate of corporals in the infantry. The badge is one chevron, and there are acting bombardiers, but no lance-corporals. In the engineers there are corporals, second corporals, and lance-corporals. In the Household cavalry the title of *corporal of horse* is given to the non-commissioned officers corresponding to the squadron sergeant-majors of other cavalry regiments (see COLOUR-SERGEANT). A ship's corporal in the navy is a petty-officer under the master-at-arms, to guard against the smuggling of spirits on board, extinguish the fires and lights, and keep order below at night.

**Corporal**, in Roman Catholic ritual, is the linen cloth on which is placed the consecrated host, or the vessel containing it. The *pall* is a square piece of linen placed on the top of the chalice; while the *chalice-veil*, covering the chalice, is of the same materials and colour as the priest's vestments.

**Corporale.** See CHALICE.

**Corporal Punishment.** See FLOGGING.

**Corpora Quadrigemina.** See BRAIN.

**Corporation.** This, in England, is either aggregate or sole. A corporation aggregate is a society of persons authorised by law to act as one person, and to perpetuate its existence by the admission of new members. Without such legal authority a society, in the eye of the law, consists merely of individuals with rights and duties towards each other based on contract. A corporation sole consists of one person, the holder of a public office, and his successors, such as the sovereign, a bishop, the vicar of a parish, and most perpetual curates. Certain officers of state—e.g. the Treasury Solicitor—are corporations sole; and by recent statutes this status has been conferred on the Postmaster-general (Post-office Act, 1903) and on the Public Trustee (Public Trustee Act, 1906). The effect is that a continuous legal personality is attributed to the successive holders of the office, so that all the rights, proprietary and other, appertaining to the office are preserved entire, and the temporary holder of the office can, in his official capacity, sue or be sued on behalf of himself and his successors in the office. The conception of a corporation sole is peculiar to English law, and in ordinary usage the term corporation means a corporation aggregate.

A corporation could formerly be established only by charter from the crown or act of parliament, unless, indeed, it existed by immemorial prescription; but of late years the exigencies of commerce have led to the passing of various enactments, by compliance with which any society of persons may acquire for themselves the character of a corporation (see COMPANY). Many important municipal

charters were granted by ecclesiastical authority—e.g. till 1835 Newcastle had only a charter from the bishop of Durham. Boroughs, too, had frequently delegated from the crown, or some subject superior with royal rights, the power of incorporating trades or crafts within their own territory (see GUILDS). The procedure by which a borough may obtain from the crown a charter of incorporation is now regulated by the Municipal Corporations Act, 1882. A corporation always receives a corporate name, by which it sues and is sued, and it must possess a common seal, which is the proper evidence of its agreements and obligations. The majority of the members are entitled to act within the powers of the corporation, and may, by a bylaw, even delegate—except in the case of municipal corporations—the power of acting to a certain number of the members. For these acts none of its members are personally liable.

Corporations, whether aggregate or sole, are divided into ecclesiastical and lay, and the lay are subdivided into civil and eleemosynary. The ecclesiastical are such as are composed wholly of clergymen in their ecclesiastical capacity, and are chiefly for the purpose of holding ecclesiastical property. Civil corporations include municipal corporations, the universities, the colleges of physicians and surgeons, learned societies, and many trading companies incorporated. Eleemosynary corporations are for the administration of funds for charitable and pious purposes, such as hospitals, the colleges in universities, which, unlike the universities, the English law holds to be subject to visitation, &c. An important consequence of these distinctions is the effect it has on the right of *visiting* a corporation, or exercising a legal superintendence over its proceedings. The crown is the visitor of the archbishops, each archbishop is the visitor of his suffragan bishops, and each bishop is the visitor of all the ecclesiastical corporations in his diocese. Civil corporations have no visitor, but in both England and Scotland they are of course liable to be restrained by the courts where anything *ultra vires* is attempted. Eleemosynary corporations in England are visited by the founder and his heirs, or such persons as the founder appointed to be visitors. In the case of charitable endowments somewhat similar functions are, under the Charitable Trusts Acts, 1853 to 1894, performed by the Charity Commissioners (see CHARITIES).

A corporation may be dissolved by the death of all its members, or of such number as leaves not enough to make new elections in the way the charter requires; by forfeiture of the charter through breach of its conditions; by surrender of the charter; or by act of parliament. In all such cases the lands of the corporation revert to their several donors—the creditors, however, if any, being entitled in the first place to insist on a sale and distribution of the property, whether in a sequestration or otherwise.

In the United States a distinction is taken between public corporations, which exist for public purposes only, and private corporations, which are created wholly or in part for purposes of private emolument. A corporation may be created by act of the congress of the United States or by an act of a state, though in some of the state constitutions the power of creating corporations by special acts is taken from the legislature. In most of the states general acts have been passed for the creation of special classes of corporations. A corporation of one state may be made a corporation of another state in regard to property and acts within the territorial jurisdiction of the other state. A corporation having stockholders is 'organised' on lines corresponding to a company in England (see COM-

PANY). For trade corporations, see the article GUILDS.

**Corps d'Armée.** See ARMY CORPS.

**Corpse.** See DEATH.

**Corpse Candle.** See IGNIS FATUUS.

**Corpulency.** See OBESITY.

**Corpus Christi Festival**, the most splendid festival of the Roman Catholic Church. It was instituted in 1264 (see BOLSENA), in honour of the Consecrated Host and with a view to its adoration, by Pope Urban IV., who appointed for its celebration the Thursday after the festival of the Trinity, and promised to all the penitent who took part in it indulgence for a period of from forty to one hundred days. The festival is chiefly distinguished by magnificent processions. In France it is known as the *Fête Dieu*; in Germany, as the *Fronleichnamsfest*. For colleges, see CAMBRIDGE, OXFORD.

**Corpuscles, BLOOD.** See BLOOD.

**Corpuscular Theory.** See LIGHT.

**Corpus Delicti**, a term used in Scotland and elsewhere to signify the body or substance of the crime charged. To make out the corpus delicti is to prove that the crime charged has been committed; as, when a person is charged with murder, it must be proved that the deceased came by his death in consequence of the injury libelled, and not, for example, by natural causes.

**Corpus Juris Civilis**, the whole body of the Roman or Civil Law, as comprised in the Institutes, the Digest (or Pandects), the Code, and the Novellæ (see CODE, JUSTINIAN, LAW). The *corpus juris canonici* is the body of Canon Law (q.v.).

**Correction, HOUSE OF**, a prison for the reformation of petty offenders. See PRISONS, REFORMATORY AND INDUSTRIAL SCHOOLS.

**Correction of Proofs.** See PROOFS.

**Correggio**, ANTONIO ALLEGRI DA, was so styled from the place of his birth, a small town 20 miles E. of Parma, where he was born in 1494. Modern research has proved the inaccuracy of Vasari's highly coloured account of his struggles and poverty. His father, a well-to-do merchant or tradesman of Correggio, seems to have designed him for a learned profession; but he turned to art, studying under his uncle and three other masters. He is believed to have gained some idea of foreshortening and perspective from the works of Mantegna at Mantua, which he visited in 1511, and to have been influenced by the graceful colouring of Lorenzo Costa. At the age of about twenty he returned to his native town, where in 1514 he painted a 'Virgin Enthroned' for the Franciscan convent, a work, now in the Dresden Gallery, distinguished by more gravity, restraint, and religious feeling than characterise his later productions. In 1518 he began his great series of works at Padua by a beautiful fresco series of mythological subjects for the decoration of the convent of San Paolo, which are still in an excellent state of preservation. From 1521 to 1524 he was engaged upon his subject of 'The Ascension' in the cupola of the Benedictine church of San Giovanni, a fresco in which the master's power is fully visible. His next great monumental work was the decoration of the cathedral of Parma, commissioned in 1522. The subject chosen for the interior of the main dome was 'The Assumption of the Virgin.'

During the execution of these frescoes Correggio was also much occupied with easel-pictures in oils. Among these are his very celebrated Adoration of the Shepherds, known as 'La Notte' or 'The Night,' commissioned in 1522, now in the Dresden Gallery, a work of marvellous softness and delicacy. Five years later he painted 'Il Giorno,' an exquisite picture, now in the Parma Gallery.

In 1530 Correggio removed from Parma to his native town, where, in the same year, he purchased an estate, and in 1533 some additional land. The production of the 'Jupiter and Antiope' of the Louvre, 'The Education of Cupid' of the National Gallery, London, of the 'Danae' of the Borghese Gallery, and of the 'Leda' of the Berlin Museum, has been assigned to the painter's later years; and the 'Reading Magdalene,' of which the picture in the Dresden Gallery is now regarded as merely a 17th-century copy, was completed in 1528. He died at Correggio, at the early age of forty, on the 5th of March 1534, and was buried in the Franciscan church of the place.

The art of Correggio is distinguished by its grace and gaiety, by its sunny sensuous charm. His figures are rendered with a bounteous sweeping outline, and he delineates rapid motion and momentary attitudes and expressions with singular power. His colouring possesses the finest delicacy and luminosity; his foreshortening is bold and skilful, if sometimes rather extravagant; and, above all, he was unrivalled as a master of subtle and refined chiar-oscuro. His works present the strongest possible contrast to the gravity and restraint, to the reverential feeling and the accurately balanced compositions, of the earlier devotional painters of Italy.

His only son Pomponio, by his wife Girolama Merlino (whom Correggio married in 1520, and who died in 1529), was born in 1521, and was alive in 1593. He also was a painter, and an altar-piece from his hand is in the Academy at Parma.

See, besides Holroyd's *North Italian Schools* (1906), the Life of the painter by Ricci (trans. 1896), books by Brinton (1900) and Leader Scott (1902), and the very important work by Sturge Moore (1906).

**Corregidor** is the name given in Spain to the principal magistrate of a town, appointed by the king. Readers of *Gil Blas* will remember his functions and the terror of his name to evil-doers. The Portuguese corregidor has administrative but not governing powers.

**Correlation of Forces.** See ENERGY, FORCE.

**Correlation of Organs**, the close mutual dependence between different systems and structures within the organism. A three- or four-chambered heart is correlated with the development of lungs; animals with an allantois never have gills; the development of a placenta is all but co-extensive with the presence of milk-glands. So among plants parallel venation of the leaves is almost constantly correlated with monocotyledonous structure; and a restriction of the vegetative leaf-organs will show itself in a counterbalancing modification of flowers and fruit. From the time of Aristotle such correlations have been noticed; but it was not till after the work of Cuvier, Geoffroy St-Hilaire, Goethe, and their contemporaries, that the fact was adequately appreciated. It was only then, in other words, that the organism began to be really understood as a unity of mutually dependent parts. The general proposition that all the organs are partners in the general life, that if one member suffer all the members are more or less influenced, is sufficiently self-evident. But beyond this there are the special facts which show that certain organs are knit together by closer physiological bonds than others, that certain structures stand or fall together, that certain characters have a contemporaneous appearance in the historical evolution. The facts are well known; their explanation in many cases is difficult or quite obscure. See EVOLUTION, VARIATION.

**Correspondence Classes**, a method of instruction first fully developed in the United

States by the Chautauqua Literary and Scientific Circle (1878), and since adopted in England—e.g. under the Oxford University Extension (1889). See CHAUTAUQUA.

**Corrèze**, a French department, formed out of part of the old province of Limousin, and taking its name from a river, the Corrèze, flowing 52 miles south-westward to the Vézère; area, 2265 sq. m.; pop. (1872) 302,746; (1921) 273,808. The chief rivers of Corrèze are the Dordogne, the Vézère, and the Corrèze. The surface of the department is mountainous, especially in the north and east, where it is broken in upon by offsets from the Auvergne Mountains, which, in Mont Odonze, attain a maximum altitude of 3129 feet above the sea. The lower slopes are clad with forests, but the district is in general sterile. Minerals, particularly coal, iron, lead, alabaster, and granite of various colours, are found. The department is divided into the three arrondissements of Tulle, Brive, and Ussel. Tulle is the chief town.

**Corrib**, LOUGH, a lake of counties Galway and Mayo, the second largest in Ireland. Lying only 30 feet above sea-level, it is of very irregular shape, 25 miles long from NW. to SE., and 1 to 6 broad, with an area of 68 sq. m. From its south end, 4 miles north of Galway, it discharges its surplus waters by Galway River into Galway Bay. It receives the waters of Lough Mask, at its north end, through the Pigeon Hole and other caves, as well as those of the Clare and other smaller rivers. It contains many islets, and to the west are mountains 3000 feet high, whilst near it are many stone-circles.

**Corriche**, a moor on the borders of Kincardine and Aberdeen shires, 15 miles W. of Aberdeen. Here on 28th October 1562 Queen Mary's half-brother, the Earl of Moray, defeated the Catholic Gordon, Earl of Huntly, who himself fell in the battle, while his two sons were taken prisoners. There is a rather poor ballad on the subject, in broad Aberdeenshire dialect, quite at variance with the facts of history, and first printed in Evans's *Old Ballads* (1777).

**Corrie** (Gaelic *coire*, 'a caldron' or 'large pot'), a term applied in Scotland and Ireland to semi-circular recesses or cirques in mountains, generally flanked by steep and lofty cliffs. They vary in character according to the nature of the rocks. In some the declivities are rounded and smooth, but generally they are broken and rugged, the bounding cliffs rising to heights of 1000 or even 2000 feet. Similar features are recognised in many mountain-regions all the world over. The origin of corries has been a subject of some controversy by geologists. There can be no doubt, however, that they are due in the first place to denudation—to the action of torrents and springs and frosts, aided and directed by the natural division-planes of the rocks. Many of the corries in Scotland and other mountainous countries have been occupied by glaciers—the grinding action of which has tended to modify the form of the ground. Not a few corries are occupied by mountain-tarns.

**Corrientes**, a province of the Argentine Republic, between the Paraná and Uruguay rivers, extending from Entre Ríos to Misiones territory, with an area of 32,500 sq. m. The surface is generally flat, with numerous lakes and swamps, but has undulating stretches along the Paraná and in the east, and is heavily wooded in parts. Lake Iberá, a group of lakes and swamps covering some 1800 sq. m., is surrounded with a jungle, in which the 'tacuara', bamboo (30 feet) is conspicuous; and here jaguars and alligators abound. The mean temperature (72° F.) is the highest in the republic, but the extremes (44°—98°) are not so excessive.

As in Paraguay, Guarani is the common language, Spanish being employed only by the official and educated classes. Cattle-raising is the chief occupation; agriculture is very backward. Population, 400,000.—The capital, Corrientes, is almost hidden among orange-groves, 15 miles below the confluence of the Paraná and the Paraguay, and takes its name from seven *currents* formed by points of rock above the city; vessels of 9 feet draught can reach the town at all seasons. Steamers from Buenos Aires (832 miles) touch here, and in 1887–95 railway connection was made with the south by way of Monte Caseos. Pop. 30,000.

**Corrievreckin** (Gael. 'Brecan's cauldron'), a whirlpool or dangerous passage scarcely a mile broad, off the west coast of Argyllshire, in the strait between Scarba and Jura isles. It is caused by the meeting of tides (running 13 miles an hour) from the north and west, in the narrow passage into the Sound of Jura, round a pyramidal rock, which rises with rapid slope from a depth of 100 fathoms to within 15 feet of the surface.

**Corroboree** is the Australian name for a gathering of aborigines, generally in large numbers, at which dances and other exercises are gone through with much excitement. They usually take place on moonlight nights, and may last the whole night through.

**Corrosive Sublimate**, the popular name of the highly poisonous bichloride of mercury (mercuric chloride). See MERCURY.

**Corrugated Metal**. Iron and other metals in sheets and plates have communicated to them enormously increased rigidity and power to resist buckling and collapse by being corrugated. The process is merely an application to metallic substances of the old contrivance of 'goffering' or 'piping,' by means of which frills are stiffened and kept in shape. The metal to be corrugated is passed between pairs of rollers with ridged surfaces, the ridges of one fitting into the hollows of the other, and the sheets or plates operated on are bent and compressed into the wavy outline of the rolls. Walls and roofs of light and temporary buildings are extensively made of corrugated galvanised iron—i.e. sheet-iron first corrugated and subsequently coated with zinc by dipping the sheets into a bath of the liquid metal. The most important mechanical application of corrugated metal has been for the flues of large steam-boilers. About 1878 a system of annular corrugated iron flues was introduced, which increased the resistance of the flue to collapse, and saved fuel because of the greater heating surface presented by the corrugations. A spiral corrugated flue gives the greatest amount of strength.

**Corruption of Blood**. See ATTAINDER, TREASON.

**Corrupt Practices**. See BRIBERY.

**Corry**, a city of Erie county, Pennsylvania, at the junction of several railways, 37 miles SE. of Erie, has foundries, machine-shops, saw-mills, and other factories, natural gas and mineral springs; pop. 7000.

**Corsair**, a pirate or sea-robber, and specially any of those rovers who in former times cruised from the Barbary ports, as Algiers, Tunis, or Tripoli, and became the terror of merchantmen in the Mediterranean and the Atlantic Ocean, ravaging the coasts and seizing shipping, as far north as Cornwall, Baltimore in Cork, and even Iceland. Though piracy on a small scale had long prevailed, the immediate cause of the sudden development of corsair states and fleets at the beginning of the 16th century was the persecution of the Moors in Spain: the exiles looked for vengeance, and their necessities

compelled thieving; and when they were joined by adventurers from the Levant and not a few Christian renegades, who were attracted by the spoils of the Indies, then coming to Spain, they soon became a formidable power, and founded citadels and states (see ALGIERS, TUNIS, TRIPOLI, SALLÉE). Their greatest leaders were the brothers Urj and Kheyr-ed-din Barbarossa, the first pashas of Algiers. Kheyr-ed-din rose from a mere captain of a galley to be high admiral of Sultan Suleyman (Soliman the Magnificent), and defeated the combined imperial, papal, and Venetian fleets under Doia off Prevesa in 1538. Other famous corsairs were Dragut (Torghud), a Sardinian who died at the siege of Malta; Ochiaï (Ulûî 'Ali), who fought in the battle of Lepanto, 1571; Aidin Reis, or 'Drub-devil'; Sinan of Smyrna; Salih Reis; Ramadan; Ali Pichinin, &c. Many attempts were made to put down the corsairs, from Sir Robert Mansel's expedition in 1621 to the very important expedition against Algiers by the United States under Decatur (q.v.) in 1815—the first serious attempt to put an end to the long established evil—followed by Lord Exmouth's victory in 1816; but the jealousies of the European powers conspired to assure the pirates' immunity, and the Deys of Algiers levied blackmail upon Christian governments who wished to protect their trade. Nothing less than the French conquest could have suppressed so long-seated a disorder, which had infected the Mediterranean for more than three centuries, and even carried off captives from Ireland. See BARBAROSSA, GALLEY, PIRACY, SLAVERY; and *Corsairs of the Mediterranean*, by St-nlev Lane-Poole (1889).

#### **Corseult.** See DINAN.

**Corsica**, the fourth largest island of the Mediterranean and a French department, is 114 miles long by 52 miles broad, with 300 miles of coastline. Area, 3378 sq. m.; pop. (1872) 258,507; (1921) 281,959. Corsica is separated from the twin island of Sardinia, double its size, to the south, by the Strait of Bonifacio. It is 54 miles SW. of Leghorn and 98 S. from Genoa. Though now part of France, the island belongs geographically, historically, and linguistically to Italy. The promontory into which the north coast projects runs 23 miles north beyond the general north coast-line, and is 6 to 9 miles broad. The interior is a labyrinth of mountains, in which, however, a principal chain traverses the whole island from north to south, dividing Corsica into two regions, an eastern and a western zone. These regions are each divided by transverse chains into parallel valleys deeply hollowed by watercourses plunging from the high summits. The highest elevations are about the middle: Cinto (8898 feet); Rotondo (8607); Pagli-Orba (8283). On the west side the mountains reach to the coast, but on the east, between mountains and sea, there extend alluvial plains, edged seawards with lagoons and swamps, highly fertile but malarious, and deserted in summer. In Roman times these plains were densely peopled. Eucalyptus plantations, pure drinking-water supplies, draining and sanitary improvements, are now reclaiming the region. The west zone is occupied mostly with primary strata, granite, and schistose rock; on the east side the mountains are Cretaceous, with serpentine and porphyry. Corsica is watered by numerous streams, none navigable, with cascades glittering in all directions. On the east coast are the Tavignano, 47 miles long, from Lake Nino; and the Golo, 52 miles long. On the west the longest is the Taravo, 34 miles long.

The climate is highly salubrious. The soil is very fertile. On the lower slopes are olives, oranges, citrons, laurels, and vines. The most important of

these is the vine. Local supplies being inadequate, wine is imported from Algiers. Phylloxera has made it necessary to replant with American vines. Higher, up to 6250 feet, are magnificent chestnut-trees; higher still rise virgin forests of oak, pine, larch, &c. These again are overtopped by pastures. The highest summits are snow-clad for half the year. About one-sixth of Corsica is estimated to be covered with forest, but this includes in many places only confused thickets (*macchie*) of green oak, albutus, myrtle, and bloom. Chestnut-trees and cork oaks yield valuable crops. Campo dell' Oro around Ajaccio and the country north of Bastia are among the most fertile districts of the Mediterranean. The mutton or wild sheep is found; also wild boars, large foxes, and small deer, but no wolves or bears. The venomous ant, *innocentato*, is peculiar to Corsica, where are also the *Malmignata* spider and the tarantula. The minerals of Corsica are yet little worked. Anthracite and amianthus are found. Copper and silver-lead mines are worked near Calvi. Sulphide of antimony is extracted in Cape Corso. There are also arsenical, iron, and manganese ores. Among the valuable stones are red and blue granite, porphyry, jasper, alabaster, and marble. The Orezza mineral waters have a high medicinal value. Agriculture is backward. More modern methods are, however, gaining ground. Corsica has very few manufactures. The chief industries are gathering and sawing of briar-wood roots, the making of chestnut-wood extract for tanning, fishing, and rearing of cattle. Raw silk is raised. The principal ports are Bastia and Ajaccio; Calvi, Île Rousse, Porto Vecchio, Propiano, and Bonifacio are engaged in the coasting trade. Corte and Sartène lie inland. The chief imports are corn and other food-stuffs, building materials, coals, metal-ware, salt, cattle, cheese, fodder, brandy, pottery, glass-ware, and paper; and the chief exports briar-wood (*Erica arborea*) for pipe-making, chestnut-wood extract, timber, wine, olive-oil, chestnuts, cork, fruits, and early vegetables. There are railways from Bastia to Ajaccio, to Calvi, and to Ghisonaccia (with projected extension to Bonifacio). Excellent roads girdle the island. Corsica is divided into five arrondissements: Ajaccio, Bastia, Calvi, Corte, Sartène. The capital is Ajaccio, but the most important town is Bastia. The language is a corrupt Italian.

In early times known as Cyrrnos, Corsica in the 8th century fell to the Saracens, who in the 11th yielded it to Pisa. Thence it passed to the Genoese. Genoese towers, that defended the bays against Saracen incursions, still add a picturesque trait to the landscape. The Genoese, unable to subdue the Corsicans, who had risen under General Paoli, surrendered Corsica to the French, who conquered it in 1768; since then it has willingly united with France.

See Boswell's *Account of Corsica* (1768); Ortolli's *Contes popul. de l'Île de Corse* (1885); Paul Borda's *En Corse* (1887); *Corsica*, by Gregorovius (1878); J. W. Barry's *Studies in Corsica* (1893); L. H. Caird's *History of Corsica* (1899); G. Renwick's *Romantic Corsica* (1910); see also the articles on Paoli and Theodore, 'King of Corsica,' and for 'the Corsican,' BONAPARTE, NAPOLEON. For the Corsican blood-fund, see VENDETTE, and Prosper Mérimée's powerful picture of Corsican life, *Colomba* (1841).

**Corslet**, a kind of cuirass, formerly the usual body-covering of pikemen. It was made chiefly of leather, and was pistol-proof.

**Corsned.** See ORDEAL.

**Corso**, an Italian word used to express not only the racing of riderless horses, but also the slow driving in procession of handsome equipages through the principal streets of a town, such as used often to take place in Italy on festivals.

This custom has given a name to many streets in almost all the larger towns of Italy. The best known of these is the Corso in Rome, which is the scene of the celebrated diversions of the Carnival.

**Corsen**, WILHELM PAUL, a great German philologist, was born at Bremen, January 20, 1820. After studies in philology at Berlin, especially under Boeckh and Lachmann, and two years spent in teaching in a gymnasium at Stettin, he was called in 1846 to lecture at Schulpforta, and there he remained till 1866, when ill-health compelled him to retire to Berlin. There, however, he continued his arduous studies until he died, a martyr to learning, June 18, 1875. His earliest great work is his treatise, *Ueber Aussprache, Vokalismus, und Betonung der Lateinischen Sprache* (2 vols. 1858-59; 2d ed. 1868-70). It was followed by *Kritische Beiträge zur Lateinischen Formenlehre* (1863) and *Kritische Beiträge zur Lateinischen Formenlehre* (1866). His second masterpiece is *Ueber die Sprache der Etrusker* (2 vols. 1874-75), in which he labours with great ingenuity and vast learning to prove against the world that the Etruscan language was cognate with that of the Romans. H. Weber edited from his papers *Beiträge zur italischen Sprachkunde* (Leip. 1876).

**Cort**, CORNELIS (1533-78), known in Italy as Cornelio Piammingo, a famous Dutch engraver, in 1572 went to Venice, and finally settled at Rome, where he founded a great Italian school of engraving.

**Cort**, HENRY, ironmaster, born at Lancaster in 1740, became a navy agent in London in 1765. He made experiments to improve British iron, then inferior, and in 1775 started iron-founding at Fontley in Hampshire. In 1784 he patented his puddling furnace, and also his method of drawing out the puddled ball into bars, inventions intimately associated with the development of the iron trade. In 1789 his partner Jellicoe died, a defaulter to the amount of £40,000 in government funds; this utterly ruined Cort, who had to sacrifice property worth £250,000. He received a government pension of £200 in 1794, and died in 1800.

**Cortes**. See SPAIN, PORTUGAL.

**Cortes**, HERNANDO, the conqueror of Mexico, was born at Medellin, in Estremadura, in 1485, of a noble but decayed family. The longing for adventure which early filled his heart was not cured by two years' study at Salamanca. He sailed for San Domingo in 1504, and ere long accompanied Velazquez in his expedition to Cuba. After the island had been subdued he came into serious disfavour with the governor, but was reconciled, and became alcalde in the capital, Santiago. The discovery by De Córdova of Yucatan, and of New Spain (Mexico) by Grijalva, had already fired the ambitious mind of Velazquez, when Pedro de Alvarado, who had been despatched by Grijalva, arrived at Cuba; and his glowing accounts filled the governor with a fresh thirst for gain and glory. He hastened to fit out a new expedition, the command of which he gave to Cortes. Cortes sailed 18th November 1518, and one of the most romantic chapters in the history of the world began. The armament with which he entered on the conquest of a vast and civilised empire consisted, according to Bernal Diaz, of five hundred and fifty Spaniards, two or three hundred Indians, twelve or fifteen horses, with ten brass guns and some falconets. Scarcely had he touched at Trinidad when orders from Velazquez to supersede him reached the island. These Cortes refused to obey, and thus cut himself off from all hope save in success. He landed first in Yucatan, and entered New Spain at the river of Grijalva. Proceeding inland he reached Tabasco, and here he fought his first battle with the

natives. His victory gave him his invaluable interpreter, the beautiful and faithful Donna Marina. At San Juan de Ulua messengers from Montezuma (q.v.), the king of Mexico, reached him, bringing rich presents, but objecting to his expressed desire for a visit to the king. Here when the faction of Velazquez within his little force began to express openly their hesitation about proceeding farther, Cortes adroitly got his men to entreat him to change the purpose of the expedition into colonisation and conquest instead of mere trade, and was thereupon formally appointed captain-general and justicia-mayor.

He now founded Vera Cruz, and sent messengers to Charles V. He next united all opposing interests in that of the common safety by burning his ships behind him, and marched to Tlascala, whose warlike inhabitants, subdued after some hard fighting, became henceforward his ever-faithful allies. After some delay he started on his memorable march to Mexico, attended by some thousands of his Tlascalcan allies; and at Cholula a treacherous attempt, by orders of Montezuma, to entrap the Spaniards, was frustrated by his sleepless vigilance. On the 8th November 1519 he reached the capital, which Bernal Diaz says appeared when they first saw it like something in a dream, or like one of the enchanted castles in the book of Amadis. The city was situated in a great salt lake communicating with a fresh-water lake, and was approached by three causeways of solid masonry, one two leagues long, with wooden drawbridges at the ends. At the lowest estimate its inhabitants exceeded 300,000. Cortes had not been a week in the city before he had determined to seize the august person of the king, and hold him as a hostage; his pretext being a treacherous attack upon Vera Cruz. Montezuma was paralysed at the heroic audacity of his proposal, and was carried to the Spanish quarters, from which he was never to return. Seventeen of the king's officers brought from Vera Cruz were burned to death in his presence, and Montezuma himself put in irons the while. In general, however, but little apparent restraint was put upon him, and he was allowed to go to his temple accompanied by a guard of one hundred and fifty Spaniards. At length he was constrained to submit to a public act of vassalage to Spain, and to give gold to the value of 100,000 ducats.

But Cortes was far more than an ordinary *conquistador*; he inquired about the mines and the methods of cultivation, and made wide explorations into the country; while with characteristic religious zeal he destroyed the more hideous Mexican idols, and sternly forbade human sacrifices. Meantime, however, the Mexican hatred for the conquering invaders was beginning to surmount their fear, as they began gradually to discover that they were merely mortal men spite of the strange wonder of their horses and cannon, and moreover were miserably few in numbers. In the sixth month of his imprisonment Montezuma asked Cortes to depart. The conqueror craved delay, and learned a few days after the request that eighteen ships had arrived in the bay of San Juan. These ships had been despatched by Velazquez under Pamphilo de Narvaez, who sent a favourable message to Montezuma. Cortes left Alvarado in command, and hastened with but a handful of men to meet Narvaez, whose force numbered 800 men; and at Cholula, amid a blinding storm, surprised him in an unexpected night-attack in which but three of his own handful of heroes fell. The defeated troops gladly embraced the cause of the conqueror.

Fourteen days after the defeat of Narvaez came the news from Alvarado that the Spaniards were besieged in their quarters in Mexico. Cortes at once collected all his men, marched to his lieutenant's

relief, and reached the city, 24th June 1520. He found himself face to face with a whole nation in arms under Montezuma's brother as popular leader. A general attack was soon made upon him, and not repulsed without a desperate struggle. On the third day the unhappy Montezuma appeared on a battlement with the view of pacifying his people, but was wounded by a shower of stones—an indignity which, said the Spaniards, caused his death. Cortes burned the two great idols of the city, but this did not terrify the Mexicans, and he now saw that he must leave the city. His dispositions were quickly made; the start was made at midnight, 1st July 1520. The first gap was crossed safely by a pontoon which he had prepared for this purpose, but at once the lake was covered with a multitude of canoes, and so furious an attack made that it proved impossible to raise the pontoon to cross the second gap. Soon the water was choked with a crowd of struggling horses and men, and the retreat became a confused and hopeless rout. The second and third bridgeways were both broken down, but it was at the third that the greatest loss occurred. In the horrors of that awful night (*la noche triste*) were lost 450 Spaniards, forty-six horses, his artillery, 4000 Indian allies, and most of the Mexican prisoners. At Otumba, whither the miserable handful of survivors had retreated, Cortes found himself encompassed with an innumerable host, and there was a desperate battle, in which every individual Spaniard performed prodigies of valour. The exhausted victors were kindly received by their Tlascalcan allies, and Cortes at once began preparations to repair his disaster.

Before the end of the year Cortes was strengthened by the arrival of reinforcements and war-stores. Taking with him 10,000 Tlascalcanes, he marched to Tezcuco, and contrived to form alliances with some of the surrounding Indian tribes. At length his brigantines, built at Tlascala, were hauled to the lake by a canal dug for the purpose, and, after a perilous expedition round the lake and many ineffectual attempts to come to terms with the Mexicans, he began the formal siege of the city in April 1521. He himself, with 300 men, took command of the brigantines, as, in his own words, 'the key of the whole war was in the ships.' After defeating the Mexicans on the lakes, and destroying innumerable canoes, he made a series of simultaneous incursions along the causeways. The Mexicans fought with the fury of despair, and the triumph of the Spaniards proceeded only at the cost of the gradual destruction of the buildings in the city. Meantime the Spaniards themselves suffered desperate hardships from the ambuscades of their sleepless enemy, and becoming impatient, they demanded a general attack, in which they suffered a severe repulse. Although famine and pestilence fought for the Spaniards—as many as fifty thousand Mexicans dying of these during the siege—the city had to be destroyed before it could be taken. It fell at length, 13th August 1521, after a siege of seventy-five days, hardly to be surpassed in the history of the world for obstinacy and valour. Scarce any booty was obtained, the ruined houses were filled with heaps of dead, and almost the entire city had to be rebuilt.

Cortes now showed his wisdom by attempting to restore the native institutions. He rewarded his men with *encomiendas* or grants of Indians for labour and assistance in colonisation. He was formally appointed governor and captain-general of New Spain in 1522. He next sent out Alvarado on an expedition which led ultimately to the conquest of Guatemala, Sandoval to the north, and Cristóbal de Olid to Honduras. The last, unfaithful to his trust, rebelled, and the indefatigable Cortes at once set out on a perilous journey to subdue him; but

finding his rebellious lieutenant assassinated before his arrival, he returned to New Spain (1526) to find Ponce de Leon invested with the powers of government. In May 1528 he arrived in Spain, was received with marked honour by the king, and created Marquis del Valle de Oaxaca. He returned in July 1530 as captain-general, but to his disappointment was not appointed also civil governor of New Spain. He was poor and broken in health, and henceforward had the continual mortification to see the government muddled by envious and incompetent men. During ten years he was constantly engaged in making new discoveries to the north of Mexico, but now, says Bernal Diaz, 'everything turned to thorns with him;' and in 1540 he returned to Spain. He accompanied the emperor in his unhappy expedition to Algeria, and was mortified by having his offer to take Algiers, if given the command, slighted and despised. Voltaire's story of his proud speech to the emperor as he stood on the step of his carriage: 'I am a man who has given you more provinces than your ancestors have left you cities,' is true in spirit, if not in fact. Cortes wished to return to Mexico, but was not allowed till his impending suits were settled. His last years were darkened by neglect, deepened by the domestic vexation of his daughter Doña Maria's repudiation by a great Spanish noble to whom she had been betrothed. He went to meet her at Seville, fell ill, and died in a small village near that city, 2d December 1547. His body, first buried at Seville, was translated in 1562 to Tezcuco, and in 1629 to Mexico.

The great conquest of Cortes ranks as one of the most splendid achievements in the world's history, and indeed it is more like romantic fable than sober fact. Its hero was no common adventurer or mere courageous soldier, but a captain of admirable sagacity and resource, a statesman of rare penetration and foresight. To the reckless audacity of a Rupert he added the astuteness of a Hannibal—a combination that marks only the highest order of military genius. His whole character was constructed on heroic lines, and is marked with a certain conspicuous grandeur throughout. He was passionate, yet patient; fond of splendour, yet simple in diet; cruel sometimes, yet sincerely religious; silent and reserved, yet capable of inspiring the most devoted as well as the tenderest personal affection. In many things he resembles Cæsar, and like him he possessed that rarest power of knowing, as De Solis says of him, 'how to be a superior without ceasing to be a comrade.' See Prescott's *History*, and Lives by Sir Arthur Helps (2 vols. 1871) and MacNutt (1909).

**Cortona**, a town of central Italy, 69 miles SE. of Florence by rail. It stands 2130 feet above sea-level, looking down on the Valle di Chiana and the Trasimene Lake, and is one of the oldest cities in Europe, with mighty cyclopean walls of Pelasgic origin, Etruscan and Roman remains, numerous handsome *palazzi*, a fine cathedral, and half-a-dozen churches. These are rich in paintings by many old masters, including Luca Signorelli (q.v.) and Pietro Berrettini or da Cortona (1596-1669). The Accademia Etrusca (1726) has its seat here; its museum contains a multitude of Etruscan sarcophagi, vases, &c. Pop. of town, 4500; of commune, 30,000. See ETRURIA.

**Coruña**, LA (often in English, *Corunna*; among seamen, *Groyne*), a fortified seaport of Spain, and capital of a province of the same name, situated about midway between capes Ortegal and Finisterre, on a peninsula in the Bay (*ría*) of Coruña, 150 miles NNW. of León. The town divides itself naturally into the upper portion and the lower, called Pescaderia, which, formerly

a haunt of fishermen, is now the centre of wealth and trade. The harbour is commodious and protected by forts; and in 1888 a long-desired quarantine harbour was completed. There are large cavalry and infantry barracks, and some colleges. Electric cars were introduced in 1913. New docks and sewage works have been made. Sir John Moore's tomb is in the centre of the gardens of San Carlos. One mile north-west of the town stands the famous Torre de Hércules, restored, it is said, by Trajan, which serves as a lighthouse, and is nearly 100 feet high. The chief imports are Argentine maize, salt fish, and coal (mostly British); also machinery, cotton, and petroleum. The port's prosperity depends on the fishing industry (sardines especially). Other industries are cotton-spinning, the manufacture of cigars, glass-ware, and canned meats and fish. The principal exports are lace, tinned fish, ham and bacon, onions, chestnuts. The once flourishing export trade in cattle is almost extinct. Cuba is Coruña's best foreign customer. Many thousands of emigrants leave Coruña yearly for South and Central America. Pop. 62,000. Coruña dates its origin from the Phœnicians, from whom it was taken by the Romans in the 1st century B.C. Here in 1386 John of Gaunt landed to claim the crown of Castile in right of his wife, daughter of Pedro the Cruel; in 1554 Philip II. embarked here for England to marry Queen Mary; and in 1588 the great Spanish Armada, which had been refitted at this port, set sail for the conquest of England. Here also fell gloriously Sir John Moore (16th January 1809), after having with but 14,000 travel-worn men defeated Soult and 20,000 Frenchmen, fresh and flushed with the expectation of victory. Few exploits in English history are prouder than his memorable retreat, closed by the brilliant victory that covered the embarkation of the British troops.—The province (3000 sq. m.; pop. 700,000), the most north-westerly of Galicia and of Spain, is somewhat mountainous.

**Corundum**, a mineral consisting essentially of mere alumina, yet of great specific gravity—about four times that of water—and of remarkable hardness, being inferior in this respect only to the diamond. Mineralogists regard the Sapphire (q.v.) as a variety of corundum, and along with it the gems popularly known as Oriental Ruby, Oriental Topaz, Oriental Emerald, and Oriental Amethyst; but the name corundum is more usually limited to the coarser varieties. These, instead of exhibiting the brilliancy of gems, are in general of a dull and muddy appearance, and the crystals—which are usually six-sided prisms and six-sided pyramids—are externally dull and rough. The colour is various, often green, blue, or red, inclining to gray. Corundum is found in many parts of the world, and has long been used in India for polishing all gems except the diamond, which is too hard for it. Emery (q.v.), so well known as a polishing substance, is a variety of corundum.

**Corvée** is the name usually given to the obligation on the inhabitants of districts to perform gratuitous labour (such as the maintenance of roads) for the sovereign or feudal lord. The forced labour for the aristocracy was one of the grievances of the French peasantry, which led to the Revolution. See FRANCE.

**Corvei**, or **KORVEY** (*Corbeia nova*), a Benedictine abbey on the Weser, near Hörter, the most famous in Old Saxony, founded in 822. It was a colony from the monastery of Corbie in Picardy, then part of the country of the West Franks. It received rich endowments; was the centre of great agricultural improvement and prosperity during the earlier part of the middle ages; and the seat of a school, founded by Ansgar, the Apostle of

the North, which flourished greatly in the 9th and 10th centuries, and was next in reputation to Fulda. Its abbots were numbered amongst the spiritual princes of the German empire. In 1794 it was made a bishopric by Pius VI. Its territory then extended to about 20 square miles, with 10,000 inhabitants. In 1803 it was annexed to Nassau, from which it was transferred in 1807 to Westphalia, and in 1815 to Prussia. The Gothic church has a magnificent interior, and contains a multitude of princely monuments. The library and archives of the cloister, which contained most valuable records of the early ages of German history, were mostly destroyed—the *Chronicon Corbejense*, an alleged record of this abbey from its foundation to the end of the 12th century (pub. 1823), is a forgery; but there are meagre *Annales Corbeienses* (648 to 1148) printed in the *Monumenta Germaniae*.

**Corvette** was a term applied to a flush-deck vessel, ship or barque rigged, having only one tier of guns, either on the upper or main deck. This class of vessels are now called cruisers; see NAVY.

**Corvidæ**, a family of crow-like birds, in the old order of Passeres. The family is widely distributed, and includes towards 200 species; see CHOUGH, CROW, JACKDAW, JAY, MAGPIE.

**Corv'ius**. See MATTHIAS CORVINUS.

**Corvisart-Desmarte**, JEAN NICOLAS, BARON DE (1755–1821), born at Vouziers, founded a clinical school at the hospital of La Charité, became professor in the Collège de France, and was created baron by Napoleon. His name is associated with Percussion (q.v.) as a means of diagnosis.

**Corvo**, the most northerly of the Azores (q.v.).

**Corwen**, a town of Merionethshire, North Wales, on the right bank of the Dee, at the foot of the Berwyn Mountains, 10 miles N.E. of Bala. It is a great resort of anglers, and boasts traditions of Owen Glendower.

**Coryate**, THOMAS, was born at Odcombe, Somersetshire, about 1577, entered Gloucester Hall, Oxford, in 1596, but left like many better men without a degree, and after James I.'s accession lived by his wits, or rather his wit, about court. In 1608 he set out on a rambling journey on the Continent, passing through Paris, Lyons, Turin, Venice, Zurich, and Strasburg, and returning five months later with a record of 1975 miles, mostly on foot. His entertaining journal was at last published in 1611, with a huge collection of commendatory verses, as *Coryat's Crudities: Hastily gobbled up in Five Moneths' Travells in France, &c.* Next year, after dedicating his travel-worn shoes in his native church, he started again on his travels, visited Constantinople, Greece, Smyrna, Alexandria, and the Holy Land, and found his way by caravan to Mesopotamia, thence through Persia and Afghanistan to Agra, where he arrived in 1616. In December of next year he died at Surat. Letters of his were printed in 1616–18; and the *Crudities* was reprinted (2 vols.) in 1905.

**Corybantes**, the priests of Cybele (q.v.) in Phrygia.

**Corygaum**, a village in the presidency of Bombay, 16 miles S. of Poona, the scene of the last of the three battles which caused the subjugation of the Peishwa of the Mahrattas. Captain Staunton, with a native force of but 300 horse and 500 foot and 24 European artillerymen, fought with success the whole day long against 3000 infantry and 20,000 cavalry (January 1, 1818).

**Coryla'ceæ**. See CUPULIFERÆ.

**Cor'ymb**, a form of Inflorescence (q.v.) which may be regarded as a raceme in which the main

axis has been more or less arrested in development, while the lower flower-stalks are lengthened so as to bring their flowers almost to the level of those of the upper. As familiar examples may be cited hawthorn, candytuft, &c. After flowering, the main axis of a corymb often elongates into an ordinary raceme, as in many crucifers.

**Corymbi'feræ.** See COMPOSITÆ.

**Coryphæ'us** (Gr. *koruphē*, 'the head'), the leader of the chorus in ancient Greece. The name is now used to signify those of the highest distinction in any art or science. The French *coryphée* is generally used of the principal *danseuse* in the ballet.

**Coryphene** (*Coryphæna*), a genus of bony fishes, remarkable for the brilliancy of their colours. They are nearly allied to mackerels, belonging to the same family, Scombridæ. For some not very evident reason they are often popularly called 'dolphins.' The body is somewhat elongated, and is laterally compressed; the scales are very small; the head of the adults bears a sharp crest. The colours of silver, blue, and yellow have great beauty and metallic brilliancy, whether the fish be darting with extreme rapidity in the sunlit water, or lie dying on the shore. Apart from their marvellous beauty, the coryphenes are well known for their habit of pursuing shoals of flying-fish. Sailors often catch them with a glittering bit of metal for bait. They are frequently seen in the Mediterranean (four species), and also in the Atlantic, Indian, and Pacific Oceans. The most familiar species is *Coryphæna hippurus*.

**Coryza.** See CATARRH.

**Cos** (often called by the Italian name of *Stanchio*), an island off the coast of Asia Minor, was seized by Italy from the Turks in 1912, held in pledge for the fulfilment of the treaty of Ouchy, retained by the treaty of Lausanne (1923). Twenty-three miles long and five broad, with a population of 10,000, mainly Greeks, Cos consists mostly of fertile and well-tilled plains, partially of hilly country. It exports lemons, grain, wine, cotton, and silk. Many ancient Greek remains are scattered over the island. The chief town, Cos or Co, is situated on the north-east coast. In early times Cos was famous for its wine, its amphoræ, and its fine 'Coan garments.' It was the birthplace of Ptolemy Philadelphus, Apelles, and Hippocrates.

**Coscinomancy**, an ancient mode of divination by means of a sieve (Gr. *koskinon*) supported or suspended by a pair of shears, in some way not easily understood. It moved at the mention of the guilty person's name.

**Cosenza**, a town of Italy, capital of the province of the same name, formerly called *Calabria Citeriore*. It is situated 12 miles E. of the Mediterranean, and 262 SE. of Naples by rail, in a mountain-closed valley at the confluence of the Crati and the Busento. Seat of an archbishop, it has a cathedral, a fine court-house, and trade in oil, wine, silk, hemp, grain, earthenware, and iron and steel wares. Pop. 26,000. The ancient *Consentia*, a city of the Bruttii, was captured by the Carthaginian general Himilco, and was forced to surrender (204 B.C.) to the Romans, who afterwards colonised it. Alaric (q.v.) died here, 410 A.D.

**Cosgrave**, WILLIAM THOMAS, Sinn Féin member for Kilkenny city (1917) and county (1918) in the Imperial parliament, and for Carlow and Kilkenny (1922) in Dáil Éireann, in 1923 succeeded Griffith as president of the Dáil and Collins as finance minister, and furthered the treaty settlement.

**Coshery**, or COSHERING, in Ireland, was the ancient feudal right of a chief to quarter himself and his retainers on his tenantry at his own discretion.

**Cosin**, JOHN, a famous bishop of Durham, was born in 1594 at Norwich. Educated there and at Caius College, Cambridge, he became fellow of his college and secretary to Bishop Overall of Lichfield, next in succession chaplain to Bishop Neill of Durham, prebendary of Durham, rector of Elwick, archdeacon of the East Riding, rector of Brancepeth, master of Peterhouse, Cambridge (1634), and dean of Peterborough (1640). An intimate friend of Laud, he had already come into collision with the Puritans about his ritualistic reforms, and been denounced by Smart, a brother prebendary of Durham, as 'our young Apollo, who repairerth the Quire, and sets it out gayly with strange Babylonish ornaments.' In later invectives his antagonist did not spare his pluralism and even his fondness for tobacco. Prynne denounced also his chapel services at Peterhouse. Cosin was soon deprived of his benefices by the House of Commons, whereupon he retired to Paris, and for nineteen years of exile kept up there a Church of England service. At the Restoration he recovered his preferments, and in December 1660 was consecrated Bishop of Durham, and soon by his splendid energy, enthusiasm, munificence, and administrative ability, made his a model diocese. His personal dignity and commanding presence were perfectly in keeping with his conception of the part of one who was not only a bishop, but a prince-bishop. During his first seven years he spent no less than £34,500 upon his two castles, his cathedral, the library at Durham, and deeds of general benevolence. Imperious in temper, he sternly repressed Puritan and Roman Catholic recusancy alike; for, however devoted to ancient ritual and order, he hated Popery, and never ceased to regret the perversion of his own 'lost son' who had 'forsaken his mother, the Church of England.' He differed too from the rest of his party in his Puritan-like support of the strict observance of the Sabbath. During his last years Cosin earned great unpopularity by his opposition to the desire of the people of the Palatinate to be represented in parliament. He died in London, 15th January 1672. All Cosin's writings are inconsiderable, save his *Collection of Private Devotions* (1627), which was denounced by Prynne in his *Brief Survey and Censure of Mr. Cozen's Cozening Devotions*. A lasting service to the church was his contribution, invaluable from his profound liturgical learning, to the final revision (1661) of the Book of Common Prayer. Bishop Cosin's works were collected in 5 vols. in the 'Library of Anglo-Catholic Theology' (1843-55). His *Correspondence* was edited for the Surtees Society by Canon Ormsby (2 vols. 1868-70). See Life by Percy H. Osmond (1913).

**Co-sine.** See TRIGONOMETRY.

**Cosmas**, surnamed *Indicopleustes*, a merchant of Alexandria, who lived in the middle of the 6th century, and after having travelled much, returned to Egypt, where in monastic retirement he wrote in Greek a work of greater interest than value, in twelve books, on Christian Topography, extending to countries as far as India. An annotated translation of the work was edited in 1898 by M'Crimdell, and a critical text by Winstedt in 1910.

**Cosmas and Damian**, SAINTS, Arabian brothers, who practised as physicians at Ægæa in Cilicia in the 3rd century A.D., and who were cast into the sea as Christians, but, according to the legend, rescued by an angel. Thereafter, burning and stoning having proved ineffectual, they were beheaded in 303. Their relics were translated from Bremen to Munich in 1649, and their names commemorated in the Canon of the Mass.

**Cosmetics** (Gr. *kosmeō*, 'I adorn') are chemical preparations employed for improving the appearance of the skin and hair. Several of the

cosmetics in use are comparatively harmless, such as perfumed starch and chalk (see *ROUGE*); whilst others, such as *pearl white* (the subnitrate of bismuth, see *BISMUTH*), are more or less poisonous, and dangerous to use. At all times, the employment of cosmetics is to be discouraged, as the minute particles tend to fill up and clog the pores of the skin, and prevent the free passage of gases and vapours, which is so essential to the preservation of any animal organ in a thorough state of health.

**Cosmic Dust.** See *DUST*.

**Cosmo de' Medici.** See *MEDICI*.

**Cosmogony**, a theory of the origin of the universe (Gr. *kosmos*) and its inhabitants, such as is found in the mythologies of all peoples except those in the very lowest stages of culture. There is the utmost variety in the explanations given, the only idea that is at all widely spread being that in the beginning all things were held in solution by water. Other prevailing conceptions are those of the Phœnician and Egyptian generative world-egg; of the Hindu tortoise which supports elephants, themselves the actual bearers of the world; of the Polynesian air-god, Tangaloa, hovering over the waters. A very elaborate cosmogony is given in the Pehlevi *Bundêshêh*, ascribing creation to the free-will of a personal deity, as distinct from primordial matter, and this more elevated conception the religion of Zoroaster shares with the Jewish alone.

In the *Sanchonathon* we have presented in a Greek version a fragment of an interesting Phœnician cosmogony, which explains the origin of organic matter as due to a series of spontaneous emanations. But the most interesting cosmogonies we possess are the ancient Babylonian, of which one form is preserved in the Greek of Berossus, while another was deciphered by George Smith from the cuneiform inscriptions. These present startling identities with the creation story in the first chapter of Genesis.

Modern cosmogonists arrange themselves mainly according to their attitude to Theism (q.v.). Theists explain the world of matter and order as having come into existence at the omnific fiat. Pantheism (q.v.), again, holds the universe to be the very body and being of Deity, and as such to have been from all eternity. Most men of science, in modern times, stopping short of an actual cosmogony or genesis of the world, have pushed their inquiries into the order of development of its present state. Some assume the necessary existence of matter; with these there is no proper beginning of things, but an eternal round, under fixed laws of growth and decay. See *MATTER*.

In cosmogonical speculations, heat, air, atoms with rotatory motions, numbers—have all in turn been recognised as the fountain and causes of things. Of hypotheses as to the formation of our own rotating globe, of our system, and of all similar systems in space, the most notable is that of Laplace, founded on observation of the mutual relations of the planets, their common direction in rotation and revolution, their general conformity to one plane, &c., taken in connection with such facts as the rings of Saturn and the fundamental unity of the asteroids. Laplace had in some measure been anticipated by Kant. Thus arose the *Nebular Theory*, the evidence for which was carefully marshalled by Sir William Herschel; and which is still regarded by some physicists as indicated by the general tendencies of the laws of nature. Faye expounded his theory of the origin of the earth from meteorites, and discussed other cosmogonic theories in *Sur l'Origine du Monde* (2d ed. 1885). Following up this view of a formation of the planetary globes by natural causes, there have

been speculations as to the commencement and progress of organic Life (q.v.) upon them, and communication of it from one planet to another (notably by Lord Kelvin; and see Professor Tyndall's presidential address to the British Association in 1874). Darwin's work has completely altered the face of biological research and theory (see *EVOLUTION*, *DARWINIAN THEORY*, *SPENCER*). For the cosmogonies of the various nations, philosophies, and religions, see *MATERIALISM*, *GNOSTICISM*, *NEO-PLATONISM*, *THEOGONY*, *HEGEL*, *ADAM*, *CREATION*; articles on Assyria, Babylonia, Egypt, India; on Scandinavian Mythology; on Greece (*Ancient Religion*); and on Spontaneous Generation; also Gunkel's *Schöpfung und Chaos* (1895), and Cheyne's *Traditions of Ancient Israel* (1897).—For the 'Cosmological Argument,' see *THEISM*.

**Cosne**, a town, with iron manufactures, in the French department of Nièvre, and on the right bank of the Loire, 120 miles SSE. of Paris; pop. 8500.

**Cosquin**, EMMANUEL, an eminent French folklorist, was born at Vitry-le-François in Marne, where his father was a notary, as well as *maire* for nearly twenty years, 25th June 1841. He made his studies at the college of his native town, taking at the close of his course the diploma of licentiate in law, and here he has lived ever since. He has contributed many articles on religious questions to the Conservative and Catholic journal, *Le Français* (since November 1887 incorporated with *Le Moniteur Universel*), as well as numerous articles on more general questions to other newspapers and magazines, and has translated *La vraie et la fausse infallibilité des Papes* (1873), and *Le Concile du Vatican* (1877), two works by Mgr. Fessler, general secretary of the Vatican Council. But his most important work was a series of articles from 1876 to 1881 in the pages of *Romania*, which at once arrested the attention of scientific folklorists everywhere. These were collected into two volumes, issued in 1886 as *Contes populaires de Lorraine*, perhaps the most really important contribution made to storiology since the classical collections of J. F. Campbell (1860-62) and Von Hahn (1864). The stories were taken from a limited region, and were for the most part poorer in detail than parallel versions found elsewhere, but they possessed in their scientific accuracy a value which belongs unhappily to but few collections of folk-tales available to the student. The theory of the origin and transmission of such stories that M. Cosquin supports in his admirable introduction and in his no less luminous than learned notes, is a development of that put forth by Benfey in the famous introduction to his translation of the *Panchatantra* (1859), that not only the bases of these stories but their combinations have been carried from India within the historical period. M. Cosquin's position has been vigorously assailed by Mr Lang and others, but has been as vigorously defended by himself. See *FOLKLORE*.

**Cossacks** (Russ. *Kazák*), a large body of Russian subjects who held of the crown by military tenure. The name has been variously derived from words meaning, in radically distinct languages, 'an armed man, a sabre, a rover, a goat, a promontory, a coat, a cassock, and a district in Circassia.' The Cossacks are by some held to be Tatars, by more to be of nearly pure Russian stock; but the most probable view is that they are a people of very mixed origin. Slavonic settlers seem to have mingled with Tatar and Circassian tribes in the regions to the south of Poland and Muscovy, in the Ukraine and on the lower Don, and to have given to the new race, first heard of as Cossacks in the 10th century, a predominantly Russian character. On the conquest of Red Russia by Poland, numerous Russian

refugees fled to the Cossack country; and more on the Tatar conquest of Muscovy. The numbers of the Cossacks were also recruited from time to time by adventurers or fugitives from Poland, Hungary, Wallachia, and elsewhere; but in physique, as in language and religion, the Cossacks have always been mainly Russian. They distinguished themselves in war against Turks and Tatars, and were known as a powerful military confederacy in the 15th century. The kings of Poland and the tsars of Muscovy employed them largely to defend their frontiers, especially against nomadic neighbours; but the connection between the Cossacks and their lords paramount was always very elastic, and was frequently repudiated to suit the convenience of either party. The Cossacks became the outposts of Russian domination in Siberia, Central Asia, and the Caucasus. Living near, or, as 'free Cossacks' amongst, hostile peoples, they developed their peculiar military organisation—either forming a cordon of military settlements along the confines of occupied territory, or isolated camps in the nomad country beyond. Agriculture they eschewed; self-reliance and readiness at all times for defence or assault were their chief characteristics; though such of them as inhabited the banks of the Don and Dnieper, and their islands, became and still are skilful boatmen and fishers. Their political constitution was completely democratic; all offices were elective for one year only, and every Cossack might be chosen to any post, including the supreme one of Attaman or Hetman. This organisation they in great measure retained. The Emperor Nicholas I. made Hetman a title of the Czarévitch. It became that of the head of the Ukrainian republic, and was applied to other Cossack leaders in the confused events that followed the Russian revolution, when the Don, Kuban, and Terek districts became (1918) short-lived republics, playing their own part in the dissensions of Reds and Whites, of Russians, Ukrainians, and Poles. There have been two main branches of the Cossacks—the Ukraine and the Don Cossacks. To the first belonged the Zaporogian Cossacks, those dwelling near the *Porogi* or falls of the Dnieper. From them again are descended the Tschernomerian Cossacks, those of the Kuban Valley and of Azov. From the Don Cossacks spring those of the Volga or of Astrakhan, of the Terek Valley, of Orenburg, of the Ural, and of Siberia. They furnished a large and valuable contingent of light cavalry to the Russian army, and are very patient of fatigue, hunger, thirst, and cold. Though the Cossacks have generally been represented in the west of Europe as little better than fierce savages, they have left a very favourable impression on those who have dwelt amongst them. Jonas Hanway found them in 1743 'a civilised, and very gallant as well as sober people;' and many more recent travellers agree in asserting that in intelligence, cleanliness, refinement, and enterprise they are greatly the superiors of the average Russians. For pictures of old Cossack life, see *Taras Bulba* and other tales of Gogol.

**Cossimbazar** (*Kasimbázár*) was at the end of the 17th century the chief English agency in Bengal. It stood on the Bhagirathi near Murshidabad (q.v.); but its site is now a swamp.

**Cossus.** See GOAT MOTH.

**Costa, ISAAC DA.** See DA COSTA.

**Costa, SIR MICHAEL**, a popular musical conductor and composer, was born at Naples, 4th February 1810. As he early showed a decided talent for music, he was sent to the Royal College in his native city for education, where he greatly distinguished himself and produced

various compositions (1825–29). He settled in England, and in 1831 his ballet of *Kenilworth* was produced with success. He was conductor at the King's Theatre (1832), at Covent Garden (1846), to the Philharmonic Concerts (1846), and to the Sacred Harmonic Society (1848). His great work, the oratorio *Eli*, produced at the Birmingham Festival of 1855 (where he conducted till 1879), raised him to eminence as a composer. *Naaman*, which was less successful, was first sung in Birmingham in 1864. From 1857 till 1877 he conducted at the Handel Festival, and in 1871 he became director of Her Majesty's Opera. He was knighted in 1869. Costa was the author of several ballets, and of some operas, including *Malek Adhel* (1838) and *Don Carlos* (1844). As a composer he holds a respectable place, but it is as a conductor that he will be longest remembered, Meyerbeer, in 1862, styling him 'the greatest *chef d'orchestre* in the world.' He died 29th April 1884.

**Costa Rica**, the most southerly of the five older republics of Central America, is divided into seven provinces (San José, Alajuela, Heredia, Cartago, Guanacaste, Punta Arenas, and Limón), and occupies the entire breadth from sea to sea between Nicaragua on the one side and Panamá on the other, with an area of 20,000 sq. m., or about two thirds that of Ireland. The population, which is mostly concentrated in a central plateau of about 3500 sq. m., was in 1885 officially estimated at 213,785, including some 10,000 uncivilised Indians; in 1921 (with 3500 Indians) at about 468,000. The whites are mostly of pure Spanish descent. Except on the coast, the country is generally mountainous, with many volcanoes, all under 11,500 feet; on the Atlantic slope dense forests prevail, but wide savannahs are more frequent on the Pacific side. The climate is mild and temperate in proportion to the elevation, and the soil of the valleys and uplands is very fertile. Prior to the discovery of gold in 1823, Costa Rica was a land of poverty, owing its title of 'The Rich Coast' solely to the anticipations of its first Spanish settlers; since then, foreign capital has opened up much of the country, and brought its products within reach of a market. Although rich in gold, silver, manganese, copper, and other metals, its chief industry is agriculture; but the population is very scanty, and only a twentieth part of the land is under cultivation. Besides valuable timber and dye-woods, it yields tobacco, sugar, bananas, cacao, rubber, sarsaparilla, and vanilla, which, with hides, tortoise-shell, and mother-of-pearl, are largely exported. But the staple is coffee and bananas, of which latter over 10,000,000 bunches are exported. Of the total annual exports, coffee and bananas represent about five-sixths. The imports are chiefly manufactured goods from Great Britain, and wheat and other products from the United States. The chief ports are Punta Arenas and Limón (q.v.); the other places of any note are San José, the capital, and the cities of Cartago, Alajuela, Heredia, and Limón.

Discovered by Columbus in 1493, and probably first settled on his fourth voyage, in 1502, Costa Rica has had much the same history as its neighbours: *pronunciamentos* have been frequent; the 1872 constitution was the ninth since the declaration of independence in 1821; and for the ten years preceding 1883 that constitution was practically suspended. It has been repeatedly altered. The president is chosen every four years, and the members of congress are elected for the same term. There is a small standing army, besides a militia, which embraces all males between the ages of eighteen and fifty. The peace strength is about 500, the war strength 50,000. Although the Roman Catholic is the state church (with an archbishop

of Costa Rica and a bishop of Alajuela), religious liberty is guaranteed. There are 400 miles of railway. A movement for Central American federation was set afoot in 1920; but Costa Rica held back, and meanwhile the other states fell apart again. A boundary dispute of old standing with Panamá was settled in Costa Rica's favour in 1921, after an invasion by Costa Rica of the territory claimed by both and held by Panamá.

See Niederlein, *Costa Rica* (Phila. 1898); Villafranca, *Costa Rica* (N. Y. 1895); and books by Biolley (Washington, 1889), Calvo (Chicago, 1890), Peralta (Lond 1873), and De Périgny (Paris, 1910 and 1918); and for the history, Fernandez (1889) and Barrantes (1892).

**Costello**, LOUISA STUART, English authoress, was born in 1799, daughter of an army captain in the baony of Costello, Co. Mayo. In Paris, and afterwards in London, she painted miniatures, and enjoyed the patronage of the Burdett family. From 1852 she received a civil list pension of £75 until her death, which took place at Boulogne, 24th April 1870. Her first production, at least of any note, was *Specimens of the Early Poetry of France* (1835), but it was her bright descriptions of travel in Auvergne, Béarn and the Pyrenees, North Wales, Venice, and the Tyrol, that made her really popular. Her semi-historical novels on Catharine de' Medici, Mary of Burgundy, and Anne of Brittany were read in their day.

**Coster**, the usual name of LAURENS JANSZON, according to the Dutch the inventor of printing, who was born at Haarlem about the year 1370. He is supposed to have made his great invention between the years 1420 and 1426, to have been sacristan (*Koster*) at Haarlem, and to have died of the plague about 1440. No question has caused more discussion than that between Coster and Gutenberg; an account of this controversy is given under PRINTING. It is unpatriotic not to argue for the native hero, whose relics are exhibited and to whom monuments have been raised. Yet the most thoroughgoing assault on the claims of Coster and of Haarlem, as being founded on local legends, was made in 1870 by a Dutchman, Dr A. van der Linde. See, however, Hessels, *Haarlem the Birthplace of Printing* (1888).

**Costiveness**. See CONSTIPATION.

**Costmary**, ALE-COST, or simply COST (*Chrysanthemum Balsamita*, or *Balsamita vulgaris*), is a herbaceous perennial composite of southern Europe. It was introduced from Italy in 1568, and is cultivated in gardens (as in Britain, and in the United States) for the fragrance of the leaves. The leaves were formerly put into ale and negus, and are still occasionally used by the French in salads.

**Costs**, the technical name in English law for the expenses incurred in legal proceedings. (In Scotland they are called Expenses, q.v.). Costs are either (1) between solicitor and client—i.e. the charges which a solicitor is entitled to recover from the person employing him as remuneration for professional services; or (2) between party and party—i.e. those which are allowed to the party succeeding in an action against his adversary. As a general rule, costs follow the event, and the costs of the successful party are paid by the loser; but the rule is subject to important exceptions. (1) A party suing or defending *in forma pauperis* does not pay costs, though he is entitled to receive them if successful. (2) In actions in which the plaintiff recovers damages under 10s., he is, in certain cases, not entitled to costs, unless the presiding judge certifies that he ought to have them; and in all other cases, he is not entitled to them, if the presiding judge certifies that he ought not to have them. (3) A plaintiff who might have brought his action in the county court is not entitled to costs

if he sues in the higher courts, and recovers not more than £10 in certain actions, or £20 in others, unless the judge who tries the case certifies that it was proper the action should have been brought in the higher court. (4) A party who is successful in the main, and therefore entitled to the 'general costs,' may be unsuccessful upon some minor point, and therefore bound to pay the costs which belong properly to it. (5) A party who has tendered the amount recovered, and who pays the sum into court, and pleads the tender, is not bound to pay costs. (6) The payment of money into court in the course of an action relieves the party paying from costs of subsequent proceedings, if no greater amount be ultimately recovered.

In suits by and against the crown, the same rules concerning costs apply as in the case of private suits. In administrative proceedings, such as actions for the execution of trusts, or proceedings to ascertain the construction of a will, executors, trustees and others, who have properly or necessarily taken part in the proceedings, are allowed their costs out of the fund or estate involved. When any step in an action is put off at the request of one of the parties, that party is usually required to pay to the other the costs of the particular step. These are called 'costs of the day.' By the Judicature Act, 1875, it was enacted that the costs of all proceedings in the High Court shall be in the discretion of the court; and that where any action is tried by a jury the costs shall follow the event unless for cause shown the judge shall otherwise order.

Costs are taxed (i.e. the items allowed or disallowed) by the officer of the court appointed for the purpose under the name of the taxing-master; and any party may have, if he choose, his own attorney's or solicitor's bill taxed by the same officer.

In criminal cases, the prosecutor's costs may be allowed by the judge, and in that case are paid out of the county rates, the county being reimbursed by the Treasury; and on acquittal of a person indicted who has not been committed or held to bail, the court may order the prosecutor to pay costs to the accused if it think the prosecution unreasonable.

The English doctrine of allowing costs to the successful party generally prevails in the United States. The right to costs, and the rate of costs, is dependent upon statutes which must be strictly construed. The Federal Courts allow costs according to the rates allowed by state law, unless contrary to some act of congress, in which case the latter will prevail as against the state law. By Act of Congress in 1853 a Fee Bill was established regulating the costs in the Federal Courts. This act, by implication, denies costs to the losing party, which in some cases are allowed by the state laws. The rule of one state as to costs cannot be applied to cases involving contracts of that state litigated in another forum. If the cause is removed from the state to the Federal Courts, the parties are entitled to costs according to the state law before removal, and after under the Act of Congress.

**Costume**. See BENEDICTINES, BREECHES, BOOTS AND SHOES, FASHION, HAIR-DRESSING, HAT, MASQUERADE, SUMPTUARY LAWS, THEATRE, VESTMENTS, WIG.

**Costus**, a widely distributed genus of Zingiberaceæ (q.v.), has two sterile stamens united to form a very large and brilliantly coloured lip, and one fertile stamen, also petaloid. The sepals and petals are relatively small. The flowers are aggregated in spikes. The aromatic *Costus*, or *Costus Arabicus*, is not got from this genus, but from the composite *Sausurea hypoleuca* (*Aplotaxis auriculata*), a native of

the moist, open slopes surrounding the valley of Kashmir. The roots are there burned as incense, and used in medicine. They are also employed in protecting bales of shawls from moths.

**Cosway, RICHARD, R.A.**, miniature-painter, was born in 1740, son of the master of Tiverton school in Devonshire. He studied at the Royal Academy, of which he became a member in 1771. He painted oil-subjects, aiming at the sweetness and softness of Correggio; but it was in portraiture that he made his mark, and soon his miniatures were 'not only fashionable, but the fashion itself.' Having gained the personal friendship of the Prince of Wales, he was appointed his painter-in-ordinary, and Mrs Fitzherbert and all the beauties of the coterie sat to him. His small female full-lengths with the faces finished in water-colour, though slight in execution, are full of exquisite grace; and his ivory miniatures are also delicate and valuable. Personally Cosway was vain and eccentric. He died 4th July 1821. In 1781 he married MARIA HADFIELD, a skilful musician, also known as an artist; she executed subjects for Boydell's *Shakespeare*, and Macklin's *Poets*. She founded a girls' school at Lodi, and died there in 1838. See G. C. Williamson's *Cosway* (1906).

**Côte-d'Or**, a department in the east of France, formed of part of the old province of Burgundy, with an area of 3391 sq. m., and a pop. (1921) of 321,088 (declining). The surface is elevated, and is traversed by a chain of hills forming the connecting link between the Cevennes and the Vosges. A portion of that range, called the Côte-d'Or ('golden slope'), receives its name, which it gives to the department, from the excellence of the Burgundy wines produced on its slopes. Much of the surface is covered with forests. The valleys and plains are fertile, and there is good pasture-land. Côte-d'Or is watered by the Seine, which rises in the north-west, and by several of its affluents; by the Saône, and by the Arroux, a tributary of the Loire. By means of canals it has water-communication with the German Ocean, Mediterranean, English Channel, and Bay of Biscay. Iron, coal, marble, and gypsum are found.

**Cotelerius** is the Latin name of Jean Baptiste Cotelier (1629-86), a French patristic scholar, who edited the Apostolic Fathers, the *Monumenta Ecclesiae Græcæ*, and some of Chrysostom's works.

**Cotentin**, THE, the peninsula projecting from the north-west of Normandy into the English Channel, between the Bay of St Michel and the Gulf of Carentan, now forms the northern part of the department of La Manche. It is about 55 miles long and 25 broad. Under the dukes of Normandy, the Cotentin became the seat of numerous powerful barons and rich abbeys. Many of the former followed William the Conqueror to England in 1066, and the names of several of the aristocratic families of England may be traced to humble towns and villages on this peninsula (e.g. Beaumont, Bruce, Carteret, Neville). The Cotentin is highly fertile, and is famous for its herds of fine cattle. The chief town in the peninsula is Cherbourg, though the old capital is Coutances.

**Cotes, ROGER**, a mathematician, whose remarkable promise was cut short by untimely death, was born at Burbage, near Leicester, July 10, 1682. He had his education at St Paul's School, London, and Trinity College, Cambridge, where he was elected fellow in 1705, and next year, through the influence of Newton, Whiston, and Bentley, Plumian professor of Astronomy and Natural Philosophy. He was elected F.R.S. in 1711, and took orders in 1713. His principal work is the admirable preface explaining the Newtonian philosophy, and answering objections to gravitation, prefixed to the second

edition (1713) of Newton's *Principia*. Various original mathematical papers, tending greatly to the development of logarithms, were edited after his death, which took place 5th June 1716. 'Had Cotes lived,' said Sir Isaac Newton, 'we might have known something.'

**Côtes-du-Nord** ('northern coasts'), a French department forming part of Brittany, and bounded N. by the English Channel, in which are several small islands belonging to Côtes-du-Nord. Area, 2786 sq. m.; pop. (1872) 622,295; (1921) 537,824. The Menez Mountains, 16 miles broad and 1115 feet high, cross the department from east to west, and chiefly consist of granite and clay-slate. There are several short but navigable rivers. Though a great portion of the south and the higher plains is occupied by heath and woods, there are also fertile tracts. The cultivation of flax and hemp, with pasturage and iron-mining, supply employment in the hill-districts; while in the sheltered valleys and on the coast-levels grain, pears, apples, &c. are produced. The department is divided into the five arrondissements of St Brieuc, Dinan, Loudéac, Lannion, and Guingamp. The chief town is St Brieuc.

**Coteswold**, or COTSWOLD HILLS, a range of oolitic limestone hills, running through the middle of Gloucestershire, from Chipping Campden in the NE., by Cheltenham and Stroud, to Bath in the SW. The range is over 50 miles long, with an average height of 500 or 600 feet, and separates the Lower Severn from the sources of the Thames. The highest point is Cleve Hill, 1134 feet. For the Coteswold Games, see ATHLETIC SPORTS.

**Cotgrave, RANDLE**, author of our earliest French dictionary, but of whose life little is known save that he was a native of Cheshire; was admitted scholar of St John's College, Cambridge, in 1587; became secretary to William Cecil, Lord Burghley; and was alive as late as 1632, in which year he carried the second edition of his dictionary through the press. The first edition had appeared in 1611, and editions revised by James Howell were issued in 1650, 1660, and 1673. Cotgrave's dictionary was a really remarkable book for its time, and is still invaluable to the philologist, not only as a storehouse of older English words, but because it fixes the actual forms of French words—though it is inevitably crowded with mistakes.

**Cöthen**. See KOTHEN.

**Coturnus**. See BUSKIN.

**Cotillon**, the name of a brisk dance, of French origin, performed by eight persons. The quadrille may be regarded as a modification of it.

**Cotinga**, a genus of Passerine birds, represented by six species in Central and in tropical South America. The family (Cotingidae) to which they belong is often called the Chatterers of South America, though the name Chatterers (q.v.) is by others confined to the Ampelidæ. They are fruit-eating birds, and the males are very beautifully adorned in blue or violet at the breeding season. See COCK OF THE ROCK.

**Cotman, JOHN SELL**, an artist of the 'Norwich School,' was born 16th May 1782, and educated at Norwich grammar-school, till, about 1798, he went up to London to study art, and there made Turner's acquaintance. He exhibited at the Royal Academy in 1800. In 1807 he returned to his native city, where he taught drawing and published etchings and engravings of local architecture, brasses, &c. He joined the Norwich Society of Artists, of which he became president in 1811. In 1834 he obtained, through Turner, the post of drawing-master in King's College, London, but his later years were clouded by much suffering. He died 24th July 1842.

Cotman's fame as a water-colour landscapist has grown steadily; indeed Mr Cosmo Monkhouse opines that 'taken altogether he was the most gifted of the Norwich School, wider in range, a finer draughtsman, and of more refined individuality than "Old Crome."' His sons, Miles Edmund (1810-58) and Joseph John (1814-78), were also landscape-painters. See W. F. Dickes, *Norwich School of Painting* (1905); Oppé, *The Water-colour Drawings of Cotman* (1923).

**Cotoneaster**, a genus of Rosaceæ, sub-family Pomoidæ, closely allied to the hawthorn and medlar. The species are shrubs or small trees, some evergreen, with simple entire leaves, more or less woolly beneath; small flowers in lateral cymes; and small, unpalatable, but bright-coloured fruit, persistent in winter. *C. vulgaris* (now extinct in its only British station, Great Orme's Head) and other species are common mountain plants of central Europe and Asia, but have been largely introduced as ornamental shrubs, the evergreen species (*C. rotundifolia*, &c.) being especially used for covering walls and rockwork.

**Cotopaxi**, the loftiest active volcano in the world, is in Ecuador, in the eastern chain of the Andes, and about 50 miles S. of the equator. Humboldt gave the height at 18,880 feet; Reiss, the first to ascend it (in 1872), at 19,500 feet; Whymper, who ascended in 1880 to the edge of the crater, at 19,550 feet above the sea. The valley at its foot, however, is itself 9000 feet high. The upper part of Cotopaxi, a perfect cone of 4400 feet, is entirely covered with snow, save that the verge of the crater is a bare parapet of rock. Below the snow is a well-marked barren belt covered with lichens and shrubs, below which again is forest. Smoke issues from the summit; sounds as of explosions are occasionally heard; and above, a fiery glow is often visible by night. Lava rarely flows even during eruptions, but flame, smoke, and immense volumes of ashes are then ejected; and when the heat melts large masses of the snow lying on the sides, destructive floods are occasioned in the valleys beneath. The first eruption recorded was in 1533. Others followed in 1698, 1743, 1744, and 1768, the most terrible of all, when ashes were carried 130 miles' distance, thickly covering an extensive area. Cotopaxi was quiet till 1851. In 1854, 1855, 1856, 1877, 1880, there were again eruptions of more or less violence.

**Cotrone**, a fortified town of Italy, 35 miles NE. of Catanzaro by rail, built on a point of land projecting into the sea; pop. 10,000. See CROTONA.

**Cotswold Hills**. See COTESWOLD.

**Cotta**, a publishing-house established at Tübingen in 1640, and still one of the most flourishing in Germany. The family came originally from Italy. Its most prominent members have been (1) Johann Friedrich (1701-79), a learned writer and theological professor at Tübingen, Göttingen, and Jena; (2) his grandson, Johann Friedrich, Freiherr Cotta von Cottendorf, born at Stuttgart in 1764, educated at Tübingen, and for some time an advocate. In 1787 he undertook the family business; and in 1795 established the famous *Horen*, a literary journal, under the editorship of Schiller, with the friendly co-operation of Goethe and Herder. Already in 1793 he had sketched out the plan for the *Allgemeine Zeitung*, which has appeared since 1798. The *Almanach für Damen* (1798) and other periodicals were no less successful. Cotta now began likewise to publish the works of Schiller, Goethe, Herder, Fichte, Schelling, Jean Paul, Tieck, Voss, the Humboldts, &c., establishing thereby a claim to the gratitude of the wide literary world. In the seventy years ending in 1864, the house had paid to Schiller and his heirs no less a sum than 528,966 marks, to Goethe and his heirs

in the same period, 865,554 marks. In 1810 he changed his residence to Stuttgart, and in 1824 introduced the first steam printing-press into Bavaria. He died 29th December 1832. In the diet of Württemberg, and afterwards as president of the Second Chamber, he was ever the fearless defender of constitutional rights; he was, too, the first Württemberg proprietor who abolished servitude on his estates. He was succeeded by his son, Georg (1796-1863); and he by his son Georg Astolf (1833-76).

**Cottage**, a small dwelling-house, especially of labourers, varying greatly in size, appearance, and comfort. Since 1860 especially, public attention has been called to the deplorable state of the cottages in many parts of Great Britain, and the desire to secure their improvement has led to the publication of many works on Cottage Architecture, including those of Birch (1872), Young (1872), and those connected with the Cheap Cottages Exhibition at Letchworth in 1905.

**Cottbus**, or KOTTBUS, a town of Prussia, in the province of Brandenburg, situated on the Spree, 71 miles SE. of Berlin by rail. It is an important railway junction and a busy mercantile town, with manufactures of woollen cloth, carpets, hats, linen, jute, leather, and tobacco. Pop. (1875) 22,642; (1900) 39,327; (1910) 48,643; (1919) 48,046.

**Cotters**. See CROFTERS.

**Cottin**, SOPHIE (née Risteau), French authoress, born at Paris in 1770, married at seventeen a Parisian banker, who left her a childless widow at twenty. For comfort she turned to letters, wrote verses and a lengthy history, and in fiction won unfading laurels. She had already written *Claire d'Albe* (1797), *Malvina* (1800), *Amélie Mansfield* (1803), and *Mathilde* (1805), when in 1806 she wrote *Elisabeth, ou les Exilés de Sévère*, a story stamped with such real unsought pathos that it has been translated into most European languages. Madame Cottin died 25th August 1807.

**Cottle**, JOSEPH, bookseller and author, born in 1770, was well read in English literature when he started business in Bristol in 1791. He took kindly to Coleridge and Southey, to whom he was introduced by Robert Lovell, and offered them each 30 guineas for their poems; and in addition 50 guineas for Southey's *Joan of Arc*, with 1½ guineas to Coleridge for every additional 100 lines of poetry he might write. The poems thus arranged for appeared in 1796. Cottle also became responsible in a business, and partly in a pecuniary, sense for Coleridge's *Watchman*; and an introduction to Wordsworth led to his publication of the afterwards famous *Lyrical Ballads* (1798). Cottle was entrusted with the delicate duty of handing over De Quincey's generous donation of £300 to Coleridge, to whom he also addressed some serious expostulations as to his indulgence in opium, which drew replies from the poet. Cottle's injudicious and unmerciful exposure of Coleridge's failings in his interesting but frequently inaccurate *Early Recollections* (1837) has served largely to gibbet himself as a somewhat obtuse and self-righteous Philistine. He wrote several volumes of verse, including an epic on Alfred the Great and a poem on John the Baptist. The fourth edition of his *Malvern Hills* (1829) contains several prose essays, one of them on the authenticity of Chatterton's Rowley poems. He retired from business in 1799, and died 7th June 1853.—His elder brother, AMOS SIMON COTTLE (1768-1800), educated at Bristol and Cambridge, wrote various works, including *Icelandic Poetry* (1797), a verse translation of the Elder Edda neither faithful nor poetical (probably from a Latin version); it contains a poetical address to him from Southey.

**Cotton** is one of the most important natural products in the world. It furnishes a large part of the clothing of the human race in almost all climes. It is also employed extensively in the manufacture of other articles. Flax, the origin of linen, has been of the utmost service to man, but beside cotton it occupies a very subordinate position. Of the crops of the world, cotton, wheat, and wool meet most extensively the pressing needs of man. And from the cotton-plant it is not only cotton-wool that is obtained. From its seed we derive cotton-seed oil and cotton-seed cake, or meal, which is so fattening a food for live-stock; and from the rugged stalk of the plant the genius of man mysteriously elicits superfine milk-white writing-paper. The Middle English word *coton* or *cotoun* comes through the French and Provencal from the Portuguese *côto*, and that from the Arabic *qutn*, *qutun*. The generic *Gossypium* of the botanists is Pliny's word.

**Varieties of Cotton.**—Everybody knows that cotton is a vegetable wool which is found in tropical and sub-tropical areas. More exactly, the latitudinal range of its cultivation lies between 43° north and 33° south of the equator. Of its species four are primary—viz.: (1) *Gossypium Barbádense*, (2) *G. herbaceum* or *indicum*, (3) *G. peruvianum*, and (4) *G. arboreum*. The yield of the first species



Cotton (*Gossypium Barbádense*):

a, ripe capsule after dehiscence; b, a seed; c, the same deprived of its hairs.

is the most valuable. The beautiful long-stapled ( $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches) silky down known as 'Sea Island' is a variety. It is grown exclusively upon the islands and a portion of the mainland of Georgia, South Carolina, and Florida. The saline ingredients of the soil and atmosphere in these places are supposed to be indispensable to its satisfactory production. The plant is 6 to 12 feet in height. A large percentage of the crops raised in Alabama, Louisiana, Mississippi, Texas, &c. are also varieties of the first species; though, probably owing to climatic influences, the plant of these districts, which is 4 to 6 feet in height, is smaller than the Sea Island plant, and the wool of the former is less easily separated from the seeds than the wool of the latter. The better descriptions of Egyptian cotton, the staple of which varies from 1 to  $1\frac{1}{2}$  inch, belong also to *G. Barbádense*. Its colour is not white or gray like that of other cottons, but a light brown. *G. herbaceum* is found in India, China, Africa, and some other parts. The principal com-

mercial varieties of its wool are those known as Surat, Madras, Bengal, &c. It is a small, shrubby plant from 2 to 4 feet high. The staple of its wool, though not long ( $\frac{1}{2}$  to 1 inch), is very fine. To this species the cotton known as nankeen is thought to belong. *G. herbaceum* can be profitably cultivated in colder countries than any other kind of cotton-plant. The third species, *G. peruvianum*, is a native of South America; the 'green seed' cotton of the United States appears to be of its family. Its stem reaches to as much as 10 to 15 feet; the fibre of its wool is in length 1 to  $1\frac{1}{2}$  inch, and is strong-stapled. Pernambuco, Maranhão, Bahia, Maceio, and Peruvian are examples. *G. arboreum*, raised in India and China in bulk, as its name imports, is a large, tree-like plant. Varieties have been long cultivated in the United States. The finer kinds of yarn are spun from Sea Island and long-stapled Egyptian.

**Supplies of Cotton.**—At the close of the 18th century 70 per cent. of the cotton used by Great Britain came from the West Indies, and 20 per cent. from the Levant. To-day over 80 per cent. is derived from the United States, and about 15 per cent. from Egypt. Little Indian cotton finds a market in the British Isles; but it is used to far larger extent in Continental Europe. Roughly speaking, half of the Indian crop feeds Indian spindles; of the remainder one-quarter goes to China and Japan, and three-quarters come to Europe; and of that which penetrates to Europe no more than 10 per cent. ordinarily finds its way into England.

The history of cotton-growing in Egypt reads like a romance, and eloquently testifies that attempts to plant new agricultural industries in countries may be productive of truly marvellous consequences. From time immemorial cotton has existed in Egypt, but the Egyptian cotton known to commerce was introduced some time prior to 1820 by Maho Bey from the Isle de Bourbon, where also it was not indigenous, but an immigrant from Barbados. Its cultivation in Egypt was fostered by Mehemet Ali, Jumel, that most enterprising of Frenchmen, who had noticed the cotton in Maho Bey's garden in 1820, and had created a plantation of his own, was placed in control of the viceroy's cotton-fields. Under his wise direction the new husbandry prospered beyond the dreams of its originators. To-day the Egyptian crop is enormous, and is highly prized. At present its cultivation is confined to the delta and parts which admit of irrigation from the Nile. In Egypt, owing to the dryness of the atmosphere, the cotton-fields can be flooded periodically without damage to the plants. Can the Egyptian supply be still further increased? one naturally inquires. This question has for long excited the speculation of experts. But unfortunately, apart from improvements in methods of cultivation, particularly in the use of water (which, according to the allegations of competent investigators, is at present injudicious, so that the land becomes water-logged, and the cotton-plant suffers in both the quantity and quality of its yield), the best-reasoned answer would seem to be in the negative. The area under cotton is strictly dependent upon the amount of water that can be supplied by irrigation, and in the irrigated area cotton has to compete with other crops. It is possible, of course, to extend the perennially irrigated area; to do this water-supplies are adequate. To the north of the cultivated portions of the delta is a large district of waste-land, once the most fertile in all Egypt; and in Upper Egypt and the Sudan large tracts exist which would yield cotton. Vast projects for watering these lands have been conceived, such as the Wady Rayan reservoir and the barrage at Lake

Albert; and the dreams of one generation may become the actualities of the next.

That India should be a poor third in the production of cotton is in some respects surprising. The conditions of climate and soil in that country are by no means unfavourable to cotton universally. Nevertheless, in India the total supply is comparatively small, the yield per acre is meagre, and the cotton is, as a rule, coarse, short-stapled, and dirty. Probably all native varieties of cotton have deteriorated through exhaustion of the soil and careless cultivation. But success has been met with in attempts to improve indigenous plants and educate the Indians, both of late and in the earlier days of endeavour to extend the sources of cotton, to which reference will be made next. Since 1860 the cotton production of British India has increased threefold.

Attempts to encourage the cultivation of cotton in districts where it is unknown or neglected have not been confined to the last few years. In 1857 an association known as the Cotton Supply Association was set on foot in England. Its objects were stated thus: 'To afford information to every country capable of producing cotton, both by the diffusion of printed directions for its cultivation and sending competent teachers of cotton planting and cleaning, and by direct communication with Christian missionaries, whose aid and co-operation it solicits; to supply, gratuitously in the first instance, the best seeds to natives in every part of the world who are willing to receive them; to give prizes for the extended cultivation of cotton; and to lend gins and improved machines for cleaning cotton.' The pioneers who banded themselves together in this association were frightened into their action by the restriction of cotton-supplies which was being experienced at the time. Some believed that American cultivation had reached its ultimate limits, and all were convinced that periodic dearths of raw material for cotton-spinning would be less likely and less severe were supplies obtainable in bulk from more parts of the world. Between 1840 and 1860 the American cotton crop increased 100 per cent., while European, including English, spindles increased about 150 per cent. and improved vastly in productive power. But the association, after some cheery successes, was doomed eventually to comparative failure; as the action of the British government prior to the birth of the association had been also. The elasticity of American sources had been enormously underestimated. Between the middle of the 19th century and its close they were destined actually to be augmented fourfold without such additional pressure on the land as to render production more costly.

But American supplies cannot be inexhaustible, though it may be that they are still far from having reached the end of their tether. And still it is felt as a possible danger by many spinners that the cotton industry is so absolutely dependent on a certain area of the United States for keeping its nimble spindles humming week in and week out. It need excite no surprise, therefore, that more than one association has sought in recent times to spread more widely over the globe the cultivation of cotton. England has had for some years its Cotton Supply Association; a German Colonial Agricultural Committee was started in 1896, and the Association Cotonnière Coloniale in 1902. Russia, too, has given attention to the matter. In 1904 the International Congress of Master Cotton Spinners and Manufacturers formally bestowed their blessing upon what was being done, and urged the need of more strenuous action. So far results have been encouraging. The English association is yearly bringing forward substantial

crops from West Africa (particularly Lagos and northern Nigeria), East Africa, and the West Indies; but as yet the whole of them make up an exceedingly small fraction of the total cotton imports of the United Kingdom. Much time is needed to effect anything appreciable in enterprises of this kind, and naturally immense obstacles have been encountered. Transportation has been a difficulty and labour has been a difficulty. But after the reports which have been made, there seems no sufficient reason to suppose that the parts of Africa where American and Egyptian plants can be acclimatised may not prove eventually, when the industry is firmly established, to be steady sources of a rich supply.

To what extent may an expansion of the American output be looked for? Upon the answer to this question much that is of vital concern to the human race may depend. In the United States, of the cotton area not more than 20 per cent. has at any time been cultivated at all, and as much as 10 per cent. has never been under cotton. It is claimed that the worn-out cotton-lands in the Eastern states might be restored to fertility and so worked that they would not relapse to their present condition, that the black prairie-lands of Texas could produce a great deal, and that superior methods of cultivation on lands now tilled might raise the yield per acre. For our generation, however, these are vague possibilities, with the exception of improvement in cultivation, of which there are already signs.

On the whole, to sum up our findings as regards supplies, there would seem to be no justification which is not remote for the pessimistic conclusion that decreasing returns will soon operate so strongly in the production of cotton that the price of textiles, which have become a necessity of existence, will be sensibly magnified.

This section may be fitly concluded with a quantitative review of existing supplies. The following figures are approximate, and are obtained by roughly averaging the harvests of some recent years when there has been no shortage. As an estimate of the world's cotton crop, they show the relations between different sources of supply.

	1000 Bales of 500 lb. each
United States . . . . .	18,000
India . . . . .	3,000
Egypt . . . . .	1,300
Russia . . . . .	500
China . . . . .	400
Brazil . . . . .	250
Mexico . . . . .	125
Turkey . . . . .	100
Peru . . . . .	50
Other countries . . . . .	100
Total . . . . .	18,775

*Cultivation.*—The most perfect system of cultivation is probably that which prevails in the United States of America, and has been adopted in many other places. Although the plant is not, strictly speaking, an annual, it is found most profitable to destroy the shrub, after the crop is gathered, and sow new seed every year. In the United States sowing usually commences in March, and may extend to May. Picking generally commences in August, occasionally in July, and continues until the occurrence of frost—about the end of October or beginning of November—puts a stop to the further growth of the plant. Picking has extended to December or January, and even into February, but the later cotton, the plant getting exhausted, is inferior in grade and quality. Sowing generally takes place between June and September, according to the district; in India and in Egypt, in March or April.

After picking, the cotton is spread out to dry. When it is dry, the first process of cleaning begins,

the separation of the wool from seed and the worst dirt. This is effected by rollers or by the saw-gin invented by Eli Whitney in 1793. The principle of the saw-gin is to drag the cotton through wires which are set so closely together that seeds cannot pass between them. This machine is employed for cleaning only the short-stapled varieties of cotton, the wool of which adheres so firmly to the seeds as to require a considerable force to separate it. The Sea Island variety is cleaned by the roller system, which consists in two small rollers revolving in opposite directions. Through these the cotton is passed, and they easily throw off the hard, smooth seeds. The Macartny-gin is an improvement on the roller-gin. Of these machines, the saw-gin is the fastest in its action, and therefore, as it happens in view of its cost, much the cheapest to clean with.

Baling is the next process. It is effected by presses. The sizes of bales vary. The approximate weights of the chief bales in the market are as follows: United States, 500 lb.; Indian, 400 lb.; Egyptian, 700 lb.; Peruvian, 200 lb.; Brazilian, 200-300 lb.

*Marketing of Cotton.*—The bulk of American cotton is shipped from Galveston, New Orleans, and Savannah. The first and last have risen considerably in importance of late years. The bulk of the cotton for England is received at Liverpool. Formerly London was the chief port of entry. Since the Manchester Ship Canal was opened some supplies have come direct to Manchester. The percentage so consigned is now substantial. On the Continent the chief cotton-markets are at Bremen and Havre.

The peculiarity of the marketing of cotton is the extent to which 'futures' are used. A 'future' is a contract to deliver a stated quantity of cotton within an agreed period in the future at a price fixed in the present. In order to limit the variety of the contracts entered into on a cotton-market, every 'future' is made to relate directly to one quality, or grade, only. Other grades of the same family, so to speak, are declared to be deliverable, on payment of allowances to or by the purchaser, according to the inferiority or superiority, as the case might be, of the grade delivered to the grade which is the basis of the future contract. Allowances are settled on some agreed principle. Delivery of the commodity is seldom made against 'futures' for reasons which will transpire. They are ultimately bought back, as a rule, when delivery is offered, or any time before.

'Futures,' properly used, enable cotton to be so spread over the year that at no time is it too scarce or too plentiful. Moreover, they are a great aid in affording a means whereby spinners and brokers may evade certain risks. Let us consider the case of the spinner. He is speculating if he quotes prices for future deliveries of yarn without knowing what his raw cotton is going to cost him. He can avoid speculating, of course, by buying at once all the cotton that he needs to execute his orders, but if the price of cotton were generally expected to fall he would be ill-advised to do so. And if he did so the community would lose, because the price of cotton when it was high would be raised still higher, and the range of variation in the price of raw cotton would be stretched out. On the other hand, the spinner might buy 'futures' in cotton in quantities and for periods to suit his orders for yarn. But to do this would not be to protect himself completely, because the price of 'futures' varies with the price of some one grade of cotton, which might not be the grade that he wanted. If the grade that he wants rises in relation to this basis grade, against its special rise in price the spinner would not be insured.

So, broadly speaking, we may say that 'futures' provide him with a hedge against a general rise in the price in cotton, but not against a special rise in the price of the exact kind of cotton that he needs. However, the spinner can escape the whole of the risks which we have been analysing if he contracts with some cotton-broker to deliver to him at stated periods stated quantities of the exact kind of cotton that he needs at a price fixed when the contract is made. The broker in turn can hedge against the bulk of the risks involved in his contract by buying 'futures' on the cotton-market, or entering into some of the numerous future transactions which are there embarked upon. He may even make arrangements with other brokers by which he distributes the whole or a part of the risk associated with the 'points on or off'—that is, the risk that the special kind of cotton that the spinner wants may rise more than basis grade rises. Cotton 'futures' have unhappily been abused and employed as agents for sheer gambling; but the gain derived from their introduction has more than exceeded the disadvantages occasioned in this way, and also occasioned by the fact that they have facilitated cornering transactions designed to rob the public.

*Early Days of the Cotton Industry.*—Where the cotton industry first appeared it is impossible to say. Herodotus said of the Indians: 'They possess likewise a kind of plant which, instead of fruit, produces wool, of a finer and better quality than that of sheep: of this the Indians make their clothes.' From the fact that Herodotus thought it worth while to place this on record, it would seem to be a legitimate inference that cotton goods were not in his time common in Europe, where the cotton industry first attained celebrity in Spain as late as the 13th century. Of its early days Baines, in his *History of the Cotton Manufacture*, says: 'In Spain the manufacture, after flourishing to some degree, became nearly extinct. In Italy, Germany, and Flanders it had a lingering and ignoble existence. It would be altogether a mistake to suppose that the same manufacture which now exists in England ever existed in any other part of Europe. A coarse and heavy article was, indeed, fabricated, probably half of cotton and half of linen, but it was of too little importance to attract the notice of historians; and calicoes, muslins, and the more delicate cotton goods were never made in Europe, except possibly by the Moors in the south of Spain, until the invention of spinning machinery in England.' But China, we know, became very early an important seat of the industry, whither it is said to have been carried from India. Probably the most interesting fact concerning its origin is that the methods of transforming cotton-wool into fabrics must have been invented twice at least. When the New World was discovered, people were found clothed in cotton textiles. It is a truly remarkable fact, and one of no slight sociological import, that the chief steps in economic progress have been made by different races independently.

*The Industry in England.*—It is a task of no small difficulty to fix the exact or even approximate date when a trade appeared in any country if its beginnings were remote. For years its existence might have passed unrecorded. But, curiously enough, we can tell within a few years when the cotton manufacture attained a sensible magnitude in England. There are many scraps of evidence bearing on the point, but far the most important is a petition of merchants praying for relief from a patent granted to the Duke of Lennox. From internal evidence it is certain that the date of the petition must be about 1621. In the petition it is stated as follows: 'About twenty years past, divers

people in this kingdom, but chiefly in the county of Lancaster, have found out the trade of the making of the fustians, made of a kind of bombast or down, being a fruit of the earth growing upon little shrubs or bushes, brought into this kingdom by the Turkey merchants, from Smyrna, Cyprus, Acre, and Sydon, but commonly called cotton-wool. . . . There are at least 40,000 pieces of fustian of this kind yearly made in England.' The industry was probably brought to England by refugees from the Netherlands. The reader of early records must be on his guard against supposing that the English 'cotons' referred to before the 17th century were cotton goods proper. They were really woollens, as a closer search of records will reveal. We may take it that the English cotton industry took root about 1600; and by 1641, according to Lewis Roberts's *Treasure of Traffic*, it was most flourishing; but on Radcliffe's showing in the *Origin of the New System of Manufacturing* (1827), it was not until 1770-83 that the cotton trade assumed such a pre-eminent position in Lancashire, its peculiar seat, that it drove away the woollen and linen industries in bulk. The triumphs of the cotton industry about this time, and for the next few decades, were the outcome of the most sensational series of epoch-making mechanical inventions which has ever been compressed into so short a period in the history of civilisation; and, no doubt, in the industrial exhilaration occasioned by the first discoveries, the later ones took their birth. It is astounding that from the time of the introduction of weaving and spinning, countless ages ago, until the 18th century the methods of manufacture, despite some few improvements, remained fundamentally unchanged. In Homer a reference to weaving will be found which might be a description of the methods pursued in England for ordinary fabrics prior to 1738. It was in this year that John Kay hit on the device of the fly-shuttle. Twenty-two years later his son Robert furnished the loom with a drop-box to aid in weaving with many colours at once. In the closing decades of the 18th century Watt's steam-engine was exciting the wonder of the world that knew of it, and in 1787 Cartwright brought the application of steam-power into relation with cotton machinery by designing a practicable power-loom. In 1794 Bell, and in 1798 Miller, took out their weaving patents; and in 1803 Radcliffe and Johnson contrived to render weaving continuous with the ingenious notion of the dressing-machine, which rendered unnecessary the frequent stoppage of the loom for the dressing of the next piece of warp to be worked upon. And spinning was not left in the lurch. Paul and Wyatt had tried spinning by rollers as early as 1738. In 1769 Arkwright improved on their ideas, and in 1775 he added machinery for carding, drawing, and roving. Spinning by rollers on Arkwright's machine, known as the 'water-frame' because it was soon driven by water instead of the old gin-horse, applied to the production of warps, which up to this time had been made of linen, as a rule, because cotton-threads strong enough for the purpose had not been producible. Other machines were introduced which cheapened weft. About 1764 Hargreaves substituted for the single-spindle wheel the 'jenny,' which carried many spindles; and about 1779 Crompton perfected a scheme for making very fine yarns by combining the principle of dragging out the yarn by rollers revolving at different speeds with the older principle of drawing it out by hand. His appliance, named the 'mule' because of its mixed nature, was a 'jenny' and roller-machine in one. The prodigious growth of the industry under these happenings is amply testified by the following rates of increase of importations of cotton:

1741-51. ....	81	per cent.
1751-61. ....	217	"
1761-71. ....	255	"
1771-81. ....	753	"
1781-91. ....	3194	"
1791-1801. ....	674	"
1801-11. ....	894	"
1811-21. ....	98	"
1821-31. ....	85	"

Observe the stupendous growth between 1781 and 1791.

It is hardly needful to remark that many technical improvements have taken place since the halcyon days when almost every decade brought forth its wonder-working machine or machines. But in the intervening period there is nothing path-breaking to record with the exception of ring-spinning—the idea of which was a stroke of genius for which two persons appear to have been independently responsible—and the automatic loom. Ring-spinning, invented in the 'thirties, was not much resorted to till some years later, though to-day the bulk of American yarns are produced on the ring-frame; and for automatic looms, of which there are many kinds, civilisation had to wait until the closing decades of the 19th century. Automatic looms are extensively used in the United States, but they would seem at present to be less suited to conditions in England, where labour is highly skilled and the fabrics produced in greatest bulk need to be woven with some care. Another idea bearing on the mechanics of industry remains to be noticed in passing—namely, the idea of electric-driving, which is already in operation here and there. It is said to have economies, in that power which is not immediately wanted can be stored in accumulators, as it cannot when driving is obtained direct from the generating engines.

Thanks to the initiation of the industrial revolution in England, particularly in its bearing on textiles, England was the producer of cotton goods for the world by the middle of the 19th century. These figures of average annual imports of raw cotton will show what this result meant for Lancashire:

1816-20. ....	130,000,000 lb.
1831-35. ....	290,000,000 "
1851-55. ....	750,000,000 "
1876-80. ....	1,275,000,000 "
1896-1900. ....	1,575,000,000 "
1917-21. ....	1,496,000,000 "

There was a slackening in the rate of advance, it will be observed, about the 'seventies. The numbers (approximate) of spindles and looms in the United Kingdom in different years bear this out:

Years.	Million Spinning-spindles.	Million Doubling-spindles.	Thousand Power-looms.
1876	38	4.4	468
1878	40	4.7	515
1885	40	4.2	561
1890	41	4.0	616
1908	44	4.0	684
1910	54	—	700 (1906)

We must remember, however, that throughout this period machinery was getting more efficient and being worked increasingly at greater speeds, so that each spindle and loom was annually turning out more. Indeed, advance in the productivity of the machinery in the industry was almost continuous throughout the 19th century. Production per spindle probably doubled between 1820 and 1860, and increased substantially after 1860, while production per loom must have doubled in the last fifty years of the 19th century. In spinning in particular the speeding-up of machinery became a striking feature of the industry from the 'sixties on. But despite the augmented productivity of machinery in the last quarter of the 19th century, it is evident, when all statistics are weighed together, that the cotton industry of

England was for the time approaching its zenith. The industry was developing abroad behind tariff barriers. But the average of English spinning is much the finest. This is evidenced statistically by the comparative consumptions of cotton per spindle.

*The Industry Abroad.*—It is as true as most general statements can be that the industrial revolution, which may be assigned to the beginning of the 19th century in England, was hardly noticeable in most parts of Continental Europe before the middle of the 19th century, though France had an extensive cotton industry earlier. The rapid industrial rise of Germany did not occur until after the Franco-Prussian war. But now there are flourishing cotton industries in France, Germany, and Russia, and even, though in a less degree, in Czechoslovakia, Austria, Spain, Italy, and Switzerland.

For long the United States has been a large and efficient producer of cotton goods. Her industry, even on a substantial scale, reaches back to the later days of discovery and restless energy in England. In 1786 models of an early form of the Arkwright machines were smuggled into the United States. In 1788 the Beverly Association began operations with machinery constructed from these models. The second mill was erected in America in 1790, the third in 1795; and in 1798 Samuel Slater, with some of his wife's relatives, began work in a mill which was the first constructed throughout on the principle of the water-frame mills in England. Power-loom manufacturing appeared in 1814. Progress in the industry was not very rapid until the war of 1812-14, when it was fostered by the check on importations from England. When the war was over duties were raised, after some agitation, to preserve what had been acquired. By 1831 there were in the United States—chiefly in the so-called New England states—800 factories, 1,250,000 spindles, 33,500 looms, and 62,200 operatives, and the annual consumption of cotton-wool was as much as 77,000,000 pounds.

The sudden and colossal expansion of the cotton industry in the southern states of North America is one of the most striking features of recent economic history. In 1880 the south contained about half a million spindles; twenty years later it had 6,000,000, besides 200,000 power-loom. In 1880 it consumed annually, on an average, about a quarter of a million bales of cotton; twenty years later it consumed nearly one and a quarter million. South and North Carolina, Georgia and Alabama, are the states affected, and in what is known as the Piedmont district advance has been most rapid. For this astounding growth of the cotton industry in the southern states proximity to the cotton-fields is partly responsible; but it is a less important consideration than one would at first imagine. Probably the dominant influence consisted in cheap supplies of white labour—not black labour, for negroes are normally indisposed to work in factories. The southern states contain a scattered population of half-occupied whites working in connection with the land. From this the wages paid in the factories attracted large numbers. But since the first steps were taken wages have risen in the south under pressure of a big demand, and as an outcome of the organisation of the operatives. There is no reason to suppose that remarkable cheapness of production must be expected for ever in the southern states.

It is not only on the Continent of Europe and in the New World that the cotton industry has attained an impressive magnitude since the days when Lancashire could truthfully be called the world's cotton-factory. Civilisation, as all know, has revived the sluggish East. India is spinning, in mills fitted with European machinery, yarns of

a high average quality, and is turning them out in bulk. In China the same phenomenon may be witnessed on a much smaller scale; but Japan, in industrial as well as all other activity, has been so pushing of late that she is yearly rendering obsolete any figures which may be put forward to indicate the state of her affairs. There is still, however, a vast distinction between East and West in manufacturing, as weaving is technically termed in England. In the East the hand-loom still holds its own in a degree in which it does not even in the most backward parts of Europe. Its use is deeply rooted in the habits and customs of the people.

*Organisation of the Cotton Industry.*—Although the factory cotton industry is now spread so widely over the face of the habitable globe, it must not be imagined that in organisation it is identical in all places. There are obvious, outstanding differences, and others no less considerable, though less immediately apparent. We shall consider now the important points in the organisation of the cotton industry; afterwards in the light of our analysis we shall comment on national differences.

Let *A* and *B* stand for the processes of spinning and weaving. Let small letters stand for the commercial work of buying and selling. Let brackets mark the boundaries of businesses. Then the following are examples of the types of business organisations that are possible:

- (*a*, *A*, *B*, *b*);
- (*a*), (*A*, *B*), (*b*);
- (*a*), (*A*, *a'*), (*b'* *B*), (*b*);
- (*a*), (*A*), (*a'*, *b'*), (*B*), (*b*).

These are only examples of many possible combinations. Let me now explain. *A* and *B* stand respectively for cotton-spinning and cotton-manufacturing (that is, weaving). The letter *a* means the commercial function of buying raw cotton, *b* means selling cotton fabrics, *a'* means selling yarn, *b'* means buying yarn. The formula (*a*, *A*, *B*, *b*) means that a single business takes responsibility for the purchase of its raw material (through a buyer, perhaps, who is a member or employee of the firm), assuming the risk of fluctuation in price; both spins and weaves; and sells as direct as it can to retailers after it has produced. The formula (*a*), (*A*, *B*), (*b*) means that a wholesale house (*b*), which may engage in the home trade or foreign trade, places orders with the spinning and manufacturing firm (*A*, *B*), and that the latter arranges for its supplies of cotton to meet its orders through an independent cotton-brokering firm (*a*), which takes the risk of fluctuation in the price of the cotton needed. In the next formula (*a*), (*A*, *a'*), (*b'*, *B*), (*b*), spinning and manufacturing are represented as having separated into independent businesses. The spinning firm sells its yarn through its seller, and the manufacturing firm buys its yarn through its own buyer. According to the next formula (*a*), (*A*), (*a'*, *b'*), (*B*), (*b*), an independent yarn agent, (*a'*, *b'*), has appeared, through whom (*A*) disposes of its yarns and (*B*) buys its yarn. There would, of course, be many yarn agents and many spinners, and so forth; and the yarn agents might be simply agents (that is, intermediaries taking no risks), or they might be dealers in yarns taking risks.

When spinning businesses are distinct from weaving businesses, it may be said that specialisation by process rules. With specialisation by process we may contrast specialisation by product, which means that a business confines itself to a very narrow range of output. Both kinds of specialisation may obviously exist together.

England is essentially the home of specialisation by process, both by industrial and commercial process. This kind of specialisation is far less common in America and in Continental Europe

than in the United Kingdom. Of course independent spinning is found to rule where there is much hand-loom work—for instance, in the East and on the Continent of Europe; but there little other specialisation by process can be discovered.

The United States has not infelicitously been dubbed the land of specialisation. And yet her specialisation in the cotton industry has mainly been by product, as it has been expressed above. The chief reason would seem to be that the industry, whether in the New England states in the north or in the southern states, is widely scattered. For specialisation by process it is essential that an industry should be concentrated in a small locality, so that marketing at a common marketing centre may be easy and cost of transport may be low. In Lancashire this concentration of the industry is to be found; and nowhere else is it discoverable in the same degree. To the localisation of the cotton industry and the characteristics of different places we shall now devote some attention.

*The Localisation of the Industry.*—In Lancashire spinning and weaving are carried on in the towns around Manchester, with which they are connected with speedy and frequent services of trains. On the Manchester Exchange, in consequence, all parts of the differentiated Lancashire industry can be brought into contact without difficulty. By the activities on the Manchester Exchange the Lancashire industry is created a unity. Given the chance, an industry gains when it differentiates into specialised parts because of the economies of specialisation. Magnificent opportunities for this differentiation were presented in Lancashire; and in other respects the county was as if designed to meet the industry's needs. All the raw material for the manufacture must be imported, and Liverpool offers magnificent harbourage. Moreover, by the proximity of Liverpool the export trade was encouraged. Lancashire, too, provides cheap coal; and, in addition to coal, she enjoys, or suffers from, a climate peculiarly adapted to the production of cotton goods. For spinning, dampness is a desirability. Without it, threads snap in the processes of drawing and twisting. Dampness causes the fibres to cling together. With its humid atmosphere, its coal and its harbour, its climate rendering an indoor occupation desirable, and its general unsuitability for agriculture, Lancashire is marked out as a spot marvellously well endowed for the prosecution of the cotton industry.

The spinning districts of Lancashire lie on the slopes of hills facing west. Upon these the damp breezes from the Atlantic discharge their moisture as they are driven to higher levels by the slope of the ground. In few places abroad where spinning can be located are such conditions to be found. Artificial humidifiers have been tried under unfavourable climatic conditions both in England and abroad; but no cheap and satisfactory ones have yet been discovered. It is for fine spinning in particular that climatic conditions are so important, and consequently it is in the finest spinning that Lancashire is as yet unrivalled. We may notice here incidentally that the fineness of yarns is technically measured by 'counts.' We speak of 'coarse counts' and 'fine counts.' 'Counts' refers to the number of hanks of yarn to the pound. A hank is 840 yards. This peculiar unit is probably derived from the size of the old winding-wheel. A winding-wheel of  $1\frac{1}{2}$  yards in circumference would yield a 'lea' or 'rap,' as it was called (i.e. 80 threads), of 120 yards, and 7 leas would be 840 yards. In the woollen industry the hank of 7 leas was the usual thing.

In broad outlines, the distribution of the industry in Lancashire may be pictured as follows. In a semicircle round Manchester, on the slopes of the

hills, as we have seen, are most of the spinning-mills, in some degree of course associated with local looms. Up the valleys, forming a crescent farther removed from Manchester, are the leading manufacturing (weaving) towns. For all, the trading centre (apart from cotton buying) is Manchester, and the port and cotton-market is Liverpool, supplemented by the inland port of Manchester. It is a remarkable fact that Lancashire districts have specialised by product as well as by process. This is referred to as follows by the late Elijah Helm (sometime secretary of the Manchester Chamber of Commerce), than whom nobody could be more fully equipped with a knowledge of local conditions in Lancashire: 'Spinning is largely concentrated in south Lancashire and in the adjoining borderland of north Cheshire. But even within this area there is further allocation. The finer and the finest yarns are spun in the neighbourhood of Bolton and in or near Manchester, much of this being used for the manufacture of sewing-thread; whilst other descriptions, used almost entirely for weaving, are produced in Oldham and other towns. The weaving branches of the industry are chiefly conducted in the northern half of Lancashire—most of it in very large boroughs, as Blackburn, Burnley, and Preston. Here, again, there is a differentiation. Preston and Chorley produce the finer or lighter fabrics; Blackburn, Darwen, and Accrington, shirtings, dhoolies, and other goods extensively shipped to India; whilst Nelson and Colne make cloths woven from dyed yarn, and Bolton is distinguished for fine quiltings and fancy cotton dress goods. These demarcations are not absolutely observed, but they are sufficiently clear to give to each town in the area covered by the cotton industry a distinctive place in its general organisation.'

The chief cotton towns in Lancashire and its vicinity, in order of importance, measured by the number of operatives, are Blackburn, Bolton, Oldham, Burnley, Manchester and Salford, and Preston. In number of spindles, Oldham surpasses all other places. Bolton stands next. In number of looms Burnley and Blackburn easily take the lead. Next to them is Preston, and thereafter Nelson and Accrington.

Nowhere else in the world is the industry concentrated as it is in Lancashire. In America, as we have seen, it is scattered over two immense areas. In France it has three districts, and in none is it densely packed and well linked up with railway communication. Normandy, containing the important town of Rouen, the north, and the east are the chief seats of the cotton industry in France. Besides Rouen other noteworthy places in the first-named district are Darnétal, Maromme, Sotteville, Havre, Yvetot, Dieppe, Evreux, Gisors, Falaise, and Flers. The northern district contains Lille, Tourcoing, Roubaix, St Quentin, Amiens, and Hellemmes, which are towns of some mark. The chief towns of the east are Epinal, St-Dié, Remiremont, Senones, Val d'Ajol, Cornimont, and La Bresse, and in Alsace, Mülhausen, Gebweiler, and Logelbach. Other towns known for their cotton industries outside the three chief districts mentioned above are the following: Troyes, Nantes, Cholet, Laval, Tarare, Roanne, Thizy, and Villefranche upon the Saône. Turning to Germany, we notice again an industry distinguished by its wide-spread dispersion. Prussia and Saxony lead with the most spindles, but in both the industry extends over an immense area. Bavaria stands next (now that Alsace is lost), but in neither is there a Lancashire in miniature. Württemberg hardly ranks with the regions already mentioned. Three great districts may be distinguished. The one is the south-west, in the neighbourhood of the

cotton districts of east France, Switzerland, and Vorarlberg. It contains Baden, Württemberg, and Bavarian Swabia. Another district may be called 'the middle district.' It covers the localities north of the mountain-ranges of northern Bohemia. In this territory the oldest industry, that of Saxony, has a history stretching back some four hundred years. Finally there is the north-west district (the Rhine Province and Westphalia). The chief spinning towns of Germany in order of importance are Augsburg, Gronau, Werdau, Rheydt, München Gladbach, Rheine, Hof, Chemnitz, Leipzig, Crimmitschau, Bochlolt, Bamberg, and Bayreuth. In what was Russia, the leading cotton towns and regions are Moscow, Vladimir, Piotrkov, Petrograd, Jaroslavl, Kostroma, Tver, Esthonia, Ryazan.

**Foreign Trade.**—From time to time great changes have taken place in the destination of British exports of cotton goods. Half of our exports of cotton fabrics went to Europe in 1820, about one-tenth to the United States, and one-twentieth to eastern Asia. Sixty years later it was eastern Asia which received the half, while Europe absorbed but a twelfth, and the United States a fiftieth only. The relative importance of the eastern market has never declined since. In yarns our European market has not been affected to nearly the same extent. The causes of the great changes in the location of the foreign demand for our manufactured goods are not far to seek. We have already noticed the development of the American and European cotton industries after the middle of the 19th century. And the opening up of the East is a matter of common knowledge. India now imports annually an enormous bulk of cotton goods. Chinese demand, as a substantial thing, dates from the Convention of 1860. Our colonial markets have steadily grown, and will yearly become of greater value.

The cotton goods received by British self-governing dominions and crown colonies come almost entirely from the United Kingdom. The one notable exception is Canada, where, though English goods preponderate, American cottons are also largely imported, despite the preference accorded to articles proceeding from the home country. Of this exception the proximity of the New England states is a sufficient explanation. India also, as well as other outlying parts of the British Empire, depends almost exclusively upon the United Kingdom for its supplies of cotton goods, apart from the large quantities which it makes for itself.

China is the chief market outside the New World for American exports of cotton goods. American manufacturers have achieved wonders in the way of lowering the cost of cheap goods through the automatic loom, and it is in respect of these cheap goods, for turning out which they have organised specialised businesses on a vast scale, that they have made the weight of their rivalry felt. So far, Lancashire has shown no disposition to follow America's lead in trusting to the automatic loom. Lancashire's staple product is of a higher quality.

It is a commonplace saying that foreign trade results in international division of labour. The statement is broadly correct, but at first one might hesitate to accept it, as regards the cotton industry at any rate, seeing that this industry is found all over the world, though nowhere on so great a scale as in the United Kingdom. How can its dispersion throughout the world be explained, and at the same time how account for the fact that countries which export cotton goods import them also? As regards the last point, the reason is twofold. In the nice balance of trade, as a result of its slight fluctuations, a few goods of a kind that a country exports on balance may flow into it. But this is not the chief reason. That is not revealed till we

look into details. When we do so it will be found that the character of the imports differs in bulk from that of the exports. A country may have a famous speciality; thus America has its cheap cloths woven on automatic looms, and France its tasteful prints. And as regards the resisting power of a small industry against the competition of an enormous and long-established rival, it must be remembered that cost of carriage protects the former, that this protection is frequently supplemented by tariffs, and that the small industry can enjoy most of the economies of specialism created by its giant rival. It can specialise in manufacturing certain things and import what it decides not to make, and for its specialised industry it can import, if it likes, the specialised machinery which its competitor has designed and perfected.

**COTTON-SEED OIL**, an oil obtained by pressure from the cotton-seed, of which it constitutes about a quarter. It consists chiefly of palmitin and olein, stands midway between the drying and non-drying oils, is yellowish in colour, almost odourless, and has a slight nutty flavour. The value of this by-product of the cotton plant was not fully appreciated till late in the 19th century, but its uses since then have been continually extending. The refined oil is employed in cooking, in pharmacy, in the preparation of lard and margarine, and as a substitute for olive-oil. The coarser grades are used in the manufacture of soap, paint, candles, and as a lubricator and illuminant.

**Cotton**, CHARLES, the friend of Izaak Walton and translator of Montaigne, was born at his father's estate of Beresford in Staffordshire, 28th April 1630. His father, himself a man of great ability, was a warm friend of Ben Jonson, Selden, Donne, and other illustrious men. The boy travelled on the Continent, devoted himself from youth to a life of letters, and early wrote verses which were handed about among his friends. In 1656 he married his cousin Isabella, half-sister of the famous Colonel Hutchinson. Though a sincere loyalist, he seems to have lived securely enough under the Commonwealth, and the decay of his father's estate was due mainly to unprosperous lawsuits. In 1664 Cotton issued anonymously his burlesque poem, *Scarronides, or the First Book of Virgil Travestie*, added to in later editions in grossness as well as in bulk. Later books, somewhat of the same character, are his *Voyage to Ireland in Burlesque* (1670), and his *Burlesque upon Burlesque, or the Scoffer Scoft, being some of Lucian's Dialogues* (1675). His *Planter's Manual* (1675: from the French) testifies to his zeal for horticulture. Next year he contributed a treatise on fly-fishing to the fifth edition of Walton's *Compleat Angler*, and here he commends his old friend and master, its author, as 'the best and the truest friend ever man had.' Further marks of affection were his commendatory verses in the 1675 edition of Walton's *Lives*; his poem *The Contentation*, as well as an earlier one of invitation to Walton to visit him; and the twisted cipher of his own and his master's names above the door of his fishing-house on the Dove. In 1685 Cotton published his translation of Montaigne's *Essays*—a masterpiece on which his fame still rests securely. He died in 1687. Cotton's verses have not a few felicities of thought and phrase, but have been overpraised by Coleridge, Lamb, Trench, and Lowell; at their worst they are obscene, dull, or fustian. His prose is simple and clear, direct and vigorous. See his *Life and Poetry* by C. G. Sambower (1911); his *Poems*, ed. J. Beresford (1923).

**Cotton**, GEORGE EDWARD LYNCH, D.D., bishop, born in 1813, was educated at Westminster and Cambridge, and from 1836 to 1852 was a master at Rugby under Arnold and Tait. In *Tom*

*Brown's School Days* he appears as 'the young master.' For six years he was at the head of Marlborough College, which he raised to a position among the first schools of England. In 1858 he was consecrated Bishop of Calcutta, where he successfully administered his immense diocese, and where his schools for the children of the poorer Anglo-Indians and Eurasians are monuments of the services he rendered to education. He was drowned in the Ganges, 6th October 1866.

**Cotton, JOHN**, clergyman, born at Derby in 1585, was a tutor at Cambridge, and from about 1612 held a charge at Boston, in Lincolnshire. Cited to appear, for his Puritan views, before Laud at the high commission court, he in 1633 fled to Boston, in New England, where he preached until his death in 1652. Cotton was reputed a profound scholar, and was the author of nearly fifty works, including a catechism, forms of prayer, and a defence of the interference of the civil authority in religious matters, in a famous controversy with Roger Williams.

**Cotton, SIR ROBERT BRUCE**, an English antiquary, was born at Denton, Huntingdonshire, 22d January 1571. From Westminster School, where he had the famous Camden for master, he passed to Jesus College, Cambridge, where he graduated B.A. in 1585. He soon settled in a house in Westminster on the site of the present House of Lords, and here he commenced to accumulate books, manuscripts, coins, and other articles, and to practise that large hospitality that made Cotton House the meeting-place of all the scholars of the kingdom. His papers read before the Antiquarian Society spread wide the reputation of his learning; King James knighted him in 1603, created him a baronet in 1611, and frequently consulted him on political matters. But he kept the scholar in prison for eight months in connection with the Overbury case. He had been returned to parliament in 1604, and soon identified himself completely with the policy of constitutional opposition to the crown. His protest against the proposed debasement of the coinage (1626), his frank criticism of kingcraft in his *History of Henry III.* (1626-27), his outspoken review of the present political situation in his tract, *The Dangers wherein the Kingdom now Standeth, and the Remedy* (1628), and the frequent meeting in his house for deliberations of Eliot, Pym, Selden, and Sir E. Coke, marked him out to the court as an enemy to be crushed. The occasion was soon found. An ironical tract, entitled *A Proposition for His Majesty's Service to Bridle the Impertinency of Parliaments*, having fallen into the hands of Wentworth, it was found on inquiry that the original was in Cotton's library, from which a copy had been made, though without his knowledge, for the press. Cotton and others were flung into prison, but proceedings were stayed and the prisoners released on the occasion of the birth of an heir to the throne (29th May 1630). But Cotton's library was not restored to him in spite of his pathetic petitions, and as his heart was bound up in his books, he pined and died less than a year after (6th May 1631). Fourteen of his tracts were collected and published as *Cotton's Posthuma* in 1651. His son, Sir Thomas Cotton (1594-1662), had the books restored to him; and his great-grandson, Sir John Cotton (1679-1731), bestowed the library on the nation.

THE COTTONIAN LIBRARY was accordingly removed to Ashburnham House, Westminster, in 1730. In the following year a fire occurred in the house, in which about 114 out of the 958 volumes of MSS. which the library contained were reported as 'lost, burned, or entirely spoiled: and 98 damaged so as to be defective.' The library was

transferred to the British Museum (q.v.) in 1753.

**Cotton-grass** (*Eriophorum*), a genus of Cyperaceæ, in which the *perianth* or covering of united bracts, which in this order enclose the ripening ovary, is developed into long silky or cottony hairs, once employed for candlewicks, stuffing pillows, &c. Attempts to use them as a substitute for cotton have failed; nor is the herbage willingly eaten by sheep or cattle. Two species, common in Britain, give a characteristic appearance to bogs and wet moors.

**Cotton-seed.** See BUTTER, COTTON, OILS.

**Cotton-tree, Cotton-wood.** See POPLAR, SILK-CORRON.

**Cotton-worm** is a common name for the caterpillar of an owl moth (*Aletia xyliana*), which is in some years very destructive to the cotton crop of the United States. The caterpillar is green, with yellow stripes and black dots, and grows to a length of an inch and a half. The boll-worm, the caterpillar of an allied form (*Heliothis armigera*), is also very destructive to cotton-buds and other crops.

**Cottus**, a genus of acanthopterygious fishes, comprising the Bullhead (*C. gobio*) of British rivers, the marine Father Lasher (*C. scorpius*), and the closely akin *C. bubalis*, found on the coasts of California and Georgia. See BULLHEAD.

**Cotyle'don** (Gr., 'a cup or cup-shaped hollow') is the technical term applied by botanists to the seed-leaves of the embryo. Their morphological importance was formerly somewhat exaggerated, as they were supposed to be quite unrepresented even in the higher cryptogams (see FERNS, &c.), to which the term *acotyledonous*, now disused, was therefore applied. The number of cotyledons is, however, usually of high systematic importance; for although in Gymnosperms it varies from a whorl of eight, ten, or even more in conifers, to usually two in cycads, it is almost constant among the higher Angiosperms, the old division of monocotyledons and dicotyledons having few exceptions to its literal accuracy. Every one is familiar with the two cotyledons of so many seedlings of the latter group; but a more extended study shows that many never emerge above ground, or even leave the seed. The form and structure of the cotyledons depends largely on whether they have precociously absorbed and stored the nutritive contents of the endosperm; in this case, of which the leguminous seeds of pea, bean, &c. afford the most familiar example, they become more or less fleshy, and frequently do not appear above ground in germination. The mode of packing the cotyledons in the bud also presents many differences in detail of high systematic constancy, and therefore importance. See OVULE, SEED, EMBRYO, and GERMINATION.

**Coucal** (*Centropus*), or LARK-HEELLED CUCKOO, a genus of common bush-birds in Africa, India, and through the Malayan Archipelago to Australia. The hind-toe is prolonged into a very long spur.



Common Cotton-grass (*Eriophorum angustifolium*).

Their call is loud and in some cases apparently ventriloquistic. They build their own nests. See CUCKOO.

**Couchant.** In Heraldry, a beast lying down, with his head up, is couchant. If the head is down, he is dormant.

**Couch-grass** (*Triticum repens*), also called *Wheat-grass*, *Dog-grass*, *Quickens*, and *Squitch* or *Quitch*, a grass which, although of the same genus with wheat, is a widespread and troublesome weed. Its perennial creeping root-stocks render it extremely difficult of extirpation; they are carefully gathered out of land under cultivation; but in times of scarcity have been employed as human food, as a source of beer, as a domestic medicine, and more frequently as fodder. They are sometimes useful in binding sand into pasture of inferior quality. Cut early, couch-grass makes very good hay.

**Couching.** See CATARACT.

**Coucy**, RAOUL, CASTELLAN DE, was a French court poet or Trouvère (q.v.) of the 12th century, to whom twenty-three poems are ascribed. He was named after the Château de Coucy, near Laon. His heart was unwittingly eaten by his mistress through the device of her jealous husband.

**Coué**, EMILE, exponent of applied psychology, was born at Troyes, France, in 1862. He was educated at Nogent-sur-Seine and at Troyes, and having studied pharmacy at Paris, practised for thirty years in his native town. Devoting himself meanwhile to the practical applications of psychology, he formulated certain theories as to the cure of various physical and mental ills, Autosuggestion (q.v.) being the cope-stone of his system. His views he expounded in the *Transactions* of the Society of Applied Psychology of Lorraine, of which he is president, in *Self-mastery by Conscious Autosuggestion* (trans. 1922), and in *My System* (1923).

**Coughing**, considered physiologically, consists (1) in a long inspiration which fills the lungs to a greater extent than usual; (2) in the closure of the glottis, or narrow opening in the organ of voice (see LARYNX), at the commencement of the act of expiration; and (3) in the sudden forcing open of the glottis by the violence of the expiratory movement. In this way a blast of air is driven upwards from the lungs through the mouth, and carries with it any sources of irritation that may have been present in the air-passages. Coughing may occur from irritation in the back of the throat, in the larynx, trachea, or bronchial tubes, and may be excited by acrid vapours, by irritant gases, or by articles of food or drink making their way into the air-passages instead of into the pharynx, or by excessive or morbid secretion from the walls of the air-tubes, or even by the entrance of cold air. More rarely it results from irritation of other parts, as the ear, and possibly the stomach. It is an accompaniment also of teething.

The object of coughing in the animal economy is unquestionably to guard against the danger of the entrance of mechanical and chemical irritants into the air-passages; and accordingly the mucous membrane, especially of their upper part, is endowed with a most exquisite sensibility which, when aroused by irritation or by a state of disease, provokes incessant coughing until the irritation be allayed or removed. Cough is an exceedingly common symptom of all diseases of the respiratory organs. The treatment of coughing must first be directed to the removal, if possible, of the cause which excites it. But besides, when once begun, coughing frequently becomes excessive, and so irritating or exhausting to the patient, from too great sensitiveness of the nervous mechanism which produces it; and this tendency, when injurious,

must also be combated. The remedies suitable to most cases of cough are therefore Expectorants (q.v.) and nervine sedatives, especially opium, morphia, and hydrocyanic acid; 'cough mixtures' generally contain both. Liquorice, jujubes, black-currant jelly, or linseed tea are often of service.

Cough occurs in the lower animals under similar conditions. In horses it is best treated by repeated doses of belladonna and camphor, but often requires for its entire removal a run at grass. See names of diseases containing cough, also PNEUMONIA, TUBERCULOSIS, BRONCHITIS, CATARRH, &c.

**Couguar.** See PUMA.

**Coulmiers**, a French village, some 12 miles WNW. of Orleans, where Von der Tann and his Bavarians were defeated by an overwhelming force under D'Aurelle de Paladines, 9th November 1870.

**Coulomb**, CHARLES AUGUSTIN DE, famous for his experiments on friction, and the invention of the *Torsion Balance* for measuring the force of magnetic and electrical attraction, was born at Angoulême in 1736. In early life he entered the engineers, and served some time at Martinique. In 1777 he gained an Academy prize by a work on magnetic needles, and again two years later by his *Théorie des Machines simples*. For speaking the truth about a projected canal in Brittany, he was for some time imprisoned, but earned the hearty approval of the honest Bietons, as well as his own conscience. Coulomb lived in retirement during the Revolution, became a member of the Institute in 1804, and died August 23, 1806.

**Coulter.** See PLOUGH.

**Coumarin** (C<sub>9</sub>H<sub>6</sub>O<sub>2</sub>) is a fragrant crystalline substance, analogous to volatile oils and camphor, which is present in the well-known Tonka bean. It is identical with the odorous principle of many other plants, including the Woodruff, Melilot, and Vernal grass.

**Council**, or SYNOD, an assembly of ecclesiastics met to regulate doctrine or discipline. We first hear of such assemblies during the Montanist controversy, about 150 A.D. Œcumenical councils are convoked from all parts of Christendom, and claim to regulate the affairs of the whole church. Other synods have represented the East and West respectively. Patriarchal, national, and primate councils represent a whole patriarchate, a nation, or the several provinces subject to a primate, while the bishops and other dignitaries of a province constitute a provincial; the clergy of a diocese under the presidency of the bishop, a diocesan council. Mixed councils during the middle ages dealt with civil as well as ecclesiastical affairs, and were composed of secular persons as well as churchmen. Sometimes, but not always, the lay and ecclesiastical members voted in separate chambers.

The first eight general councils were convoked by the emperor, all the later ones by the popes, and the fifth Lateran Council asserts (*Sess. xi.*) the modern principle that the right of convoking, removing, and dissolving general councils belongs to the pope. The right of voting was reserved in early times to bishops and priests, or deacons who acted as representatives of absent bishops. From the 7th century onwards this right was sometimes extended to abbots, and from the end of the mediæval period to cardinals who were not also bishops. At the Vatican Council the members entitled to vote were cardinals, bishops (even if only titular bishops), mitred abbots, and generals of religious orders. Priests acting as proxies of bishops were not admitted. The presidency at the early Œcumenical councils followed no fixed rule. In a certain sense it belonged to the emperor, who

had convoked the bishops, and was responsible for peace and order. 'It was not,' says Harnack (*Dogmengeschichte*, ii. p. 101), 'till the fourth general council that the papal legates gained a unique position, and learned Catholics have admitted that the presidency of the papal legates at Nicæa does not admit of positive proof.' This is true even of Catholic theologians writing after the Vatican decrees. Thus Kiaus (*Kirchengeschichte*, p. 147) contents himself with maintaining 'the probability' that the papal legates presided at Nicæa, and Hefele (*Concil.* i. p. 38, 2d ed.) admits that the question is 'not without difficulty.' The modern theory that a council is then, and then only, to be counted general when its acts have been ratified by the pope, is of still later origin. Even medieval theologians, such as Thomas of Walden, maintained that the decisions of general councils did not acquire binding force till they had been accepted by the whole church. And although it was an established principle in the 6th and the following centuries that the definitions of councils, indisputably œcumenical, could not be called in question, it is certain that St Augustine had been of another mind. He asserts (*De Bapt. contra Donat.* ii. p. 3-4) that Scripture alone has final and irrefragable authority, but that even 'plenary councils, assembled from the whole Christian world,' may be 'corrected' (*emendari*) by the accession of knowledge and experience. Moreover, the fact that the decisions even of provincial councils are sometimes attributed, in the 4th century, to the 'suggestion' of the Holy Spirit, shows that caution is needed in interpreting the rhetorical language of early writers.

The Greek Church recognises seven general councils—viz.: (1) The first of Nicæa, 325 A.D.; (2) the first of Constantinople, 381; (3) Ephesus, 431; (4) Chalcedon, 451; (5) second of Constantinople, 553; (6) third of Constantinople, 680; (7) second of Nicæa, 787. To these Roman Catholics add: (8) fourth of Constantinople, 869; (9) first Lateran, 1123; (10) second Lateran, 1139; (11) third Lateran, 1179; (12) fourth Lateran, 1215; (13) first of Lyons, 1245; (14) second of Lyons, 1274; (15) Vienne, 1311; (16) Constance, 1414-18, of which Ultramontanes accept only the decrees passed in sessions 42d to 45th inclusive, and such decrees of earlier sessions as were approved by Martin V.; (17) Basel, 1431 and the following years, œcumenical according to Ultramontanes only till the end of the twenty-fifth session, and even then only in respect of such decrees as were approved by Eugenius IV.; (18) Ferrara-Florence, 1438-42, really a continuation of Basel; (19) fifth Lateran, 1512-17; (20) Trent, 1545-63; (21) Vatican, December 8, 1869, to July 18, 1870, and still unfinished.

The best collections of councils are by Hardouin (12 vols. folio, Paris, 1715), and that of Mansi (31 vols. folio, Florence, 1759), which is by far more complete than Hardouin's, but inferior to it in correctness of typography. An excellent account of the councils, with the text of the most important decrees, will be found in Bishop Hefele's *Konziliengeschichte* (7 vols. 1855-74; continued by Hergenröther and then Knöpfer, vols. viii.-ix., 1887-90; Eng. trans., vols i.-v., 1871-96). For the more important councils, see NICEA, BASEL, &c.

**Council Bluffs**, a city of Iowa, capital of Pottawattamie county, 141 miles WSW. of Des Moines, on a plain backed by high 'bluffs.' The Missouri River, 3 miles to the west, is crossed by a grand railway bridge to Omaha, and six railways meet at the town, which is an important distributing centre, and has manufactures of carriages, agricultural machines, rubber goods, baskets, &c., and an extensive trade in grain and cattle. Pop. 36,000.

**Council of War.** In the 16th century, in England, a council of war was instituted, which was practically a standing Court-martial (q.v.). In more modern times the phrase denotes a conference of military or naval officers or of statesmen, or of a combination of these, to consider a plan of campaign or to assist a commander to make up his mind. It is convened by the commander, or by the secretary of state who is his civil superior, who may cause opinions to be placed on record. A commander of a fortress will usually fortify himself in this way before capitulating. There is no regulation in British military law in relation to councils of war, but a Committee of Imperial Defence under the prime-minister exists permanently, and confers with statesmen and experts from all parts of the empire.

**Counsel.** See ADVOCATE, BARRISTER, KING'S OR QUEEN'S COUNSEL.

**Counsellor** in the United States nearly corresponds to Barrister (q.v.), and Advocate (q.v.); but there is no such well-marked distinction between counsellor and solicitor as between barrister or advocate and solicitor. See LAWYER.

**Count** (Lat. *comes*, in Fr. *comte*, Span. *conde*, Ital. *conte*), the name of a dignity in mediæval and modern Europe, to which Earl (q.v.) is in one view supposed to be analogous, the Latin equivalent of each being the same, and the wife of an earl being a countess. On the various significations of the *comes* of classical times it is unnecessary to enter. Under Constantine the term became an honorary title; and the *comites* became a sort of council of state both in the eastern and western empire, each having his separate office in the household. The counts under the first two races of Frankish kings were (like those of the lower empire) of various degrees. The count of the palace (*comes palatii nostri*) was the highest dignitary in the state after the *maire* of the palace; and in the 11th century he had already acquired a rank apart from that of the other counts. He presided in the court of the sovereign in his absence, and possessed sovereign jurisdiction. The habit of instituting counts-palatine (*comites palatii*) was adopted by Spain and England. Those counts, again, who, at a later period, as rulers of provinces, had attained to something approaching to sovereign power, exercised also the right of appointing counts-palatine under them—e.g. the Counts of Chartres, of Champagne, of Blois, Toulouse, &c.; and the ancient houses of Chartres and of Blois continued to claim in perpetuity the title of count-palatine as that of their eldest sons. Counts of this sovereign class owed their origin to the feebleness of the later Carlovingian kings, under whom they contrived gradually to convert the provinces and towns which they had governed as royal officers into principalities hereditary in their families. It was then that the counts came to be known by the names of their counties. Down to the middle of the 14th century they wielded a most formidable power, somewhat broken by the eventually successful struggle of the towns of Northern France to throw off their yoke. In later times there were numerous mere titular counts, and even before the first revolution many titles of count, believed to be pure assumptions, were recognised by the courtesy of society.

The German word *Graf*, akin (like *reeve*, *grieve*, and *sheriff*) to the Old English *gerefa*, 'governor,' in time came to be identified with the *comes* or count, the *Pfalzgraf* being the German equivalent of the *comes palatii*. In Germany there have been in modern times two classes of counts, one belonging to the *Dynastien-Adel*, or higher nobility—i.e. those families whose head had a seat in the diet or estates of the realm; the other

forming the highest class of the lower nobility. Of the former class the larger number, as the price of their acquiescence in the abolition of the old German empire, received the title of prince. The merely titular counts belonging to the lower nobility were very numerous.

**Counterfeit.** See COINING.

**Counterforts**, the buttresses or arches behind the revetments or retaining walls of the ditches of permanent fortifications. They help to support the earth above them and make it more difficult to form a Breach (q.v.).

**Counter-guard** is a low outwork designed to cover the revetment of a bastion or ravelin from the fire of the enemy's breaching batteries. It is separated from them by a narrow ditch, and lest the enemy should establish a battery on it when captured, the terre-plein, or flat space behind its parapet, is made very narrow. See FORTIFICATION.

**Counter-irritants**, agents applied to the skin so as to redden (rube-faci-ents), to vesicate (vesicatories or Blisters, q.v.), or to produce pustules, purulent issues, or even sloughs of skin and of the subcutaneous textures. The milder counter-irritants are mustard (see CATAPLASM), turpentine applied on warm cloths, and spirit or acetic acid in lotion. The stronger are blisters of cantharides (see CANTHARIS) or of ammonia; Croton-oil (q.v.) or Tartar Emetic (q.v.), in ointment; setons; caustic; and, above all, the actual Cautey (q.v.) or hot iron at various temperatures. None of the stronger counter-irritants should be used without careful consideration and medical advice; great mischief is often done by their careless or improper use. Counter-irritants relieve internal pain, check inflammations, and tend to promote the absorption of morbid effusions. Their effect is, probably due mainly to reflex action, produced by the impression they cause upon the nerves of the skin to which they are applied.

Amongst horses, counter-irritants are much used for strains and diseases of the joints, but should never be applied, as they too often are, in recent cases, or whilst the part is hot or inflamed. Cantharidine preparations, or ointment of biniodide of mercury, are the most convenient. For cows, use fomentations, followed by the smart infriiction of mustard-paste; for dogs, soap-liniment, strengthened, if required, by ammonia or turpentine.

**Countermine**, a subterranean way to counter-act besiegers' mines. See MINES (MILITARY), SIEGE.

**Counterpoint**, in Music, has been defined as

'the art of combining melodies.' The name arose from the early system of notation by points. When another part or melody was added to one already represented by a row of points, this was called *punctum contrapunctum*. A single melody is usually taken as the 'subject,' and the part or parts added are called the 'counterpoint.' When this is done according to the numerous and stringent rules of the old authorities, it is called strict counterpoint; but in modern music these rules are much relaxed. The devices of counterpoint are, however, still largely relied on; Wagner, the greatest innovator of our time, being also one of the greatest practical contrapuntists. The aim of Beethoven in his later works to make every part *sing*, and not be a mere filling up of the harmony, may be referred to as illustrating the object of these devices; and there is no doubt that as used by the classical writers, they are the source of some of the grandest effects in music.

In simple counterpoint the parts are written above or below the subject without regard to their capability of being transposed. It is divided into different species, according as the added parts contain one, two, or four notes against each note of the subject, or are written in syncopated notes, or have a combination of all or any of these, when it is called 'florid.' The so-called 'rules' are in effect limitations of the degrees in which the parts may progress—e.g. the prohibition of consecutive octaves and fifths. The general principle of them is to secure complete *independence* of melodic motion in the parts, while at the same time the laws of harmony are observed. When the parts reach the number of eight or more in vocal music, they are sometimes divided into different choirs, which sing alternately together and in antiphony. A famous example of this class is Tallis's motet 'Spem in alium non habui,' for forty voices, in eight choirs, each of five voices. In double counterpoint the subject and counterpoint are so written that each may form the bass to the other. When in this transposition the upper part is taken to the octave below, or *vice versa*, it is called double counterpoint at the octave; but it may also be at any other interval, the fourth, fifth, &c., or even at two different ones. In treble counterpoint each of three melodies can be put as the bass to the others; and similarly in quadruple and quintuple counterpoint; but counterpoint beyond double can only be at the octave, as the other intervals are impracticable. One or more free parts may be added to fill in the harmony. The following instance of quintuple counterpoint is taken from the finale of Mozart's 'Jupiter' Symphony:



Among the other devices of counterpoint may be mentioned those of contrary motion, augmentation, and diminution, the latter two referring to the time-values of the notes. See IMITATION.

The history of the art of counterpoint can be traced step by step from its beginnings in the rude efforts at part-writing, called *organum*, barbarous to modern ears, in medieval church music, of which

the earliest known account we have is by Hucbald, a Flemish monk, who died in 930. The earliest existing specimen of part-music is an English one—a *rotu* or round, written by a monk of Reading in 1226 to words beginning 'Sumer is icumen in,' the MS. of which is in the British Museum. The Polyphonic schools of composition in Flanders, England, Germany, and Italy, of the four succeeding centuries, reaching their culmination in Palestrina, were based pre-eminently on counterpoint. Bach is usually considered its greatest master.

See Onseley's treatise, based on Cherubini (2d ed. 1880), and manuals by Prout (1890-91) and Pearce (1899).

**Counterscarp.** See FORTIFICATION.

**Countersign.** See SENTINEL.

**Counter-tenor.** See ALTO.

**Counting-out Rhymes.** See FOLKLORE.

**Country-dance,** an English dance in which as many couples can take part as there is space to accommodate them; the gentlemen being ranged at the commencement on one side, and the ladies on the other. The dancers are constantly changing places, leading one another back and forward, up and down, parting and uniting again. 'Sir Roger de Coverley' is the best-known example. The dance and the name—a dance of country-people—passed from England into France, where the name was altered into *contre-danse*, often erroneously assumed to be the original form. See DANCING.

**County,** a territorial division whose name finds its origin in the ancient *scr* or shire, literally 'care,' 'official charge,' not connected (as is often said) with *shear* (O.E. *sceran*). The diocese was the bishop's *scr*. The ancient English counties or shires owe their existence to varying causes. Some—e.g. Kent and Sussex—were originally kingdoms; some were divisions of a kingdom (Norfolk and Suffolk); some, chiefly the midland counties, represent convenient administrative districts created around the centres out of which a heptarchic kingdom (Mercia) grew. The western counties—e.g. Hants, Wilts, Somerset, Devon—are very ancient divisions of the kingdom of Wessex, in which the shire system was existent as early as the reign of Ina. All southern counties date back at least to the time of Edgar; but the northern counties were either formed or much modified after the Conquest—e.g. Northumberland, Cumberland, and Westmorland were not formed until the time of Rufus and Henry I., and Lancashire was created in the 12th century.

The shire was governed by an ealdorman and *geréfa* (or sheriff), and by the *scr-gemót* (shire-moot), which subsequently developed into the county court. The ealdorman was elected in Anglo-Saxon times by the national Witan, with the consent of the king. There was no election of the ealdorman in the shire-moot, though he was probably formally accepted by that body. The office tended to become hereditary. One ealdorman usually ruled over several counties, and some ealdormanships—e.g. that of Mercia—included the greater part of one of the ancient heptarchic kingdoms. The ealdorman sat in the shire-moot (which was also a folk-moot or assembly of free inhabitants) with the sheriff and the bishop, and received one-third of the profits of the jurisdiction. He also commanded the military forces of the shire. The sheriff, whose jurisdiction was confined to a single shire, though anciently he may have been elected, was the representative of the crown, and, within historic times, was nominated by the crown. He was the judicial president of the shire and the executor of the law, as well as the king's steward and the administrator of the royal demesne. The office never became hereditary, and, under the name of *vice comes*, the sheriff was used by the

crown after the Norman Conquest to oust, or to prevent the creation of, any extensive feudal jurisdictions of the Continental type.

The sheriff held the shire-moot twice a year, and he gradually became the chief civil officer of the county, leaving to the ealdorman military duties only. The 'suitors' or constituent members of the court consisted of all lords of lands, all public officers, with the reeve and four men from each township. The shire-moot had jurisdiction in every suit; but it was not, strictly speaking, a court of appeal from the hundred-moot. A suitor could not apply to the shire-moot before he had thrice demanded his right in the hundred-moot; but the right he had there failed to obtain could be asserted in the shire-moot. Thus the shire-moot was not a court of first instance or a court of appeal, but a means of providing for lapses and omissions in the inferior court. The suitors of the court were the judges, and the function of the sheriff was that of chairman or moderator. The court also witnessed private acts (e.g. wills and transfers of land), and though its legislative power was shadowy, national laws appear sometimes to have been accepted in it.

The principal divisions of the county are of great antiquity; indeed, they are probably older than the shire itself. Nominally, at least, they still exist. These are the hundred, the ward, the wapentake, the rape, the lathe. Yorkshire is divided into three ridings (*trithings*), Lincolnshire into three parts. Northumberland, Durham, Westmorland, and Cumberland have wards. The wapentake is found in the ancient Anglian districts only (Yorkshire, Lincolnshire, Nottinghamshire, Derbyshire, Northamptonshire, Rutland, and Leicestershire), though some of these contain hundreds as well. Durham has one wapentake in addition to its wards. Sussex has six rapes, and Kent five lathes, but these are subdivided into hundreds, which seem to correspond to the ancient townships or tithings of other counties. In all other English counties the subdivision is into hundreds, which were, and in some cases still are, in turn divided into townships, or, in the Wessex counties, into tithings. In the hundred or wapentake a hundred-court or hundred-moot was held monthly. It had jurisdiction in every suit both civil and criminal, and gradually became the administrative unit of the county—e.g. the division for purposes of taxation. Franchises or private jurisdictions were granted both in Anglo-Saxon and later times. Such franchises were separated out of the hundred, but not usually out of the county jurisdiction. The rapes and lathes of Sussex and Kent, and the ridings and parts of Yorkshire and Lincolnshire, possibly represent divisions intermediate between the hundred and the shire; indeed, the ridings of Yorkshire and the parts of Lincolnshire have developed into what are, for most administrative purposes, separate counties.

The itinerant justices sent forth by Henry II. sat in the county court, and in this way the ancient popular administration of the law was linked to the new system. But from about this time onwards the county court declined in judicial importance, its sphere being gradually occupied by the king's judges sitting in the assizes on the one hand, and, later, by the justices of the peace on the other. The sheriff became more and more subordinated to the royal judges. Though the court assembled twice a year to meet the judges, it met also every three weeks, presumably to try the more numerous petty causes. And from the settlement of the office of justice of the peace by Edward III., the justices, either in quarter sessions, petty sessions, or as individual justices, became the real county rulers whether in small affairs or great. The *custos*

*rotulorum* (one of the justices designated in the commission of the peace for each county as 'keeper of the rolls of the peace') dates from the beginning of the 16th century. The military office of lord-lieutenant originated in the middle of the 16th century, and was at first a temporary office often held by one person for several counties. But from about 1689 onwards these two offices, though always by separate appointment, were held by the same dignitary. The administrative powers of the justices, especially in general or quarter sessions, grew with especial rapidity in Tudor times, and by the time of the Revolution county government was almost completely in their hands. The county court (become practically the sheriff's court) survived only as a court for the recovery of small debts. Proceedings in outlawry also took place, when at all, in that court. Otherwise its sole function was the election of the county members of parliament (the knights of the shire) and the election of coroners. And it was no longer a folk-moot which theoretically at least could be attended by all freemen since, in 1293, the qualification for jurors had been made the ownership of a forty-shilling freehold.

The administrative functions of quarter sessions were fulfilled by the justices sitting as a court, and their administrative acts in most cases were, in form, judicial decisions. The sessions had to be held at least four times a year. In some counties they were held at a single county centre; in others the session was held at a different centre in turn—e.g. in Wiltshire at Marlborough, Salisbury, Devizes, and Trowbridge; and in some cases—e.g. Lancashire—the same sessions would be adjourned to several county centres, so that a sitting of each session took place at each centre. The *custos rotulorum* was assumed to preside, but in practice a chairman who was not the *custos* was usually elected, though it was not until late in the 18th century that the practice of appointing a permanent chairman became settled. This practice has developed in some cases in the appointment of a paid chairman for the criminal business of the court.

The fact that the administrative functions of the county were performed under the guise of decisions of a court of law is explained when we remember that at any rate from the 16th to the 18th century, when this administrative system was built up, the county was considered by the central government not as an organ of local self-government, but as a unit of obligation, an entity responsible for the performance of obligations imposed upon it. It was the duty of quarter sessions to see that the county, and all the minor units into which the county was divided, fulfilled these obligations. The county as a whole had, either in the form of the sheriff's *posse comitatus* or the militia, to furnish an armed force. It was the duty of the county to furnish the king's taxation. County bridges had to be maintained. The county was to furnish the king's jail, and the lodgings of his judges on circuit. For any failure in these duties the county as a whole could be indicted and fined in the court of assize, and the fine could be levied against the goods of any inhabitant of the county. But the county as a whole could only perform such obligations if the units into which it was divided performed theirs; and the justices in quarter sessions were responsible for seeing that all officers and citizens within their jurisdiction fulfilled their (often obligatory) parochial or manorial offices, or did their duty as private citizens. Thus the grand jury, the hundred jury, the high constables, and other officers made their presentments at quarter sessions, not only of ordinary breaches of the law, but of the wrongful acts and neglects of parishes, officers, or private individuals, such as negligence

to maintain pounds, stocks, highways, or parish bridges, the neglects of hundreds to keep the peace within their limits, and even the omissions of the county itself. Moreover, cases are not wanting in which individual justices made presentments (e.g. of the bad state of roads) on their own knowledge and responsibility. Thus if a parish neglected to maintain a highway, or the high constable of a hundred neglected to pay over punctually the proper quotum of an assessment, the presentment might be taken up by the grand jury; that is, the individual or locality was indicted, and might either submit or 'traverse' the indictment. In the latter case the indictment was tried, and if found guilty the accused, whether a private person, an officer, a hundred, a parish, or manor, might be fined. If the indictment was not traversed the same result ensued without trial. The administrative work of securing the repair of highways was thus performed by the judicial process of fining the parish a sufficient sum to pay for the repair of the road, or more commonly by fining the parish and respiting the fine for three months. During the period of respite the parish could secure the repair of the highway either by the direct enforcement of labour upon the inhabitants or by raising the money by a more or less formal rate.

Presentments of these and many other kinds were made by the grand jury as representatives of the respectable inhabitants of the county, by the now obsolete hundred jury, by the high constables of hundreds or the petty constables of the township or parish, or, apparently, in some cases by juries of constables. But the activity of such juries of presentment tended to diminish as time went on. The hundred jury was almost obsolete by the beginning of the 18th century, and the presentments on which the quarter sessions founded its administrative activity were made by individuals; either by the justices themselves, or by the high constables of hundreds or the constables of parishes or tithings.

The 18th century witnessed the slow transition of the court of quarter sessions into a regular administrative body having a paid staff and acting through committees, and the separation of administrative from judicial functions. The change was marked by the separation of administrative from the judicial work in the records of the sessions, which generally, though not invariably, took place during the late 18th century. This separation in the records resulted from the fact that the administrative business began to be considered by the justices either before or after the sitting of the court. The sessions were thus consciously recognising their administrative functions. The clerk of the peace, originally almost the only paid county official, was supplemented by a paid county treasurer and by a county surveyor. We may mention that Telford was appointed county surveyor by the Shropshire justices in 1787. The minor officials, such as the crier of the court or the marshal (appointed in imitation of the marshal of the judge of assize), were sometimes employed on police work. Some counties appointed common informers to present to the courts not only defects of weights and measures, but all the matters hitherto cognisable by the court leet, the high constable, the hundred jury, and the grand inquest of the county. But in the main the justices relied during this period not on any salaried executive staff of their own, but on the employment of contractors, who undertook for fixed payments the maintenance and conduct of the jails, the removal of vagrants, the conveyance of prisoners or of militia baggage, the repair of bridges, and the performance of such other administrative functions as from time to time became county duties. Thus at the beginning of the 19th century the justices in

quarter sessions had developed into an administrative body, in some cases with a definite committee organisation and a staff; and, as that century proceeded, their duties became greater and more varied, their conduct of them more efficient. And each new county function as it arose was imposed upon the justices.

It was the necessary outcome of such a history that county government was during the greater part of the 19th century conducted by an unpaid, non-elected body of justices. By 1888, when most of their administrative functions were transferred to the newly created county councils, quarter sessions controlled the making, assessing, and levying of the county rate and the expenditure thereof, and the provision of shire and county halls, assize courts, judges' lodgings, police-stations, and other buildings necessary for the administration of justice and police. The control of the jail and prisons remained in their hands up to 1870, when they were transferred to the central government. But quarter sessions still controlled the licensing of houses for music and dancing. Licensing of houses for the sale of beer, spirits, &c. was performed by the justices, not in quarter sessions, but in special brewster sessions. The provision and administration of lunatic asylums and reformatory and industrial schools was another function of quarter sessions. They provided and maintained the county bridges, and appointed and paid inspectors of weights and measures and public analysts. As a rule they paid the coroners, and they controlled the division of county constituencies into polling districts. Further, they were entrusted with the administration of the Contagious Diseases (Animals) Acts, the acts relating to destructive insects, fish and river conservancy, weights and measures, gas-meters, and the like. They were, further, entrusted with any matters arising out of the Riot Act, 1886, and with the registration of the rules of scientific societies under various acts of parliament. And from 1878 onwards the control of main roads (chiefly those roads which before that date were turnpike-roads managed by trustees and supported by tolls) was vested in the quarter sessions.

This régime of county government through the justices was brought to an end by the Local Government Act, 1888, which may be said to have put county local government upon a democratic basis. By this act the whole of the above-mentioned powers and duties were transferred to an elective body, the county council. Broadly speaking, the areas governed by the county councils, called administrative counties, are much the same as the ancient counties governed by the justices, except that the county council has no jurisdiction in the 'county boroughs' created by the act of 1888. Moreover, there are sixty-three administrative counties as compared with the fifty-two ancient counties. The county of London was a new creation, carved out of Middlesex, Surrey, Kent, and Essex, but almost identical with the areas formerly administered by the Metropolitan Board of Works. Each of the three ridings of Yorkshire and the three parts of Lincolnshire is a separate administrative county. The Isle of Wight has its own county council, and there are two administrative counties in Suffolk and Sussex. Moreover, the Soke of Peterborough and the Isle of Ely are each separate administrative counties. Most of these administrative counties, however, represent the divisions previously observed by quarter sessions. Separate sessions were, for instance, held for East and West Sussex, and for the North, East, and West Ridings of Yorkshire.

County councillors are elected upon a franchise which includes all inhabitant householders, whether men or women, and all occupiers. Any

county elector is qualified to be elected for a county council, and this qualification includes peers, clergymen and ministers of religion, and, by 7 Edward VII. c. 33 (1907), women. The number of councillors to be elected for each county was settled by the Local Government Board under powers contained in the act of 1888; and changes in that number or in the apportionment of councillors to electoral districts may be made by the Board (now the Ministry of Health) on the representation of any council. The membership of the councils varies considerably, Rutland having the smallest council, and Lancashire the largest. One-fourth of the members of the council are, however, aldermen. The councillors are elected for three years, and at the first meeting of the council the aldermen are elected. The aldermen hold office for six years, one-half of their number retiring every three years; so that half the aldermen are elected by the newly chosen council triennially.

Besides the functions already mentioned as having been transferred to the county councils from quarter sessions, the councils are empowered under the Rivers Pollution Act, 1876, to prevent the pollution of rivers. The councils may, without consulting the ratepayers, oppose bills affecting their district or its inhabitants in parliament; but, with the exception of the London County Council, they may not promote bills. They have little direct concern with the administration of the sanitary laws, but they may, and usually do, appoint a medical officer of health, who must report periodically both to his council and to the Ministry of Health; and they may, on the petition of district councils, parish councils, or ratepayers, constitute a hospital district and provide an isolation hospital for that district. As education authority, the county council conducts the medical inspection of school children.

The county councils share in the administration of the county police force. This force was formerly controlled by the justices in quarter sessions. Its local control is now vested in a standing joint-committee composed half of justices and half of county councillors. The council has also power to adjust boundaries of parishes and urban districts within its areas, subject to modification or disallowance by the Ministry of Health, on petition of one-sixth of the electors in the district affected; and under the Local Government Act, 1894, the county council has, in certain cases, power to create and dissolve parish councils, to group, alter, unite, or divide civil parishes, and to fix the number of parish councillors.

Since the creation of the county councils very important functions have been added to the original sphere of the councils. The most important of these is the fact that under the act of 1902 (London, 1903) the county council is now the most important local education authority. Since 1889 it had been the technical education authority; but from 1902 onwards it was entrusted not only with the administration of elementary education, but with the power to create and assist out of the public funds secondary schools and, if it pleased, institutions of university rank. The county council has also important powers under the various acts relating to allotments and small holdings.

Welsh counties, as units of local government, have the same constitution and powers (except for some slight differences as to education) as the English counties; but, like the Scottish and Irish counties, they are the outcome of creation rather than growth. First there are the ancient palatine counties, Pembrokeshire and Glamorganshire, created as a result of the Norman conquests in South Wales. The counties of Anglesey, Carnarvonshire, Merioneth, Cardiganshire, and Car-

marthenshire were the outcome of Edward I.'s conquests. Finally, on the incorporation of Wales with England under Henry VIII. the remaining Welsh counties were created. Some of the Welsh counties represent agglomerations of older divisions known as cantreds (or cantrevs) and commotes. From this point of view they resemble rather the Mercian than the Wessex counties.

*Scottish Counties.*—The origin of the Scottish counties is obscure. The tendency in feudal times to imitate English forms of administration is seen in the appointment of sheriffs by Malcolm and Margaret. Districts were appropriated to these sheriffs, and by such a process the modern Scottish counties came into existence. In the Lowlands, the three ancient provinces of Lothian, Galloway, and Strathclyde seem to have been taken as the areas for subdivision. Most of the new sheriffdoms seem to have been formed around old towns from which the counties took their names. Some Scottish counties are probably coincident in area with older districts—e.g. the county of Peebles is the ancient district known as Tweeddale. Strathclyde was divided into the counties of Ayr, Lanark (Clydesdale in the narrower sense), Renfrew, and Dumbarton. Kirkcudbright is still similarly known as the Stewartry of Kirkcudbright. A sheriff of Ayr was appointed in 1221, but Renfrew does not appear as an independent sheriffdom until 1414. In the Highlands sheriffs were introduced very gradually, the process of creating sheriffdoms, and therefore counties, not being completed until the 16th century. The powers of the sheriff were, as a rule, conferred upon local chieftains. Though the office of sheriff originated in much the same manner as the English shrievalty, it developed in an entirely different manner. The object of its introduction was to secure that there should be in each district a person charged with the representation and maintenance of the king's authority in that district. But the process of constitutional development in early times in Scotland tended to increase the power, not of the king, but of the feudal lords. Hence the sheriffdoms fell into the hands of local magnates, and were used as a means of strengthening local rather than national jurisdictions, and the office became hereditary in certain noble families (see HERITABLE JURISDICTIONS). In 1748 the last of these hereditary jurisdictions was abolished, as an incident in the settlement after the Jacobite rising of 1745. Henceforth the sheriffs were legal officers appointed by the Crown. These officers are now of two classes—sheriffs principal or depute, and sheriffs-substitute. The first class act mainly as appeal judges, and are not debarred from private practice. The sheriff-substitute must not engage in private practice, and must reside within the area of his jurisdiction. His functions very much resemble those of an English county court judge. The boundaries of the Highland counties were in some cases not settled until the early 19th century. The system of appointing justices of the peace was introduced by James VI. Prior to 1889, however, the county administration in Scotland was, mainly, not in the hands of the justices as such, but was entrusted to the commissioners of supply. These commissioners consisted of those who owned landed property to the annual value of £100 a year. A landowner might choose to be represented by his agent, and if his income from land exceeded £800 a year his eldest son was also entitled to be a commissioner of supply. Thus the body which carried on the Scottish county administration was neither elected nor appointed, but was a primary and not a representative body, consisting of those who possessed a prescribed property qualification. There are now thirty-three Scottish counties, and a system of government by county councils, essen-

tially similar to that of England, was extended to Scotland in 1889; though education in Scotland is controlled by separate education authorities. Women became eligible for seats in Scottish county councils in 1907 (7 Edward VII. c. 48).

*Irish Counties.*—The existing Irish counties were created either as a result of the conquest of Ireland in the time of Henry II., or of the reconquest under Henry VIII. and his successors. The division at both periods took place gradually, and, as in Scotland, took the form of the appointment of sheriffs and the consequent creation of sheriffdoms. A sheriff of Dublin is mentioned in 1201. The county of Dublin is first mentioned in 1207, Cork in the same year, Kildare in 1249, and Wexford and Waterford in 1251. The division resulting from Henry II.'s conquest seems to have included the areas of Leinster and Munster only. The process of division was long drawn out, King's County and Queen's County being formed as late as the reign of Philip and Mary; and it was not finally completed until 1607, when, after the rebellion of that year, Armagh, Tyrone, Donegal, and other Ulster counties were constituted. There are thirty-two Irish counties. From 1836 to 1898 the principal county authority was a grand jury of twenty-three persons. In 1898, by the Irish Local Government Act of that year, county councils, elected triennially, took over the administrative functions of the Irish grand jury, together with some of the functions of the presentment sessions and the boards of guardians.

*The County Courts.*—The modern county courts were created by the County Courts Act, 1846, which divided England and Wales into circuits, to each of which a local court was assigned. Originally limited in their jurisdiction by the amount of the sum recoverable and by the character of the action brought, their sphere has been very greatly extended; and, in the words of Sir William Anson, they 'are now not so much a relief to the poor suitor as to the judges of the high court.' They replaced and supplemented old-fashioned local 'courts of request' created for various groups of hundreds by local act, or existing in towns by virtue of charters or local act. Some courts of the latter class, of course (e.g. the Lord Mayor's Court in London, the Court of Passage at Liverpool), still exist.

The county courts are now regulated by the County Courts Consolidation Act, 1888. They have civil jurisdiction only. In cases where more than £5 is claimed, and in all other actions, by leave of the judge, a jury may be demanded, the number of such jury being five. Appeal lies to the high court where more than £20 is claimed, and in all other cases by leave of the judge. The registrar of the court may hear all undefended and admitted cases by leave of the judge. The judge may commit to prison, but only where the debtor has suffered judgment and the judge is satisfied that he has means to pay the debt or the instalment ordered and has not done so. The period of commitment is forty-two days. Commitments are very numerous.

*County Boroughs.*—These are boroughs rather than counties. By the Local Government Act, 1888, towns with a population of more than 50,000 were taken out of the county jurisdiction, and their councils were given most of the administrative powers of a county. Other towns have subsequently been added to the list. The county boroughs of England now number about a hundred, and include all the larger English towns. The county boroughs also comprise those towns which were counties of themselves prior to the act of 1888. These are properly called *counties of towns or of cities*, and are chiefly ancient towns, which were of

such importance in the early middle ages that separate sheriffs were appointed for them. Instances, besides the city of London, are Nottingham, Gloucester, Bristol, Kingston-upon-Hull, &c. Thus Nottingham is not only a county borough but an 'ancient' county.

*Authorities.*—Stubbs, *Constitutional History of England*; Pollock and Maitland, *History of the English Law*; Webb, *The Parish and the County*; Redlich and Hirst, *English Local Government*; Atkinson, *The Local Government of Scotland*; Anson, *The Law and Custom of the Constitution*; Ashley, *Local and Central Government*; Lowell, *The Government of England*.

**Coupar-Angus**, a town of Perthshire (till 1891 partly in Forfarshire), near the left bank of the Isla, a tributary of the Tay, 13 miles NNE. of Perth, and 15 NW. of Dundee. Within remains of a Roman camp is a fragment of a Cistercian abbey, founded by Malcolm IV. in 1164. Linen is manufactured. Pop. 2000.

**Coup d'État.** See NAPOLEON III.

**Couperin**, FRANÇOIS (1668–1733), clavicinist and composer, the most notable of the many musicians of his family, was born in Paris, and, like many of his relatives, was organist of St Gervais there. His suites for the clavicin influenced Bach. See Bouvet, *Une Dynastie de Musiciens* (1919).

**Couperus**, LOUIS (1863–1923), born at The Hague, lived in Java as a boy. In 1882–84 he published volumes of verse, and from 1889 novels notable for their vividness, freshness, sensitiveness, and brilliancy. They include *Ecstasy* and a tetralogy, *Small Souls*, *The Later Life*, *The Twilight of the Souls*, *Dr Adriaan*. *Eastward* (trans. 1924) consists of letters from the East written in 1921–23.

**Couple** is a pair of equal forces acting on the same body in opposite and parallel directions. The effect is to rotate the body about a certain axis, perpendicular to the plane of the couple.

**Couplet.** Any two lines which rhyme together may be called a couplet; but the term is more frequently used to denote two lines which contain the complete expression of an idea, and are therefore to a certain extent independent of what goes before or what follows. The poetic wits of the age of Queen Anne excelled in this kind of aphoristic versification. Pope, as has been said, reasons in couplets. However effectively epigrammatic short aphorisms may be expressed in rhymed couplets, a long poem in this rhythm becomes wearisome to the ear. Not all the alert genius of Pope nor the sonorous strength of Dryden could avert from their favourite rhythm the damning sin of monotony.

**Coupon**, a term signifying any billet, cheque, or other slip of paper cut off from its counterpart, applied chiefly to a dividend or interest warrant, which is presented for payment by holders of debentures. Coupons in Great Britain require to be stamped. The term is also applied to one of a series of tickets which are vouchers that certain payments will be made or services be performed, at various times or places, in consideration of money paid.

**Courbet**, GUSTAVE, painter, was born at Ornans, Franche-Comté, on the 10th of June 1819. In 1839 he was sent by his father, a well-to-do farmer, to study law in Paris, but all the bent of his singularly strong and self-assertive nature was turned towards art. In 1841 he took to landscape work, painting in the forest of Fontainebleau. In 1844 he began to exhibit at the Salon; and his works created a great sensation when shown in the Salon of 1850. Marred by frequent coarseness, and by defects of drawing, Courbet's works possess fine and powerful colour, and are valuable for their firm basis in actual fact, for their truth to an

individual and personal impression of nature. His realism meant the negation of all idealism in nature without the addition of sentiment or the infusion of beauty. Revolutionary in his own time, his work seems sober and classic beside that of the post-impressionists. His hunting scenes and animal subjects, his landscapes and sea-pieces, are almost equally vigorous and spirited. In 1871 he joined the Commune, was elected to the Chamber, and, as responsible for the destruction of the Vendôme Column, was sentenced to six months imprisonment, and to be fined for its restoration. On his release in 1873 he retired to Vevey in Switzerland, where he died, 31st December 1877. See Muther's *Modern Painting* (1907–8), Lives by Ideville (1879) and Estignard (1897), L. Bénédite's *Courbet* (trans. 1913).

**Courbevoie**, a north-west suburb of Paris, on the left bank of the Seine; pop. 46,000.

**Courier**, PAUL LOUIS, one of the most powerful and brilliant of French writers, was born in Paris on January 4, 1772. His boyhood was spent in Touraine, and he afterwards studied at the Collège de France and the School of Artillery at Châlons. He then served for some eighteen years in the army, but his interest lay wholly in study, and especially in the study of the Greek language. His military experiences ended in 1809 on the field of Wagram, from which he was carried insensible to Vienna. Thenceforth he devoted himself to letters. He lived for some time at Florence, where he became embroiled with the librarian of the Laurentian Library, in regard to a manuscript of Longus. The quarrel led to the publication of the *Lettre à M. Renouard*, in which Courier's incomparable ironic faculty was for the first time revealed. He removed to Paris in 1812, and in 1814 settled on his estate in Touraine. In 1816 he issued the first of his famous pamphlets, the *Pétition aux Deux Chambres*, a scathing exposure of the wrongs inflicted on the peasantry by the government of the Restoration. The *Pétition* was read by high and low, and its author was thenceforth recognised as a political power in France. Courier continued the attack in a series of admirably witty letters in the *Censeur*, and in 1821 there appeared the inimitable *Simple Discours de Paul Louis, Vigneron de la Chavonnière*. In this pamphlet the scheme to purchase the estate of Chambord for the Duc de Bordeaux by a 'national offering,' wrung from the peasantry, was mercilessly derided and laid bare. The *Simple Discours* is Courier's masterpiece. It was made the subject of a government prosecution, and its author underwent two months' imprisonment in Sainte Pélagie, where he formed the acquaintance of Béranger. On his release he was again tried, but escaped with a reprimand, for his *Pétition pour les Villageois qu'on empêche de danser*. His subsequent writings were published anonymously at Brussels. They comprised *Réponses aux Lettres Anonymes*, the *Gazette du Village*, the *Libret de Paul Louis*, the *Pièce Diplomatique*—an imaginary letter from Louis XVIII. to the king of Spain—and the *Pamphlet des Pamphlets*, a vindication of pamphleteering, which appeared in 1824, and which Armand Carrel called 'the swan-song of Courier.' On Sunday, 10th May 1825, Courier was found shot dead by an assassin near his house at Varetz.

With the exception of Pascal, Courier is the greatest master of irony in the ranks of French authors. A deadly controversialist, he was at the same time an exquisite artist, whose style is characterised by austere simplicity of diction. See the notice of Courier in the edition of his works edited by Armand Carrel (4 vols. Paris, 1829–30), also R. Gaschet's edition (2 vols. 1925), and an essay

prefixed by Sarcey to his edition (1876-77), besides the several papers by Sainte-Beuve.

**Couriers** are persons hired to accompany travellers abroad, whose special duty is to make all arrangements for the journey, and relieve their employers as far as possible of all anxiety about passports, exchange of money, hotel negotiations, and the like. The speaking of several languages is one of many important qualifications in a good courier.—King's or Queen's Messengers are sometimes called Foreign Office couriers.

**Courlan**, an American wading-bird of the genus *Aramus*, usually placed among the Rails (q.v.). The North American courlan or crying-bird (*A. giganteus*) is 27½ inches long, with long bill and short wings, is a rapid runner, and has a cackling note. It inhabits Florida and the West Indies. The nest is usually attached to reeds. The flesh of the young is good eating. The South American courlan (*A. scolopaceus*) is larger.

**Courland**, or KURLAND, till 1917 a Russian government, and one of the Baltic provinces, now two provinces of the republic of Lettland: Courland or Kurseme (5500 sq. m.; pop. 304,000) to the west, and Semgallen or Zemgale (5000 sq. m.; pop. 207,000) to the east. The whole was formerly an independent duchy—properly, indeed, consisting of two duchies, Courland and Semgallen—and belonged, along with Livonia, to the Teutonic Knights. The difficulty of resisting the Russians led to the acknowledgment in 1561 of the feudal sovereignty of Poland. The country was long distracted by the contentions of two parties, one Russian and the other Polish; and after being for some time very completely under Russian influence, it was united to Russia in 1795. Biron (q.v.) was made Duke of Courland in 1737. The people are mostly Protestants. It is generally a level country, with ranges of low hills, and contains many lakes, bogs, forests, and sand-dunes, but some parts have a very fertile soil. Cattle-breeding is on the increase; game abounds; and bears, boars, elks, and wolves are met with occasionally. The proprietors of land, under Russian rule, were mostly German; the Russians did not amount to 2 per cent. of the population. The peasantry, who constitute the bulk of the population, of Lettish extraction, are chiefly engaged in husbandry.

**Courmayeur**, or CORMAGGIORE, a tourist resort of the NW. corner of Italy, under Mont Blanc, has mineral springs.

**Courses.** See SAILS.

**Coursing** is defined by Dr Johnson as 'the sport of hunting hares, foxes, and sometimes deer with greyhounds.' From the sportsman's point of view foxes and deer must be eliminated from the definition, for coursing is now understood to be the pursuit of hares by a brace of greyhounds. The saying that 'a gentleman was known by his hawk, his horse, and his greyhound' is a very ancient one; and King John is recorded to have accepted greyhounds in lieu of a money fine; but in those times it was generally deer that were coursed. In Elizabeth's reign the sport attained a fashion and celebrity previously unknown, and has since that time been followed up with undiminished zeal.

Late in the 16th century we have a record of some laws of the leash, apparently based on a code used by the Greek historian Arrian, and framed by the then Duke of Norfolk on principles which have been largely adhered to since. To Lord Orford, the lord-lieutenant of Norfolk, the sport of coursing is much indebted. Indeed, by some he is called 'the father of modern coursing;' and he it was who founded the first society, as it was then called, in 1776 at Swaffham in Norfolk. Other clubs were soon organised, Lord Craven founding one at

Ashdown Park in 1780, and this was followed by the Malton Club in Yorkshire and the Bradwell and Tillingham Club in Essex, besides many others starting soon after the opening of the 19th century, including the Altcar Club and the Newmarket Club.

After the passing of the Game Laws in 1831 coursing became much more general, and the sport was taken up by the public, meetings prior to that time being principally supported by members of clubs, of which there were a large number spread over the kingdom. From that date up to 1875 the growth of coursing was very great, and all the chief meetings throughout England, Scotland, and Ireland were attended not only by those who owned greyhounds, but also by many who simply went for the love of the sport. It was feared by many that the Ground Game Act of 1880 would greatly interfere with public coursing, and this fear naturally caused coursers to follow the example of Mr Case, of Plumpton, who originated the enclosed system, the first ground being made over his farm in Sussex. Up to this time old-fashioned coursers had looked rather askance at the new method of carrying on the sport; but the Ground Game Act caused more enclosures to be formed, and then the fact of their being so easy of access added greatly to their popularity.

At a coursing-meeting two Greyhounds (q.v.) are slipped together, and the judge who has been appointed by the committee or by the votes of the nominators decides which is the winner of the trial upon the one uniform principle that the greyhound which does most towards the killing—though he may not actually kill—is to be declared the winner. The judge has a recognised code of points to go by, these points being *speed*, for which one, two, or three points may be allowed; *the go-bye*, two, or three points; *the turn*—that is, bringing the hare round at not less than a right angle—one point; *the wrench*—bringing the hare round at less than a right angle—half a point; *the kill*, one or two points or nothing; and *the trip*—where the hare is thrown off his legs—one point.

Coursing in enclosures, however, never attained a lasting popularity, although much money was freely put down in other districts, notably at Gosforth Park, near Newcastle; Four Oaks Park, near Birmingham; and Haydock Park, between Liverpool and Manchester; whilst the Kempton Park racecourse was, at an early period of the innovation, utilised. One after the other, including Plumpton, was abandoned, mainly on account of the receipts not meeting the expenditure, not omitting a very serious discovery that the apology—for it was little better—for the true pristine character and traditions of the pastime was undermining the quality and essential attributes of the greyhound, as far as breeding is concerned. In a sentence, the fast greyhound was the animal for enclosures, and so people devoted their attention almost entirely to speed, to the neglect of other and equally necessary properties of the breed, especially staying powers. The disappearance of enclosed coursing absolutely preserved the real greyhound; and, although an attempt was made to revive Plumpton, three or four seasons saw the last of the enclosures, in the shape of dog-racing.

Strange to say, no departure from the real thing was ever introduced into Scotland; but in Ireland there is another tale to tell in connection with agrarian economics. The number of open meetings in Ireland left are probably no more than about a dozen; but, on the other hand, enclosures of the primitive kind may be counted by scores; indeed, the National Coursing Club (founded in 1858), which controls the sport, as does the Jockey Club racing,

some years ago was compelled to institute regulations to meet what was fast becoming a travesty on the time-honoured pastime by the appointment of an Irish committee, with full powers to act when occasion required.

The Ground Game Act of 1880, as before mentioned, bid fair to undermine, if not ruin, coursing. Fortunately many landed proprietors, following the sport, and breeding their own greyhounds on orthodox lines and on a large scale, arranged with their tenantry to preserve the hares, often at considerable self-denial, whilst, in not a few instances, the tenants themselves guarantee the game, and practically run some of the most important meetings in England. Thus the historical Waterloo Cup, with its interesting international associations, beginning as far back as 1836, and the Altcar Club (founded in 1825), provided no fewer than fifteen days' coursing every season, thanks to the generosity and love of the greyhound displayed by successive Earls of Sefton, and on ground that is without a compeer in the kingdom. The Border Union, dating from the middle of the 19th century, is second in importance to the Waterloo Cup, and for many years was managed by the tenants of the Netherby estate, on the Cumberland side of the border. Owing to a shortage of hares, due probably to the huge establishment erected by the War Office at Gretna, the Border Union Committee were obliged to give up the district, and the Earl of Lonsdale granted them permission to course over his Lowther estate in 1919, and the sport there is quite up to the Netherby standard. Two meetings, under the title of South Lancashire, have been conducted by a committee of leading sportsmen on the famous Scarisbrick estate, near to Southport, during a long period of years. Newmarket, with its Champion Puppy Stakes, has of late years lost its old importance through changes in the management, and in the season of 1914-15 was allowed to lapse. Time was, however, when the Newmarket type of greyhound was a distinct breed at the headquarters of the British turf. The Wryde Club (a successor to the Farset Fen Club), within easy distance of Peterborough, is the scene of the contest for a valuable stake, entitled the Barbican Cup, not to omit a few subsidiary meetings on the same ground. The Southern Counties Club revived coursing in Essex, over marshland that has always been noted for hares that 'run for ever,' so to speak. The county of Kent provides some good sport, thanks to the energetic Isle of Thanet Club. Sussex has a prosperous club, supported by farmers and sportsmen from all parts of the country, and it reminds one of old coursing lore to know that the Swaffham Club is a worthy successor to its namesake of 1776. Many other meetings are periodically held in different parts of England; but Amesbury in Wiltshire, Ashdown in Berkshire, and Stockbridge in Hampshire, the downs which provided incomparable sport, are now mere matters of history. It is regrettable to observe that coursing has during several years past been gradually going to the wall in Scotland. One can trace the decline with the legislation of 1880, till, in spite of the whole-souled enthusiasm and self-sacrifice of two Anstruther baronets on their Lanarkshire estates, a like co-operation by two Jardine baronets in Dumfriesshire, the game has clearly reached its lowest ebb. Yet it can be vividly recalled to mind by a few old coursers that at least half of the Scottish counties could count on two or more meetings in a season. The only meeting that calls for special mention across St George's Channel is that of the Irish Cup, on Waterloo Cup lines, started in 1905 by the Co. Limerick Club, which for a long period has been permitted the use of Lord Dunraven's lands.

**Court, PRESENTATION AT.** Formal presentation to the sovereign of persons whose status entitles them to that honour, takes place either at St James's Palace, at a levee, intended for gentlemen only, or at Buckingham Palace, a drawing-room, where both ladies and gentlemen appear. The days when levees and drawing-rooms are to be held are always announced some time beforehand. It is difficult in the present day to define exactly who may and who may not be entitled to be presented. Members of families of the nobility and landed gentry, diplomats, members of the House of Commons, persons holding high offices under the crown, judges, magistrates, church dignitaries, officers in the army and navy, persons who have attained distinction by eminence of any kind, and the wives and daughters of the same classes, form the larger number of those presented at levees and drawing-rooms. Persons are often presented on entering on some office, or attaining some dignity. Any one who has been once presented is entitled to appear at any future levee or drawing-room without a new presentation. The whole arrangements connected with presentations are under the supervision of the lord chamberlain, in whose office in St James's Palace information is given to all persons wishing to be presented. The names of ladies and gentlemen desiring presentation, and of the ladies, noblemen, and gentlemen who are to present them, have to be submitted to the sovereign for approval, and there is a strict exclusion of persons of damaged reputation, whatever their rank. Court dress or official uniform must be worn. A British subject who has been presented at St James's may on any after occasion claim to be presented by the British minister at any foreign court. As to court dress both of ladies and gentlemen, court etiquette, court mourning, &c., reference may be made to *Old Court Customs and Modern Court Rule*, by the Hon. Mrs Armytage (1883).

**Courtallum (Kūttālam),** a town of the district of Tinneveli, Madras, stands amongst the Ghats near the southern end of the peninsula; and though only 450 feet above sea-level, serves as the sanatorium of the district, deservedly enjoying a reputation for salubrity of air, richness of vegetation, and beauty of scenery.

**Courtesy, or CURTESY,** in Law, is the life interest which the surviving husband has in the real or heritable estate of the wife. Both in England and in Scotland this customary right has been regarded as a national peculiarity. Littleton speaks of it as tenure 'by the curtesie of England, because this is used in no other realme but in England only.' In Scotland it is called the courtesy or curialty of Scotland. It was probably introduced into both countries from Normandy. The four circumstances requisite to make a tenancy by courtesy in England were—marriage, seizin of the wife, living issue, and the wife's death; but see HUSBAND AND WIFE. The rule that the child must have been heard to cry once held in England, and is still adhered to in Scotland. In neither country, however, need the child survive; it is enough that it was once in existence, although only for a moment. In Scotland courtesy extends only over estate inherited by the wife. In both countries the child must be the mother's heir, and it is consequently said that courtesy is due to the surviving husband rather as the father of an heir than as the widower of an heiress.

**Courtesy Titles** are titles allowed to certain near relations of peers by understood usage and the courtesy of society to which the users have no legal right. The subject of courtesy titles, though tolerably familiar in its general outline to persons resident in Britain, is complicated

enough to be a frequent source of perplexity to Americans and foreigners, and may be thus explained: Dukes, marquises, earls, and even viscounts are often in possession of a number of titles belonging to an inferior grade in the peerage, which have in many cases been gradually accumulated by the ancestors of the peer in the course of his upward progress in the peerage. Some peers have as many as sixteen inferior titles—e.g. the Duke of Atholl, who has one marquise, four earldoms, three viscounties, and eight baronies. While in ordinary parlance a peer is known by his highest title (or titles, if he holds two of the same degree), his eldest son bears by courtesy one of his inferior titles. Thus the eldest son of the Duke of Devonshire is Marquis of Hartington; of the Duke of Buccleuch and Queensberry, Earl of Dalkeith; of the Marquis of Bute, Earl of Dumfries. There is no rule as to which inferior title should be assumed, a lower one being occasionally preferred to a higher; and the courtesy title may be different in one generation from another. The inferior title of a viscount who is also a baron is never borne as a courtesy title by his son; but a usage prevails among viscounts and barons (more properly 'lords') in the peerage of Scotland, of the eldest son designing himself 'master'; thus the eldest sons of Viscount Arbutnot and Lord Lovat are known as the Master of Arbutnot and Master of Lovat. Courtesy titles are allowed to the eldest sons of courtesy marquises and earls. Thus the eldest son of Earl Percy, himself eldest son of the Duke of Northumberland, is Lord Warkworth. There are various instances of titles borne by heirs-apparent or grandsons of peers which have no existence among the family honours, or are derived from them by some modifications. While Earl Nelson's inferior titles are Viscount Merton and Baron Nelson, his eldest son is known as Viscount Trafalgar. There are a few cases where, in consequence of the inferior title being identical with the higher one, the eldest son substitutes the family surname for the title. The Earl of Gosford, whose family surname is Acheson, is also Viscount Gosford and Baron Gosford; and his son adopts the courtesy style of Viscount Acheson. The holders of courtesy titles, not being legally peers, can sit in the House of Commons.

The younger sons of dukes and marquises have the courtesy title of 'Lord' prefixed to their Christian name and surname—e.g. Lord Charles William de la Poer Beresford, second son of the late Marquis of Waterford; and the daughters of dukes, marquises, and earls, have 'Lady' followed by their Christian name and surname, the surname being that of their husband if married, or his courtesy title if he be a courtesy peer. But if a lady enjoying such courtesy title marry a peer (not by courtesy), she only takes her husband's peerage title. Thus the fifth Duke of Buccleuch's second daughter, by her marriage with Donald Cameron of Lochiel, became Lady Margaret Elizabeth Cameron, while the same duke's eldest daughter was Marchioness of Lothian. Lady Emily Somerset, daughter of the Duke of Beaufort, on marrying Viscount Dupplin, eldest son of the Earl of Kinnoull, was known as Lady Emily Dupplin; but on her husband succeeding his father as Earl of Kinnoull, she became simply Countess of Kinnoull, this change of designation involving, curiously enough, a loss of precedence, inasmuch as the rank of a duke's daughter is higher than that of a countess. When, as often happens, a royal warrant is granted to the brothers and sisters of a peer whose father has never been in possession, giving them the precedence of the sons and daughters of a peer, they enjoy the corresponding courtesy titles. The title 'Honourable,' used by sons of earls, viscounts,

and barons, and daughters of barons, belongs, not of courtesy, but of right, to them in common with all sons and daughters of peers.

The widow of a peer or a knight is allowed by courtesy to retain the title she acquired from her husband, notwithstanding a second marriage; the widow of a baronet is legally entitled to do so.

Along with courtesy titles may be ranked the appellations of the judges of the Court of Session in Scotland, who prefix 'Lord' either to their surname or to a territorial designation. These titles, though given in general society as well as on the bench, are not used in subscribing the judge's name, even to official papers. Hence Lord Kingsburgh's signature, 'J. H. A. Macdonald.' Only since 1905 do the wives of Scottish judges participate in their husbands' official titles. See ADDRESS, FORMS OF.

**Court-fools.** See FOOLS.

**Court-hand,** a name given in England to a modification of the Norman handwriting, as distinguished from the modern or Italian handwriting which was in use in the English law-courts from the 16th century till abolished by law in the reign of George II. See WRITING.

**Court-martial,** a court for the trial of all persons subject to military law or to the Naval Discipline Act. For early history, see CHIVALRY (*Court of Chivalry*) and MUTINY ACT. This act was passed by parliament in 1689, and, with the articles of war, made by royal prerogative, constituted the law under which discipline in the army was maintained. This law, which is now embodied in the Army Act of 1881, provides for the assembly of courts-martial for the trial of offences which are of too grave a character to be dealt with summarily by the regimental commanders. They are of four kinds—general, district, regimental, and field-general. The sovereign issues warrants to certain high officers and to governors of colonies to convene general courts-martial, and the power to convene district courts follows as an incident. A regimental commander, as such, has power to convene a regimental court. The field-general court-martial is an emergency court for use beyond the seas or on active service, on any occasion when an ordinary general court-martial cannot be assembled conveniently; it may be convened by any commanding officer.

The Army Act lays down rules for the general conduct of courts-martial. In 1920 improvements in procedure were introduced as the result of the recommendations of a parliamentary committee of 1919.

**Composition.**—(a) General court-martial—in United Kingdom, India, Malta, and Gibraltar, not less than nine members; elsewhere, not less than five; each member must have at least three years' commissioned service; except in emergency, the president must be a field or general officer, and five members must be not below the rank of captain. (b) District court-martial—not less than three members, each of whom has at least two years' commissioned service; except in emergency, the president is a field officer. (c) Regimental court-martial—not less than three members, each having at least one year's commissioned service; except in emergency, the president is not under the rank of captain. (d) Field-general court-martial—not less than three members of any rank; in emergency, two members; president, of any rank.

**Jurisdiction.**—(a) General court-martial—all persons subject to military law, which includes civilians under a royal proclamation. (b) District court-martial—cannot try a person subject to military law as an officer. (c) Regimental court-martial—cannot, as a rule, try any soldier above

the rank of corporal. (d) Field-general court-martial—all persons subject to military law; but where it is not 'active service, the offender must be under the command of the convening officer and be charged with an offence against an inhabitant.

**Powers of Punishment.**—A graduated scale of punishments is laid down in the Army Act. (a) General court-martial—any punishment, but two-thirds of the court must concur in the award of death. (b) District court-martial—cannot award death or penal servitude. (c) Regimental court-martial—cannot award discharge with ignominy, or detention for more than forty-two days, or anything higher in the 'scale.' (d) Field-general court-martial—when three members are unanimous, death may be awarded; when less than three members, imprisonment and forfeiture of pay; the punishment known as 'field punishment,' which was introduced in 1907 as a substitute for flogging, was abolished in 1923.

The scale of punishments in the case of officers is—death, penal servitude, imprisonment (two years), cashiering, dismissal, forfeiture of rank, reprimand; in the case of soldiers—death, penal servitude, imprisonment, detention, discharge with ignominy, forfeiture of rank and of decorations, fines, stoppages. Confirmation of award is made by the sovereign, or by an officer authorised by him, who may commute, mitigate, or remit all or part of a sentence, but may not increase it.

The procedure is similar to that of civil courts—the court is public, and the same rules of evidence are in force; but the members of a court-martial act as both jury and judge—i.e. they find the facts and allot the sentence. All are sworn, and each votes, commencing with the junior, both on the finding and sentence, as well as on any question that may arise, the majority deciding. The witnesses are also sworn. An officer is appointed as judge-advocate in important trials, to assist the court on points of law, see that the proceedings are regular, and, with the president, take care that the prisoner is treated with strict fairness. Counsel may appear on both sides at general courts, and, if barristers or officers subject to military law, may address the court, and examine and cross-examine witnesses; or before any court the prisoner may be assisted in his defence by a 'friend,' who may make suggestions to him, but is not allowed to address the court or the witnesses. The prosecutor must be an officer and not a member of the court; he is sworn, and charged with the duty of eliciting the truth, but not necessarily of obtaining a conviction. The proceedings are all written, usually on an official form. In cases of emergency officers are enjoined to preserve at least such record of the proceedings as is possible.

Contempt of a court-martial by persons subject to military law is punishable by the same or another court-martial, and, in the case of civilians, by a civil court, to which the offence is certified by the president. Witnesses are summoned by the convening officer or the president, and, if civilians, their travelling expenses must be tendered.

On board a man-of-war no military court-martial may sit except a regimental court, with the sanction of the captain of the ship, for the trial of a non-commissioned officer, and it may only sentence him to reduction to the ranks. Marines are liable to trial by military court-martial when not borne on the books of a man-of-war, in which case they come under the Naval Discipline Act. Naval courts-martial consist of admirals, captains, and commanders, who try offences against the Naval Discipline Act. The chief admiral of the fleet or squadron appoints the members; but all captains on the station have a right to sit, if not implicated.

The court-martial is open to all the crew and others as spectators. The sentence is final.

**Courtney, LORD** (LEONARD HENRY COURTNEY; raised to the peerage as Lord Courtney of Penwith in 1906), was born at Penzance, the son of a banker, 6th July 1832. Educated at Penzance and St John's College, Cambridge, he graduated second wrangler and first Smith's prizeman in 1855, and became fellow of his college the year after. In 1858 he was called to the bar, and from 1872 to 1876 he filled the chair of political economy at University College, London. He early began to write for the *Times*, and his pamphlets and articles to monthly magazines placed him among the ablest and most advanced doctrinaire Liberals in England. He early became an eager advocate for proportional representation and a wide extension of local government. He was returned for Liskeard in 1876 and 1885; in 1886, 1892, and 1895 for the Bodmin division; in 1900 he was rejected as a pro-Boer. He was Under-secretary of State first in the Home and next in the Colonial Office, and in May 1882 became Financial Secretary to the Treasury. He was chairman of committees in the parliaments of 1885 and 1886-92. He died 11th May 1918. See *Life by Gooch* (1920).

**Court of Session**, the supreme court of civil jurisdiction in Scotland. After various experiments, from James I.'s time, cases in which the Auditors appointed by parliament failed to agree were referred to the Privy-council; and James IV. created Lords of Session who 'approximate to the character of privy-councillors and depart from the older model found in the parliamentary committee of Auditors.' In its present form, however, it was constituted in 1532. Its origin is generally ascribed to the Duke of Albany, who when regent had submitted a scheme for such a court to Pope Clement VII. The details of the scheme were carried out by Archbishop Dunbar of Glasgow, who was then Lord Chancellor. The judges of the Court of Session originally consisted of the Lord Chancellor, Lord President, and fourteen ordinary judges or 'senators of the College of Justice,' together with an indefinite number of extraordinary lords, who represented the peerage. At first, half the number of the judges were laymen appointed by the king, and half ecclesiastics appointed by the church. In 1584 all clergymen were declared disqualified from holding judicial office, but so late as 1664 the Archbishop of Glasgow was made an extraordinary lord. The extraordinary lords themselves were abolished in 1723, and the Court of Session then consisted of the Lord President and fourteen ordinary judges, the office of Lord Chancellor having been abolished at the Union. The Court of Session first sat in the Tolbooth or prison of Edinburgh, but in 1639 was accommodated in the buildings of the Parliament House, which was then erected. It sat as one chamber, one of the ordinary lords going by rotation weekly to sit in what was called the Outer House. Here all cases, with certain exceptions, were in the first place heard and decided by the Lord Ordinary, but an appeal lay from his judgment to the whole court. Fresh changes were made in 1808 and 1810; and in 1830 the total number of judges was reduced to thirteen, the two divisions each consisting of four, including the Lord President and Lord Justice-clerk, whilst the number of the Outer House judges remained as before: this is the present constitution of the court. In 1830, moreover, the office of president was united with that of Lord Justice-general or president of the High Court of Justiciary (q.v.), the supreme criminal court in Scotland. Prior to 1887 five of the judges were appointed Lords Com-

missioners of Justiciary, but by the Criminal Procedure (Scotland) Act of that year all the judges are now members of that court. Since the Union in 1707, several courts which had a separate existence, and in some cases an exclusive jurisdiction, have been merged in the Court of Session. These are the Court or Commission of Teinds (though this still sits nominally as a separate court), in which questions relating to the law of teinds or church tithes were decided; the High Court of Admiralty, dealing with maritime cases; the Court of Exchequer, having jurisdiction in all matters relating to crown rents, customs, &c.; and the Commissary Court of Edinburgh, which had to do with wills. The judges of the Court of Session are appointed by the crown from the bar, and hold their offices *ad vitam aut culpam*. See APPEAL, JUSTICIARY (COURT OF), ACTS OF SEDERUNT; and Professor Hannay in *Book of the Old Edinburgh Club*, vol. xi. (1922).

**Courtrai** (Flem. *Kortrijk*), a town of Belgium, in the province of West Flanders, 48 miles W. of Brussels, and 6 miles from the French frontier. Built on both sides of the Lys, it has ancient walls, a fine old bridge flanked with Flemish towers, a noble town-hall (1526), a belfry, and a beautiful Gothic church, founded in 1238 by Baldwin, Count of Flanders. Table damask, linen, and lace are the principal articles of manufacture. There are extensive bleaching-grounds in the vicinity, and the neighbouring plains supply fine flax in large quantities to many European markets. Pop. 37,000. In 1302 the Flemings, citizens of Ghent and Bruges chiefly, won a splendid victory over the chivalry of France beneath the walls of Courtrai, called 'Battle of the Spurs,' from the number of gilt spurs afterwards gathered from the dead by the victors. Henry VIII.'s 'Battle of the Spurs' was fought at Guinegate (q.v.) in 1513. Courtrai was in German hands almost from beginning to end of the Great War.

**Courts of Law.** See COMMON LAW, CHANCERY, EQUITY, APPEAL, ASSIZE, COURT OF SESSION, COUNTY, ADMIRALTY COURTS, DIVORCE, PROBATE COURT, JUSTICIARY, POLICE.

**Cousin** (Fr., from Low Lat. *cosinus*; for Lat. *consobrinus*), a kinsman; more specifically the son or daughter of an uncle or aunt. The children of brothers or sisters are *cousins-german* (german being the Lat. *germanus*, 'brother'). The children of cousins-german are *second cousins*; and if A and B are cousins, A is a *first cousin once removed* to the children of B, as B is to the children of A. See CONSANGUINITY.

**Cousin, VICTOR**, the founder of systematic eclecticism in modern philosophy, was born in Paris, November 28, 1792. He studied with brilliant success at the Lycée Charlemagne and the École Normale. He was attracted to the study of philosophy by Laromiguière, a disciple of Locke and Condillac; but appointed in 1815 assistant-professor to Royer-Collard at the Faculty of Letters, he threw himself heartily into the reaction against the sensualistic philosophy and literature of the 18th century. Following the path of his senior, he became an exponent of the doctrines of the Scottish metaphysicians, but exhibited far more brilliancy than the original authors of these doctrines. In 1817 Cousin visited Germany, and already introduced to its bolder speculative systems, he now zealously studied Kant, Jacobi, Fichte, Schelling, and Hegel. For his liberalism he was in 1821 deprived of his offices; and in a second visit to Germany in 1824-1825, suspected of carbonarism, he was arrested at Dresden, presumably at the instigation of the French police, and sent to Berlin, where he was detained for six months.

He took advantage of his compulsory residence in the capital of Prussia further to study the philosophy of Hegel. On his return to France he took a decided stand against the reactionary policy of Charles X., and in 1827 was reinstated in his chair at the Sorbonne. Meanwhile he had appeared as an author. During 1820-27 he published his editions of Proclus and Descartes and part of his celebrated translation of Plato. It has been said that to find an audience as numerous and as passionately interested as were those of Cousin, it would be necessary to go back to the days of Abelard. Cousin threw great moral earnestness into his work; his doctrines were for the most part new to his hearers, bold, and in harmony with the spirit of the time. The finest qualities of the national genius appeared in his lectures, a wonderful lucidity of exposition, a beauty of style such as few philosophers have equalled, and a power of co-ordinating the facts of history and philosophy in such a manner as to make each illustrate the other. At this period Cousin was one of the most influential leaders of opinion in Paris; and consequently, after the revolution of 1830, when his friend Guizot became prime-minister, Cousin was made a member of the Council of Public Instruction; in 1832 a peer of France; and later, Director of the École Normale. The great success of his efforts for the organisation of primary instruction was largely a consequence of those valuable reports which he drew up, from personal observation, on the state of public education in Germany and Holland. In 1840 he was elected a member of the *Académie des Sciences Morales et Politiques*, and in the same year became Minister of Public Instruction in the cabinet of Thiers. The revolution of 1848 found in Cousin a friend rather than an enemy, and he aided the government of Cavaignac. After 1849 he disappeared from public life. In his last years he lived in a suite of rooms in the Sorbonne, and he died at Cannes, 13th January 1867.

His philosophy is eclecticism, but not mere syncretism. He has a definite criterion of truth, and a definite method of observation, analysis, and induction; his system comprises psychology, ontology, and an eclectic history of philosophy. Psychological observation gives three great factors—sensibility, activity or liberty, and reason, the latter being impersonal. Cousin repudiates pantheism, with which he has often been charged; and criticising the opposing systems of sensationalism, idealism, scepticism, and mysticism as incomplete rather than false, he holds that each expresses a real order of phenomena and ideas. Cousin's influence revived the study of philosophy in France, and especially renewed interest in the history of philosophy. Amongst his pupils more or less influenced by his teaching are Jouffroy, Rémusat, Barthélemy St Hilaire, Jules Simon, and Janet.

Cousin's chief works (besides those already mentioned) are *Fragmens Philosophiques* (1826), *Cours de l'Histoire de la Philosophie* (1827), *Cours d'Histoire de la Philosophie Moderne* (1841), *Cours d'Histoire de la Philosophie Morale au XVIII<sup>e</sup> Siècle* (1840-41), *Leçons de Philosophie sur Kant* (1842), *Études sur les Femmes et la Société du XVII<sup>e</sup> Siècle* (1853), his famous *Du Vrai, du Beau, et du Bien* (1854), works on Aristotle, Locke, Kant, and Pascal, and his editions of Abelard and of Pascal's *Pensées*. See Sir W. Hamilton's critique in the *Discussions*; Janet, *Victor Cousin et son Œuvre* (1885); Jules Simon's Monograph (1887; trans. by Masson, 1888); Barthélemy St Hilaire, *Victor Cousin, sa Vie et Correspondance* (3 vols. 1895); and Dumas, *Victor Cousin et le Mysticisme* (1902).

**Cousins, SAMUEL**, engraver, was born 9th May 1801 at Exeter, and was apprenticed to S. W. Reynolds, the excellent mezzotinter, in many of

whose plates he had a chief hand, while some fifty-five of the small mezzotints after Sir Joshua, which bear his master's name, were his work. About this period he also executed portraits in pencil. In 1826 he started on his own account as an engraver, and produced the 'Master Lambton' after Lawrence, a mezzotint which at once established his reputation. It was followed by a long series of admirable plates after Reynolds, Lawrence, Landseer, Leslie, Millais, Leighton, and other eminent painters. His 'Marie Antoinette in the Temple,' after E. M. Ward, he was accustomed to rank as one of his finest works. He was elected an Associate-engraver of the Royal Academy in 1835, and a Royal Academician Engraver in 1855, and he retired in 1880. To the Academy he presented a sum of £15,000 to found annuities for poor and deserving artists. He died 7th May 1887. His works were catalogued by Algernon Graves in 1880.

**Coutances**, a town in the French department of La Manche, 5 miles from the English Channel, and 57 S. of Cherbourg by rail. It stands on a hill crowned by the cathedral (dating from the 13th century), one of the finest specimens of ecclesiastical architecture in the Early Pointed style in Normandy. Pop. 6000.

**Couthon**, GEORGES, a fanatic of the French Revolution, was born in 1756 at Orcet, near Clermont, in Auvergne. An advocate at the outbreak of the Revolution, he was sent by Puy de Dôme to the National Convention, where, spite of his crippled limbs, he made himself conspicuous by his shrieking hatred of the priesthood and the monarchy. He voted for the death of the king without delay, became a devoted and bloodthirsty partisan of Robespierre, and was appointed in July 1793 a member of the *Comité de Salut Public*. At Lyons he crushed the insurrection with merciless severity, and outdid himself after his return to the Convention, with his frothy ravings against Pitt and the English nation. The fall of Robespierre brought down Couthon also. Accused by Fréron, he was thrown into prison, delivered by the mob with whom he was popular, recaptured by the soldiers of the Convention, and executed 28th July 1794, along with St Just and Robespierre.

**Coutras**, a town in the French department of Gironde, on the left bank of the Dronne, 32 miles N.E. of Bordeaux by rail, with some trade in flour and wine. Here, in 1587, Henry of Navarre gained a bloody victory over the forces of the League, under the Duc de Joyeuse, who perished. Pop. 5000.

**Coutts**, THOMAS (1735-1822), banker, was born in Edinburgh, the son of a merchant and banker, who was Lord Provost in 1742-44. With his brother James he founded the banking-house of Coutts and Co. in London, and on the latter's death in 1778 became sole manager. Keen and exact in matters of business, although charitable and hospitable in private, he left a fortune of some £900,000. By his first wife, who had been a servant of his brother's, he had three daughters, who married the Earl of Guildford, the Marquis of Bute, and Sir F. Burdett; in 1815 he married Miss Mellon the actress. See BURDETT-COUTTS; Richardson's *Coutts & Co.* (1900); and Life by E. H. Coleridge (1919).

**Couvade**, a singular and widespread custom among savages in many parts of the world, and regulating the conduct of a father in connection with the birth of a child. In Guiana, even before the child is born, the father abstains from some kinds of animal food. The mother works up to a few hours before the birth, and retires alone, or with some women, to the forest for the birth. In a few hours she returns and resumes her ordinary work.

Meanwhile the father has taken to his hammock, and abstains from every kind of work, from meat and all other food except weak gruel of cassava meal, from smoking, from washing himself, and especially from touching weapons of every kind. During this time, which may extend for weeks, he is fed and cared for by the women. The explanation is unattainable; but the custom appears to imply a mysterious magical and sympathetic connection between father and child, such that if the father infringe the rules of couvade the child suffers. If he eat capybara flesh, the child will have protruding teeth like those of that animal; if he eat an animal with spotted skin, the child will be spotted too. In Guiana the child is not weaned till the third or fourth year. Indians often allege in explanation that the child descends more directly from father than from mother. Some recent anthropologists find the origin of the custom in the transition from the original matriarchal system (see *TRIBE*), in which descent and inheritance were reckoned through the mother alone, to the patriarchal system. In some places still the father has to buy the child from the mother; among the ancient Romans, the father had to lift the child from the ground. The couvade may therefore be a ceremony by which the father secures and proclaims his property in the new-born child. Diodorus records the custom as in use among the ancient Corsicans; and it has been found by ancient and modern travellers in parts of China, Borneo, Africa, North and South America. The name, now commonly used by anthropologists, is French, being from *couver*, 'to hatch eggs.'

**Couza**, ALEXANDER JOHN (1820-73), Prince of Rumania (q.v.) from 1859 to 1866.

**Covenant** (Lat. *convenire*, 'to come together'), a contract or agreement; a term much used by theologians, and in its ordinary signification, as well as in its theological use, nearly if not always exactly equivalent to the Hebrew *berith* of the Old Testament and the Greek *diathēkē* of the New. Applied to relations established between God and men, the term covenant must be understood with a certain modification of the meaning it bears when employed concerning the relations of men to one another, where two independent parties enter into a covenant, which they have equal right to make or to refuse to make; so it is sometimes employed as equivalent to *dispensation*, and the Jewish dispensation is called the *Old Covenant* (or *testament*, by another translation of *diathēkē*), in contradistinction to the Christian, which is called the *New* (see *BIBLE*). The 'Covenant' or 'Federal' system of theology was developed by Cocceius (q.v.). God, in his supremacy, is regarded as appointing certain conditions for his creatures, which they cannot but accept, yet their willing consent to these conditions gives to the relation established the nature of a covenant; and thus God is commonly said to have made two covenants with man—the *first covenant*, or *covenant of works*, with Adam, as the representative of the whole human race, promising life (with perfect happiness), upon condition of perfect obedience, whilst death was threatened as the penalty of transgression; the *second covenant*, or *covenant of grace*, being that on which depends the whole hope and salvation of man since the first covenant was broken, and in which life is freely offered to sinners, and they are simply required to believe in Jesus Christ that they may be saved. This covenant God is regarded as having made with Christ, as the representative of his people, and with them in him. The older theologians often speak of the *covenant of redemption* between God and Christ, employing the term *covenant of grace* rather to designate the whole dealings of God with men in

giving effect to the covenant of redemption; but the term *covenant of grace* has long been almost universally employed to include all that was comprehended under both terms. The *Abrahamic covenant* is the covenant of grace as declared to Abraham, in its particular relation to him and his seed. God is represented in Scripture as sustaining a *covenant relation* to his *own people*, to the Jews under the Old Covenant, to believers in Christ under the New; and doctrinal theology consists not a little in tracing out the nature of this relation, and the consequences which flow from it. As the people of God collectively sustain a covenant relation to him, so do believers individually; and it has not been an uncommon thing for pious persons to endeavour to reduce to writing their sense of this *covenant obligation*, under the notion of a *personal covenanting* with God; and of binding themselves by a stronger obligation to what they believed to be good and their duty. It has also been common for men, from the earliest ages, to enter into covenants with one another with more or less of religious solemnity; and this has in particular been done among those who have suffered persecution, or have been engaged in contests concerning matters of religion, for which the authority of certain passages of the Old Testament is strongly pleaded. Instances occur in the history of the Waldenses, and of some of the Reformed churches, particularly in Scotland.

THE COVENANTS, known in Scottish history and tradition, originated in the Reformation movement of the 16th and 17th centuries. The first Reformation, in 1560, was preceded by several religious bonds among the Reformers themselves; but the work of reformation was crowned in both first and second periods by the whole nation engaging in public religious covenanting. These public national covenants are two in number—the National Covenant, and the Solemn League and Covenant.

The *National Covenant*, which is sometimes called the 'Scots Confession' and the 'Short Confession,' to distinguish it from the more elaborate Confession of Faith enacted and placed on the statute-book by parliament in 1560, was drawn up in 1580, at the command of James VI., by one of his chaplains, John Craig (q.v.), to counteract attempts which were made by the Roman Catholics to regain their lost hold of Scotland. It contains a profession of adherence to the 'true Christian faith and religion' more particularly expressed in the Confession of 1560, an explicit renunciation of the tenets of popery, which are detailed at length, and a pledge of obedience to the Presbyterian discipline of the church as then established, and of allegiance to the king in the defence of the gospel, all being ratified by solemn oath. By the ordinance of the king, the Privy-council, and the General Assembly, this Covenant was sworn and subscribed by all ranks and classes in 1581; renewed in 1590 in a bond specially directed against the machinations of the Holy League, which had in 1588 despatched the Armada against the British Isles; again renewed in 1596, and still again in 1638. In the last-mentioned year it was renewed in a bond directed against the attempts of Charles I. to enforce the Laudian service-book and Episcopacy upon Scotland. The swearing and subscribing of the Covenant throughout the country was inaugurated in the Greyfriars' Churchyard at Edinburgh, on 28th February; numerous copies were then sent out over the country, and of these many are still extant both in private and public custody. In the library of the Faculty of Advocates at Edinburgh alone, no fewer than five parchment copies are preserved with the original signatures of Rothes, Montrose, Loudoun, and many others of the nobility, gentry,

commissioners of counties and burghs, and ministers. Only one of these, however, is connected with the year 1638. At the meeting of the General Assembly in Glasgow, on 21st November of that year, the Covenant was ratified and appointed to be again sworn, while in pursuance of the object of the Covenant, the assembly deposed the whole of the Episcopal hierarchy which had been established by James VI. The other four copies of the Covenant above referred to were subscribed in 1639. The Covenant was further ratified by the parliament of Charles I., held at Edinburgh, June 11, 1640; and it was subscribed by Charles II. on his landing in Scotland, at Speymouth, on June 23, 1650, and again at his coronation at Scone, on January 1, 1651.

The *Solemn League and Covenant* was in effect an international treaty between Scotland and England, for the object of securing the civil and religious liberties of these kingdoms. In 1643 commissioners were sent by the parliament to Edinburgh to solicit the assistance of the Scots on the basis of a treaty between the two kingdoms. To this the Scots Convention of Estates and also the General Assembly cordially assented, on condition that the treaty was drawn up in the interests of their religious as well as their civil liberties. Committees of both were appointed to meet with the English commissioners, and the result of their deliberations was the Solemn League and Covenant. It is believed to have been largely the work of Alexander Henderson. It was hailed by both the representative bodies of the Scots with joyful unanimity, and sent to England for approbation, with their warmest recommendations and assurances that it would prove 'the most powerful means, by the blessing of God, for settling and preserving the true Protestant religion with perfect peace in all his majesty's dominions, and propagating the same to other nations, and for establishing his majesty's throne to all ages.' It was received with almost perfect unanimity by the English parliament and the Westminster Assembly of Divines, both of which forthwith swore and subscribed it, and sent copies over the kingdom, with their ordinance that it should be subscribed and sworn by all. Zachary Crofton gives a list of 793 ministers in twelve only of the counties of England, the West Riding of Yorkshire, and the city of London who subscribed their adherence to the Covenant. As soon as intimation of its acceptance by England was received in Scotland, the Solemn League and Covenant was enjoined to be sworn there by all ranks and classes; and being sent to Ireland was embraced by the Protestants there with like eagerness and satisfaction.

The prime object of the Solemn League and Covenant, as stated in the preamble thereof, was 'the preservation of ourselves and our religion from utter ruin and destruction,' and the Covenanters pledged themselves, in their places and callings, to endeavour the preservation of the reformed religion in the Church of Scotland, and the reformation of religion in England and Ireland, in the way of securing a uniformity of religion in the three kingdoms, in doctrine, worship, discipline, and government. There can be little doubt that Presbyterianism was intended, as prelacy, which had just been abolished by both English and Scottish parliaments, was specially marked for extirpation along with popery. The Covenanters also pledged themselves to 'preserve the rights and privileges of the parliaments,' to 'defend the king's majesty's person and authority in the preservation and defence of the true religion and liberties of the kingdoms,' to endeavour that the three kingdoms might 'remain conjoined in a firm peace and union to all posterity,' and finally, to evince a thorough and real reformation of life both in public and in private. The

Solemn League and Covenant was renewed in Scotland in December 1648, and along with the National Covenant was sworn to and subscribed by Charles II. at Speymouth and Scone. In fighting for his succession against Cromwell, the Scots in 1650 enacted that the motto on all their colours and standards should be 'For Covenant, religion, king and kingdom,' and their watchword at the battle of Dunbar was 'The Covenant.' After the Restoration, parliament decreed that the Covenants were not obligatory on the lieges; in 1662 they were declared unlawful oaths, and all acts ratifying and approving them were annulled; in 1682 an oath was imposed specially renouncing the obligations of the Covenants, and in 1685 it was declared to be treason to take them.

Between the Restoration and the Revolution, however, the Covenants were adhered to by many who, upon this account, were called COVENANTERS. They maintained that these Covenants, notwithstanding all acts of parliament to the contrary, were binding upon the nation, and great numbers of them suffered and died in this testimony. Their heroic resistance was justified by the Revolution of 1688, when the nation united in one final effort for the restoration of civil and religious freedom. The Covenanters, however, found no place in the polity of the reconstructed Church of Scotland. They are nevertheless printed along with the authorised standards of the church—viz. the *Westminster Confession of Faith*, and Catechisms, &c. Their continued obligation upon the entire nation remained a prominent principle of the Original Secession and Reformed Presbyterian churches, both of which frequently renewed them. See SCOTLAND (ECCLESIASTICAL HISTORY); CAMERONIANS; and Hewison, *The Covenanters* (1908). For Covenant of League of Nations, see LEAGUE OF NATIONS; and for Ulster Covenant, see IRELAND (History).

**Covenant**, in English Law, an agreement by *Deed* (q.v.) in writing, signed, sealed and delivered. A special *action of covenant* lay where a party claimed damages for breach of a covenant; but since the passing of the Judicature Act, 1875, this is no longer a technical expression. A covenant may also be *implied*. 'Covenant running with the land,' is a covenant affecting the land into whose-soever hands it comes. In the United States, the term covenant is used with the same sense as it has in England. The action of covenant is not there in use, a covenant being enforced by an ordinary civil action. The covenant running with the land is almost universally replaced in the United States by a covenant of warranty, by which the grantor of the deed, and not the land itself, is bound.

**Covent Garden**, corrupted from *Convent Garden*, from having been originally the garden of the Abbot of Westminster, is a spacious square in London, celebrated for a great market held within it of fruit, vegetables, and flowers. The square was formed about 1631 from the designs of Inigo Jones, and has the arcade or piazza on the north and north-east side, Tavistock Row on the south, and the church of St Paul's on the west. In the 17th century Covent Garden was a very fashionable quarter of the town. The scene of one of Dryden's plays is laid here, and frequent allusions are made to the place in plays of Charles II.'s time. The market, now so famous, appears to have originated about 1656 in a few wooden sheds and stalls. Covent Garden is for a stranger one of the sights of London, and is seen to greatest advantage about three o'clock on a summer morning. Covent Garden Theatre (1858) is the home of grand opera in London. The building is the third on the present site; the first, opened in 1732, was destroyed by fire in 1808, as was also the second in 1856. See

Reginald Jacobs, *Covent Garden* (1913), and Wyndham, *Annals of Covent Garden Theatre* (1906).

**Coventry** (A.S. *Cofantrêo*, the tree of Cofa, or Cufa), a city, parliamentary, municipal, and county borough and manufacturing town in north Warwickshire, 18 miles ESE. of Birmingham, and 91 NW. of London. A small stream, the Sherbourne, an affluent of the Avon, flows through the city, which stands on a gentle eminence in a valley, with a ridge of hill on the south, on the edge of the coalfields. The city is ancient, and has associated with it the famous legend of Lady Godiva (q.v.). There are many interesting architectural remains, of which Ford's Hospital for old women, and Bablake Hospital for men, are both perfect specimens of the domestic architecture of the 16th century. The city is famous for its three spires (see Tennyson's 'Godiva') of the three churches of St Michael's (now the cathedral), Holy Trinity, and Christ Church. Coventry's bishopric existed separately from 1102-83, and, bearing the joint title of Coventry and Lichfield, from 1183-1661, when the title was reversed to Lichfield and Coventry. It continued thus until 1836, when the archdeaconry of Coventry was attached to the bishopric of Worcester. Created a separate diocese under the Bishoprics of Bradford and Coventry Act, 1918, it now consists of two archdeaconries—Coventry and Warwick. The cathedral (1373-94), one of the noblest examples of the Perpendicular style of architecture in England, possesses the largest of the three spires (295 feet). The fragmentary remains of the ancient cathedral of Coventry (part of a Benedictine foundation demolished by Henry VIII.) are still to be seen near the Holy Trinity Church. The latter is a cruciform building. The most interesting secular building is St Mary's Hall, which dates from about the 14th century. Originally the home of the craft guilds, it developed later into the centre of civic life. Here are an ancient piece of tapestry and a stained-glass window, both world famed. The muniment-room contains the historical documents of the city, including the Leet Book. The city stocks are preserved just outside the building. The hall served as a council chamber until 1920, when the present council house—a vigorous example of modern architecture—was opened. The city walls, three miles in circuit, and built in 1356, were demolished by order of Charles II. in 1662, probably to avenge the repulse of his father in 1642. Some ruins still remain, of which the Cook Street Gate is a notable example. The public libraries, consisting of the Gulson (Central) Library and three branch libraries, are considered to form a model library system. Other modern public buildings include King Henry VIII., Bablake Secondary, and many other schools; baths; fire station; whilst many large industrial firms are established in the city, specialising in motor-cars, motor-cycles, cycles, aeroplanes and engines, wireless and other telegraphic and telephonic instruments and accessories, machine tools and drop forging, while the ancient trades of silk-dyeing, ribbons, and watches are still fairly well represented. In addition the development of the artificial silk industry has been very rapid. Coventry played a conspicuous part in the provision of munitions during the Great War. A Memorial Park (1921) of about 120 acres, at Stivichall, just outside the city, preserves the beautiful avenue of trees on the road to Kenilworth. Coventry has in addition several small parks, and is rich in charities and common lands. The Martyrs' Memorial in Cheylesmore is to the memory of those who were burnt at Coventry during the reigns of Henry VIII. and Mary. Coventry is nearly in the centre of England, being equidistant from the four great ports of London, Bristol,

Liverpool, and Hull, and has extensive canal and railway communications, being served by the London, Midland, and Scottish Railway. It has an excellent system of sanitation, and owns gas, electricity, tramway, omnibus, and water undertakings. The Coventry Fair (first granted as an eight day fair by Henry VIII.) is held annually during Whit week. During the 15th century mystery plays, sacred plays, and pageants were often acted by the various crafts. Here, on Gosford Green, occurred the famous meeting for the intended trial by battle between the Dukes of Norfolk and Hereford, immortalised in Shakespeare's *Richard II.* Two memorable parliaments were also held in the monastery of Coventry in the 15th century. The one contained no lawyers, and the other passed attainders against the Duke of York and others. In the 14th, 15th, and 16th centuries Coventry was famous for woollens, broad-cloths, caps, and blue thread. Constituted a civic corporation in 1344, a separate county in 1451, and incorporated with the county of Warwick in 1842, it became a county borough under the Local Government Act of 1888. The parliamentary borough returns one member. Population (1801) 16,049; (1831) 27,670; (1861) 40,936; (1891) 52,742; (1901) 69,978; (1911) 106,349; (1921) 130,300.

Coventry has few literary associations. George Eliot was at school in Coventry, and lived there when she translated Strauss's *Life of Jesus*. A. E. W. Mason describes Coventry (as 'Ludsey') in *The Turnstile*. The city is also the birthplace of Ellen Terry. See local histories of Poole and Taunton (1870) and M. D. Harris (1911), and the latter's edition of the *Leet Book* (1907-13).

**Coventry**, SIR JOHN, a staunch cavalier who had sat in the Long Parliament (1640), and who at the coronation of Charles II. was made a Knight of the Bath. Elected for Weymouth in 1667, he asked, during a debate on playhouses (October 1670), a question which reflected on the king's amours. Charles and his minions were furious, and one December night Coventry was pulled from his coach by Sir T. Sandys and other ruffians, and his nose slit to the bone. Parliament took notice of this atrocious outrage, and by its 'Coventry Act' made cutting and maiming a capital offence; but they had not the courage to bring the king's bravoes to trial. Coventry died in 1682.

**Coverdale**, MILES, translator of the Bible, was born in Yorkshire in 1488. He made his studies at Cambridge, was admitted priest at Norwich in 1514, when he joined the Austin Friars at Cambridge, and probably imbibed his liking for the new doctrines from Robert Barnes, who became prior about 1523, and whose Protestantism led to his being tried and ultimately burned in 1540. Before long Coverdale went abroad. According to Foxe he was at Hamburg with Tyndale in 1529. His own translation of the Bible appeared in 1535, with a dedication by himself to Henry VIII., and secured the royal license in the quarto and folio editions of 1537. The Psalms of this translation still form the psalter in the Book of Common Prayer, and many of the finest phrases in our authorised version of 1611 are directly due to Coverdale. The original issue of the book is a folio volume, 'faithfully and truly translated out of Douche and Latyn into Englishe,' printed in German black letter, in double columns, with woodcuts and initials, and containing the Apocrypha. Its place of publication is very uncertain, and attempts have even been made to degrade Coverdale from its translator to a mere proof-reader. In the prologue to his own second edition (1550) he states that the translation was his own work, although not at his own cost, and that it

was made 'out of five sundry interpreters,' most likely the Vulgate, Pagninus, Luther, the Zürich or German-Swiss Bible of 1531, and Tyndale's Pentateuch and New Testament. In 1538 Coverdale was sent by Cromwell to Paris to superintend in Regnault's press another English edition of the Scriptures. Francis I. had granted a license, but in spite of this, before the printing was finished, an edict was issued prohibiting the work. Many of the sheets were burned, but the presses and types were saved and hastily carried over to London, whither also some of the workmen soon came. Grafton and Whitchurch, the noted printers of that day, were thus enabled to bring out in 1539, under Coverdale's superintendence, the 'Great Bible,' which was presented to Henry VIII. by Cromwell. The second 'Great Bible,' known also as 'Cranmer's Bible' (1540), was also edited by Coverdale, who found it expedient to leave England on the fall of his patron Cromwell. While abroad he married, received the degree of D.D. from Tübingen, and acted as Lutheran pastor for some years at Bergzabern, in Rhenish Bavaria. In March 1548 he returned to England, was well received through Cranmer's influence, and in 1551 was made Bishop of Exeter. On the accession of Mary he was deprived of his see, but was suffered to leave the country. From Denmark he passed to Wesel in Westphalia and to Geneva, where he may have assisted in the preparation of the famous Geneva version (1560), the favourite Bible of the Puritans. Returning to England in 1559, he did not resume his bishopric, but was made D.D. by Cambridge in 1563, and the following year was collated by Grindal to the living of St Magnus, near London Bridge, which he resigned from growing Puritan scruples about the liturgy in 1566. He continued, however, to preach, but died early in 1568, and was buried in St Bartholomew's Church, and, on its demolition in 1840 to make room for the New Exchange, was reburied in the south aisle of the church of St Magnus. The tercentenary of his Bible—the first complete English translation of the Scriptures—was celebrated 4th October 1835, when medals were struck in honour of the venerable translator. Most of Coverdale's works, including his letters, were edited for the Parker Society by Rev. George Pearson (2 vols. 1844-46). See *Memorials of Miles Coverdale* (1838), H. R. Tedder's article in the *Dictionary of National Biography*, F. Fry's *The Bible by Coverdale* (1867), and Conant, *History of English Bible Translation* (1910).

**Covered-way**. See FORTIFICATION.

**Covilhão**, a town in the Portuguese province of Beira, on an eastern spur of the Estrella Mountains, with some manufactures of brown cloth, and a pop. of 14,000.—Pedro de Covilham (or Covilhão), sent by the king of Portugal in 1486 to visit Prester John's country, reached Calicut overland in 1487, and Abyssinia in 1490.

**Covington**, a city of Kentucky, U.S., on the Ohio River, opposite Cincinnati, with which it is connected by a fine suspension bridge. Many of the inhabitants transact their business in Cincinnati, but Covington is itself a thriving place, with manufactures of glass-ware, nails, tobacco, &c. Pop. (1830) 715; (1880) 29,720; (1920) 57,121.

**Cow**. See CATTLE, DAIRY.

**Cowbane**. See HEMLOCK.

**Cowberry**. See WHORTLEBERRY.

**Cow-bird** (*Molothrus pecoris*), also called Cowpen Bird, Cow Blackbird, &c., a native of North America, nearly allied to the Troupials, remarkable for its cuckoo-like habit of utilising the nests of other birds for its own eggs. The latter are

hatched sooner than those of the rightful owners, which fall victim to this lofty form of parasitism. The cow-bird is about 7 inches in length, predominantly brownish-black in colour, and has a short but sharply pointed beak. 'It utters a peculiarly liquid April sound.' The females are far more numerous than the males, and polygamy is therefore in vogue. The males have deeper, glossier coats than the females. It is said to damage the fields of sown maize, but feeds largely on insects. The name refers to its habit of frequenting cowpens for the sake of the attracted insects. Seven other species of *Molothrus* are known, occurring from La Plata to the United States.

**Cow-boy.** See RANCHING.

**Cowbridge,** a municipal borough of Glamorganshire, on the Ddow, 12 miles W. of Cardiff (17 by rail), with which and Llantrissant it returned one member to parliament till 1918. It has an old gateway and a grammar-school (1678). Pop. 1200.

**Cow-catcher,** a kind of barred iron cone or beak-shaped arrangement, about 6 feet long, projecting from the front of locomotives, close over the railway track, and attached to the buffer-beam by strong bolts. It is generally used upon American lines where unfenced, for the purpose of throwing aside animals or other obstructions.

**Cowdenbeath,** a police and parliamentary burgh of Fife, 5 miles NE. from Dunfermline, almost entirely inhabited by miners; pop. 14,000.

**Cowdenknoves.** See EARLSTON.

**Cowell, EDWARD BYLES,** a learned Sanskrit scholar, was born at Ipswich, January 23, 1826. He was educated at Ipswich grammar-school and Magdalen Hall, Oxford, and in 1856 sailed for Calcutta, to fill the chair of History in the newly-established Presidency College, becoming also soon after principal of the Sanskrit College. He returned home in 1864, and was elected in 1867 professor of Sanskrit at Cambridge, and in 1874 to a fellowship in Corpus Christi College. He published a long series of Sanskrit texts and translations, alone or in collaboration with other scholars, and edited Colebrooke's *Essays* (1873). A contributor to this work, he died 9th February 1903; and his *Life and Letters* appeared in 1904.

**Cowen, SIR FREDERIC HYMEN,** composer, born at Kingston, Jamaica, 29th January 1852, was brought as a child to England. He early showed decided musical talent, which was cultivated by a course of study under Benedict and Goss, as also at Leipzig and Berlin. Among his works are the operas *Pauline* (1876), *Thorgrim* (1890), *Signa* (1893), and *Harold* (1895); the cantatas *The Rose Maiden*, *Sleeping Beauty*, *The Water Lily*, and others; oratorios (including *Ruth*, 1887); half-a-dozen symphonies (No. 3 being the 'Scandinavian'); a number of overtures, pianoforte pieces, and minor works; and over 250 songs. He has been conductor to the Philharmonic Society, at Manchester, Liverpool, and Bradford, and of the Scottish Orchestra. He was knighted in 1911.

**Cowes,** a seaport and watering-place in the north corner of the Isle of Wight, 1½ miles SSE. of Southampton by water, and 4 N. of Newport by rail. It consists of West and East Cowes, lying on opposite sides of the mouth of the estuary of the Medina, and connected by steam-ferry. Standing on a hill-slope, West Cowes has a striking aspect from the sea, and is the seat of much trade, being the chief port of the island, and the headquarters of the Royal Yacht Club (1815), whose regattas are held here. Their club-house was originally a fort, built by Henry VIII. in 1540. Yacht-building is the great speciality of Cowes, which has a fine promenade (1864), excellent hotels, baths, villas,

lodging-houses, &c. Slatwoods at East Cowes was the birthplace of Dr Arnold. East Cowes Castle (1798) and Norris Castle (1799) are near. Osborne House, a favourite residence of Queen Victoria, for whom it was built in 1845, was converted by Edward VII. in 1902 into a convalescent hospital for naval and military officers, and contained the Royal Naval College till 1921. Pop. of West Cowes, 10,000; of East Cowes, 4600.

**Cowhage.** COWAGE, or COWITCH, consists of short, slender, brittle hairs, which cover the pods of species of *Mucuna*, a papilionaceous climber, particularly *M. pruriens* of the West Indies and *M. urens* of the East. These hairs readily stick in the skin and cause intolerable itching, and were hence formerly used (as still in their native country) as a vermifuge. They are administered in syrup, and of course act mechanically. The unripe pods are eaten like kidney-beans.

**Cowl.** See BENEDICTINES.

**Cowley, ABRAHAM,** in his own day considered the greatest of English poets, was born in London, 1618. His father was a stationer in that city, and died before his son's birth. By the exertions of his mother, Cowley received a learned education. At an early age he was sent to Westminster School, where he displayed an almost unparalleled precocity. It was by the reading of the *Faery Queen*, a copy of which lay in his mother's window, that his mind was turned to poetry. He wrote excellent verses at the age of ten, and published a volume of poems at fifteen. In 1637 he proceeded to Cambridge, and while there wrote, among many other pieces, a large portion of his epic, the  *Davideis*, on the subject of the life of King David. On the outbreak of the Civil War, he was ejected (1644) from Cambridge for refusing to take the oath tendered to all the members of the university. At Oxford, however, the headquarters of the king's party, he continued his studies for other two years. On the queen's flight to Paris, Cowley followed her, and did effectual service to the royalist cause by various missions, and by carrying on the secret correspondence in cipher between the queen and Charles. In 1656 he returned to England, but was arrested and only allowed at large on a bail of £1000. To conciliate the party in power, he qualified himself as a doctor of medicine, by way of proving that he had abandoned all political connections. On Cromwell's death, Cowley again went to Paris, but returned to England at the Restoration. He was disappointed in the hope of preferment, especially of the mastership of the Savoy, which both Charles and his father had led him to expect. By the generosity of the Duke of Buckingham and Cowley's lifelong friend the Earl of St Albans, he at length received a comfortable provision. Cowley died at Chertsey, London, 28th July 1667.

Cowley's most ambitious works are the *Davideis*, the *Pindarique Odes*, written in supposed imitation of Pindar, and the *Mistress*, a series of love poems. His fate as a poet is one of the most singular in literature. Deemed unapproachable in his own day, he has ever since sunk steadily in popular estimation. Dr Johnson's explanation is still accepted as the best that can be suggested. Cowley wrote for the court and the reigning taste, and not for the general heart of men. What he is still admired for is his astonishing ingenuity and agility of mind. Moreover, though the bulk of his verse can never again have any living interest, he has not a few passages characterised by delicacy and power. By his small collection of essays, Cowley takes rank with Goldsmith and Addison as one of the masters of simple and graceful prose style. It is by these essays that Cowley is now best known. See Grosart's (1881) and Waller's (1905-6) editions;

Sprat's *Life of Cowley* (1668), Johnson's *Lives of the Poets*, R. Schafer's *English Ode to 1660* (1918).

**Cowley**, HANNAH (1743-1809), wrote thirteen lively dramatic works, including *The Belle's Stratagem* (1782), and several volumes of feeble verse. She was attacked along with the other Della Cruscans by Gifford in the *Buvald and Mæviad*.

**Cowley**, HENRY RICHARD CHARLES WELLESLEY, EARL (1804-84), diplomatist, was born in London. His father, the first Baron Cowley, was a younger brother of the great Duke of Wellington. He was educated at Eton, and at twenty began a long career as a diplomatist by becoming an attaché at Vienna. He was in succession secretary and ambassador at Constantinople, minister-pleni-potentiary to Switzerland (1848), to the Germanic Confederation (1851), and in 1852 succeeded the Marquis of Normanby as ambassador at Paris, a position he held with rare tact and temper till his resignation in 1867. With Clarendon he represented Great Britain at the Paris Congress of 1856, and in 1860, with Cobden, he arranged the commercial treaty between France and England. He succeeded to his father's title in 1847, and was created Viscount Dangan and Earl Cowley in 1857.

**Cowley Fathers.** See BENSON (RICHARD MEUX).

**Cow-parsnip** (*Heracleum*), a genus of Umbelliferae, of which one species (*H. Sphondylium*) is a common and rank wayside weed, which, however, when cut early in the season, affords a wholesome fodder to pigs and cattle. *H. sibiricum*, a much larger species, has been recommended for cultivation on account of the great quantity of herbage it yields very early in the season, and with other species (*H. villosum*, &c.) it is also used with much effect as a decorative plant. *H. lanatum* is very common in North America.

**Cowper**, WILLIAM, surgeon and anatomist, was born at Petersfield, in Sussex, in 1666, settled as a surgeon in London, and died 8th March 1709. He made some new anatomical observations, notably discovering the glands beneath the male urethra called 'Cowper's glands,' and published *The Anatomy of Humane Bodies* (1698) and other works.

**Cowper**, WILLIAM, was born in 1731 at the rectory of Great Berkhamstead, in the county of Hertford. He was sent to Westminster School at so early an age that all his impressions were painful, and he thus conceived a hatred of public schools which was never modified. He complains that there he became an adept 'in the infernal art of lying,' an art which we could hardly assert either to be extinct in our public schools at the present time, or to be or ever to have been entirely confined to them. Among his schoolfellows were Churchill the poet, and Warren Hastings; and for these two at least he seems to have maintained a lasting affection. On leaving school he was articled to an attorney named Chapman, with whom he idled away his time for several years. One of his fellow-pupils there was Thurlow, who in a jesting mood promised to give Cowper an appointment when he should be Lord Chancellor. The boyish ambition was verified, as every one knows, but not the promise. Cowper was called to the bar in 1754, and lived for some time the ordinary life of a young man, not uncheerful, though with occasional fits of depression. He belonged to the 'Nonsense Club,' founded by Bonnell Thornton and George Colman, and is supposed to have contributed some short articles to the *Connoisseur*, a paper started by them. He also fell in love, during this period, with Theodora, the daughter of his uncle Ashley Cowper, a lady who seems to have had for him a far deeper feeling

than his essentially recipient nature could return. Certainly he appears to have made no particular effort to overcome his uncle's opposition to his suit. In those days a well-connected young man was more easily provided for than now, and a sinecure appointment, as 'Commissioner of Bankrupts,' gave Cowper a certain independence, which he enjoyed tranquilly, relying on the influence of his relations to promote him further, an expectation which they on their side did all they could to fulfil. His cousin, Major Cowper, had the right (extraordinary to hear of nowadays) of appointing to the office of Clerk to the Journals of the House of Lords, and also to the joint offices of 'reading clerk and clerk of the committees' to the same august assembly. All these appointments happened to fall vacant at the same time (1763). Major Cowper wished his cousin to take the latter and more valuable office, but Cowper in one of his fits of self-depreciation, preferred the other, which was found eventually to involve a so-called examination as to his fitness for the office, meaning in fact only an appearance before the bar of the House. The idea of this appearance unmanned him altogether. A fixed idea, the well-known forerunner of madness, that every one was hostile to him, gradually took possession of his mind; and the horror grew by continual brooding, until suicide seemed the only way of escape. He several times attempted to make away with himself, and on one occasion at least was only saved by a fortunate accident. When his friends were finally made aware of his condition, they gave up at once a project so evidently impracticable; but Cowper's mind was permanently unhealed. He fell into a state of religious despair as to the consequences of the crime he had almost committed, in the height of which his misery found vent in the composition of a copy of Sapphics, in which he describes himself as 'damned below Judas, more abhorred than he was,' and again, 'man disavows and Deity disowns me.'

It was found necessary to remove him to a private asylum at St Albans, where he was gradually restored to health by judicious treatment. After this, in June 1765, he drifted to the quiet town of Huntingdon, where he made acquaintance with an amiable and religious family to which he was at once attracted, and in which he was soon accepted as an inmate. The head of the family, Mr Morley Unwin, was a clergyman, but retired from active work, and with his wife and two children lived a life of almost perpetual devotion, into which Cowper plunged, spending most of his time in religious exercises of various kinds, and correspondence on religious subjects. Cowper continued to reside with Mrs Unwin after her husband's death (July 1767), but they soon removed to Olney in Buckinghamshire, where the famous John Newton was curate. This remarkable man soon acquired the most complete influence over the gentle invalid; and, under Newton, Cowper worked among the poor of his friend's parish, devoting his whole time to pious exercises and good works. Owing, perhaps, to these exertions, and to the unbroken monotony of the atmosphere, signs of his former madness began to reappear, and in 1773 it burst out. He was at the time in Newton's vicarage, and here he remained for more than a year, refusing to return to his own house though it was but next door. After his recovery (which was never complete) he lost—we might almost say, though it seems cruel, he was delivered from—the companionship of Newton, who was presented in 1779 to the rectory of St Mary Woolnoth. The effect of his departure on Cowper was miraculous; whether Newton, in his intense enthusiasm miscalculated his friend's powers, or whether he was only ignorant

of the delicate nature of the mind on which he was working, it is evident that the constant intercourse with him, aided perhaps by the wearying sameness of the life, had an oppressive and crushing effect upon Cowper. Even after Newton's departure, the old gloom appears in letters addressed to him, while in correspondence with Hill or Unwin, Cowper is always cheerful, full of graceful playfulness, entering into a pleasant record of his amusements and occupations, his hares and garden and greenhouse. To the quiet of this period of his life we probably owe the tranquillised condition of mind which makes the tone of Cowper's poetry contrast so strangely with the sentiments of his early experiences. An astonishment almost amounting to incredulity fills our mind when we find the madman, the religious fanatic, who despaired of salvation, and on several occasions attempted suicide, luxuriating in the quiet of nature, which he fully appreciated and enjoyed, and changing his abject fears of God's wrath for a tender delight in and love of the ordinary works of His hands.

He was, however, as yet no poet at all. Mrs Unwin was the first who had the wisdom to perceive that a variety of occupation was necessary to Cowper, and that something to occupy his mind during the gloomy months of winter was of the highest importance to his well-being. No power of initiation seems to have existed in his mind, but he followed with docility his friend's suggestions, and when she bade him write poetry, did so. His first volume (1782) was in the fashion of the time, and consisted of several poems on abstract subjects, a poetical dialogue called 'Table Talk' being added to lighten and enliven the book. Probably Cowper himself was not conscious at the time how much higher he was capable of flying and was destined to fly; but once more a happy suggestion came to his aid. In 1781 he accidentally made the acquaintance of Lady Austen, a woman full of intelligence, and of a gay and happy disposition, bringing sunshine with her. The acquaintance rapidly grew into a warm friendship, and Lady Austen settled in Newton's deserted vicarage, next door, it will be remembered, to Cowper's house. The inhabitants of the two houses soon, of course, grew intimate, with the happiest results to the poet. It is to Lady Austen's playful commands to write a poem for her on any subject, 'this sofa for instance,' that we owe Cowper's greatest work, *The Task*. She has also the credit of having told him the story of John Gilpin, reproduced in the immortal ballad the next morning: and there can be no doubt that this lady was his better angel, and made the happiest revolution in the too-serious house. His position between his old friend and his new one, both being women, has been the subject of many, and we think somewhat vulgar comments. That Cowper was engaged to marry Mrs Unwin, that this project was defeated by a dawning love between the poet and Lady Austen, and that jealousy and passion came in to disturb their relations is an off-repeated tale. It surely, however, requires but little reflection to see how unnecessary such a theory is. Cowper was in every way calculated to arouse a more than passing interest in the heart of an intellectual woman, but neither in his past nor his present was there anything that could inspire such a woman with the desire of marrying him. He had the gift of making friends and calling forth sympathy in an unusual degree, and the influence of this tender sympathy not only saved but made him what he grew to be. If Lady Austen had never said to Cowper, 'Why not try blank verse?' that grand revolt against the smoothness and artificial perfection which Pope had established as essentials of poetry might have been indefinitely postponed. Against a style which repelled him,

Cowper was the first to protest by the effectual reproduction of a more excellent way. He took that polished and splendid instrument from the hand of Milton, without his grandeur of tone, yet with a sweetness and serious power not unworthy of it. His schoolfellow, Churchill, had struck a rougher and more vigorous note, yet had not been bold enough to return to the old ways. But the timid poet in his seclusion, under the influence of his domestic muses, with unexpected boldness, seized on his inheritance. Wordsworth carried on both style and subjects, but he, like Gray, put of his own into the theme, and described less Nature herself than the thoughts which she inspired. In Cowper, on the contrary, we have Nature's very face, the calm description of a quiet scene painted by one who loved her for herself, not peopled with fancies by a poetical observer.

How his friendship with Lady Austen came to an end has never been clearly known, but at the end of 1783 she retired to Bristol, and Cowper writing to Unwin declared the connection at an end. It is a commonplace to talk, of course, of jealousy between Lady Austen and Mrs Unwin, and it is easily comprehensible that the latter lady may have objected to see her place as Cowper's friend and adviser taken from her by a stranger. However, as regards our poet, Lady Austen had done her work; *The Task* was published in 1785, and its power and the greatness of the old-new method very soon made themselves apparent. Whether Cowper has retained the high place which was accorded to him in the surprise and delight of the new movement, is a question which will be answered according to individual tastes and opinions, but there can be no doubt that the publication of *The Task* had a most powerful effect upon the literary tastes of the time.

It is characteristic of Cowper that on the departure of Lady Austen, he fell for some time into a little of his old melancholy, until in 1786 Lady Hesketh appeared upon the scene, and the poet accepted the new comforter in lieu of her who was gone. His translation of Homer was carried on under the influence of this new adviser, who was a relation of his own, and consequently escaped the imputation of wishing to marry him. She procured the removal of the sad poet and his ailing companion to Weston-Underwood, where they made acquaintance with the Throckmorton family, and received much comfort and consolation in their waning days. This move, as well as the translation of Homer, Newton, with whom Cowper still kept up a correspondence, condemned with almost brutal violence of language, and it is an evidence of his temporary recovery of strength, that Cowper defended himself without, however, losing his temper. Against Newton's advice he continued his translation, which brought him in at least a little money if not much fame: and the money was by this time much needed. In 1787 he had another attack of his old ailment, and again attempted suicide. From this attack he never seems to have completely recovered, and when he was almost at his worst, Mrs Unwin had a stroke of paralysis which cast a gloom over this devoted pair from which they never emerged. In 1794 a pension of £300 a year was assigned to him, but too late to confer much comfort or relief. When Mrs Unwin died in 1796 he heard the news 'not without emotion,' and growing gradually weaker, died peacefully at East Dereham, Norfolk, on the 25th of April 1800. Curiously enough, out of the gloom of his last waning years came two of his most beautiful and touching poems, the lines 'Addressed to My Mother's Picture,' and those entitled 'My Mary.'

Hayley's Life first appeared in two volumes in 1803. The later editions (1806, 1809, 1812) were in four volumes.

See Life by T. Wright (1892; revised 1921), and his edition of the Correspondence (4 vols. 1904), also his *Unpublished and Uncollected Letters of Wm. Cowper* (1925). Southey's edition of the works, with memoir (15 vols. 1834-37), was reprinted by Bohn (1853-54). Others are those of Grimshawe (8 vols. 1835); the Aldine edition (1865); the Globe edition (1870). Editions of the poems are by Mrs Meynell (1904), Milford (1905), and Bailey (1905); there is a concordance by Neve (1887). See Goldwin Smith's monograph (1880); Sir Leslie Stephen's *Hours in a Library* (1882); and Sainte-Beuve's essay.

**Cowper's Glands.** See COWPER (WILLIAM).

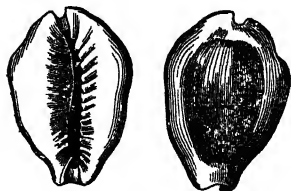
**Cowper-Temple,** WILLIAM FRANCIS (1811-88), son of the fifth Earl Temple, entering parliament in 1835, attained various offices (in Admiralty, Home Office, Board of Trade, &c.), and became vice-president of committee of council on education. Best known as author of the 'Cowper-Temple clause' in the Education Act of 1870 (see EDUCATION), he was in 1880 created Baron Cowper-Temple.

**Cow-plant.** See ASCLEPIADACEÆ, COW-TREE.

**Cowpox.** See VACCINATION, SMALLPOX.

**Cowry** (*Cypræa*), a large genus of Gasteropods in the Prosobranchiate section, including over a hundred species, some of which are very familiar as decorative objects and as furnishing a medium of exchange with uncivilised peoples. The shell has more or less of an oval form, and is usually thick, polished, and beautifully coloured. The young shells are delicate and more typically snail-like, but in the adults the large last whorl more or less conceals the others, and has its outer lip bent in towards the inner. The internal axis may be wholly absorbed. The animal has a broad head, a protrusible proboscis, eyes associated with the long horns, and a broad foot protruded through the elongated aperture. The mantle or skin fold, which forms the shell as in other molluscs, extends over the whole or most of the surface, and thus conceals during life what gives the dead shells half their charm. In habit the cowries are predominantly sluggish animals, creeping slowly on rocks and coral reefs. They are mainly carnivorous in diet. Though widely distributed, they thrive best in the tropical seas. Fossil forms occur abundantly (about 80 species) from the chalk onwards. The nearest relations of the cowries are the two genera *Ovulum* and *Trivia*. The former includes the *Poached Eggs* and the *Weaver's Shuttle* (*Ovulum volva*); two species are found on British shores. The genus *Trivia* includes the little cowry (*Trivia europæa*), not uncommonly found on British coasts—e.g. near John o' Groats's House.

The cowries proper are well known in several practical connections. The money cowry (*C. moneta*), found especially in the Maldivé Islands, was long used as currency, and is still so used in Africa from Guinea to the Central Sudan. In Siam over 6000 cowries were required to make a tical worth 1s. 8d.



Money Cowry.

Cowries are familiar in England as counters in games of chance. From prehistoric times they have been used to form necklaces and other ornaments of the person. In some cases they are worn as charms, and their bright colours, so attractive to human eyes, have also been utilised in catching cuttle-fishes. Cowries have had their share in later days in the conchological craze, and 'small fortunes' have been spent in gathering that wealth of varied

colour which a good cabinet displays. A shell of *C. princeps* has sold for £40. See IMAGES, MAGIC.

**Cowslip** (*Primula veris*; see PRIMROSE), a common native of pastures in England and many other parts of Europe, but rare in the west of Scotland, a delicate and modest little flower, a universal favourite, both for its beauty and its fragrance. It differs from the common primrose conspicuously in having umbels of flowers on a scape; it is supposed to be the original of the garden polyanthus. Darwin holds the common *oxlip* to be a cross between the cowslip and the common primrose. Its bells were long supposed to be the haunt of fairies, and the name of Fairy Cups is still given to them in some parts of England. The flowers are sometimes fermented with sugar to make *cowslip wine*, which is not unpalatable. It was once a favourite domestic soporific. The leaves are by some used as a salad and pot-herb, and also as food for the silkworm before those of the mulberry have expanded. The American cowslip (sometimes also called Shooting-star) is *Dodecatheon Meadia*, a very handsome spring flower. This and other species are also well known in cultivation.

**Cow-tree**, a name given to a number of trees of different natural orders, the bland milky juice (Latex, q.v.) of which is used instead of milk. The most famous of these is the Palo de Vaca of the Cordilleras and Venezuela (*Galactodendron* (*Brosimum*) *utile*), an artocarpaceous tree, with large lamel-like leaves and very small flowers. The milk is obtained by piercing the bark of the trunk or branches, and flows so freely that an ordinary bottle may be filled in half an hour. The milk has an agreeable creamy odour and taste recalling that of cow's milk, but is slightly viscid and soon becomes yellow, gradually thickening into a somewhat cheesy consistency. Its chemical composition, of course, widely differs from that of milk, but its nutritive value is considerable. It is much used by the negroes and Indians.

The cow-tree or Hya-hya of Demerara is *Tabernaemontana utilis*, a tree belonging to the Apocynaceæ. In this order the milky juice is usually acrid and poisonous, and even that of other species of the same genus is of sharp and burning taste. In this case, however, the latex is agreeable and wholesome, although somewhat sticky, owing to the large proportion of caoutchouc.

**Cow-wheat** (*Melampyrum*), a genus of Scrophulariaceæ, of which the deep-furrowed two-celled capsule somewhat resembles a grain of wheat. They are annual weeds, growing in woods, corn-fields, and pastures, and are eaten by cattle. Being root-parasites, they grow on the roots of other plants. *M. pratense* is common in Europe and North America.

**Cox,** DAVID, landscape-painter, was born at Deritend, a suburb of Birmingham, 29th April 1783. His father was a blacksmith, and he worked at the forge for a time; and after trying various employments and studying drawing under Joseph Barber, he was scene-painter in the Birmingham, Swansea, and Wolverhampton theatres, and occasionally appeared upon the boards in minor parts. He next took lessons in London from John Varley; in 1805 and 1806 visited North Wales, which to the end of his life was his favourite sketching-ground; and taught as a drawing-master, mainly in Hereford, publishing *A Treatise on Landscape Painting and Effect in Water-colours* (1814), and other educational works, illustrated by soft-ground etchings by his own hand. In 1813 he joined the Society of Painters in Water-colours, to whose exhibitions he was a regular contributor. From 1827 till 1841 his headquarters were in London, but he was constantly sketching in the country,

and occasionally he made brief visits to the Continent, executing water-colours of noble quality which slowly but steadily made their way with the public, and are now recognised as entitling their painter to a place among the very first of English landscapists. In 1839 he turned his attention seriously to oil-painting, a medium which he had hitherto used only for sketching, and soon he had mastered the process. He executed in all about a hundred works in oil. These are less widely known than his water-colours, but they are of at least equal quality. In 1841 he settled at Harborne, near Birmingham, where he resided for the rest of his life. It was during this period that he produced his greatest works, those most rapidly synthetic in execution, and most deeply poetic in feeling. They owe their inspiration mainly to the scenery of North Wales, and especially of Bettws-y-Coed (q.v.), which he visited every autumn. He died at Harborne, 7th June 1859. The manliness and simplicity of the painter's own character is reflected in his direct, faithful, and forcible art. His works are distinguished by great breadth, purity of tint, truth of tone, and brilliancy of effect, and they are admirable in their rendering of atmosphere, and in their suggestion of the sparkle and breezy motion of nature. Among the more celebrated of his oil pictures are 'Lancaster Castle' (1846); 'Peace and War' (1846), a small picture 18½ by 24 in., for which Cox received £20, but which fetched £3602 in 1872 (his lifelong ambition had been 'some day, D.V., to get £100 for a picture); 'The Vale of Clwyd' (1846 and 1848); 'The Skylark' (1849); 'Boys Fishing' (1849); and 'The Church of Bettws-y-Coed.' Among his very numerous water-colours are 'Lancaster Sands' (1835); 'Ulverston Sands' (1835); 'Bolton Abbey' (1847); 'Welsh Funeral' (1850); and 'Broom Gatherers on Chat Moss' (1854). His water-colour titled 'The Hayfield,' fetched £2950 in 1875. His works have been frequently brought together in exhibitions, and he was admirably represented by forty-six examples in the Manchester Exhibition, 1887. See the Memoir by N. N. Solly (1875), and the Biography by William Hall (1881).—His son, David Cox the younger (1809–85), was also known as a water-colour painter.

**Cox, Sir George**, an eminent mythologist, was born in 1827, and educated at Rugby and Trinity College, Oxford. He took orders in 1850, and after holding curacies in Devonshire, and an assistant-mastership at Cheltenham, became vicar of Bokesbourne in Kent, and afterwards rector of Scrayingham, York. In 1877 he succeeded to his uncle's baronetcy. An industrious man of letters, he wrote much on ancient history and on mythology. His *Tales of Ancient Greece* (1868) was a collected edition of several admirable earlier volumes of Greek history. His most important work, *The Mythology of the Aryan Nations* (2 vols. 1870), was an uncompromising development of the solar and nebular hypothesis as the key to all mythologies. It is learned, lucid, and courageous; but the extreme to which a serviceable enough theory has been pushed in an attempt to account for the unaccountable, and to reconcile the irreconcilable, has exposed its real weakness. His *History of Greece* (2 vols. 1874) was a work of great learning, and his *Introduction to the Science of Comparative Mythology and Folklore* (1881) showed its author's old ingenuity and erudition, but none the less the singular limitation of his knowledge. Other works are *Latin and Teutonic Christianity* (1870), *The Crusades* (1874), *History of British Rule in India* (1881), *Lives of Greek Statesmen* (2 vols. 1886), and concise *History of England* (1887). With W. T. Brande he edited the useful *Dictionary of Science, Literature, and*

*Art* (3 vols. 1865–67). His *Life of Bishop Colenso* appeared in 1888. He died 9th February 1902.

**Coxe, Henry Octavius**, librarian, was born at Bucklebury vicarage in Berkshire, September 20, 1811. He was educated at Westminster and Worcester College, Oxford, and entered the manuscript department of the British Museum in 1833, soon afterwards taking orders. In 1838 he became attached to the Bodleian Library, in 1860 its head, and here his marvellous knowledge and patient kindness made him the very ideal of the librarian. Already in 1857 he had been sent by Sir G. C. Lewis to the East on a tour of discovery, which resulted indeed in his finding many codices, though the grasping greed of the ignorant monks, at last awakened to their value, made it impossible to buy them. Coxe held in succession several curacies near Oxford, and in 1868 became rector of Wytham. He was Select preacher in 1842, Whitehall preacher in 1868, and in 1878 presided at the first annual meeting of the Library Association at Oxford. Coxe died July 8, 1881. Although himself an excellent palæographer and ripe scholar, Coxe did much more for others' reputations than his own. The most important of his own works were an edition of Roger of Wendover's *Chronicle* (5 vols. 1841–44), and of Gower's *Vox Clamantis* for the Roxburghe Club (1850), and his Catalogues of MSS. in the colleges and halls of Oxford (1852), and of the Bodleian MSS. (1853–54). See Dean Burgon's *Lives of Twelve Good Men* (1888).

**Coxe, William**, historical writer, was born in London, 7th March 1747, and from Eton passed to King's College, Cambridge, of which he became a fellow in 1768. As tutor to the sons of four persons of quality, he spent much of twenty years on the Continent, where he neglected no opportunity of collecting information about the countries which he visited. The result appeared in fourteen works of travel and history, careful but dull, the best known being his *History of the House of Austria* (1807). He died, a prebendary of Salisbury and Archdeacon of Wilts, at Bemerton rectory, 16th June 1828.

**Coxswain**, or COCKSWAIN (pronounced *cozn*, and often abbreviated to *cox*), on board ship, is the steersman of a boat, and commander of the boat's crew. In boat-racing, the coxswain should always by preference be a very light weight. See ROWING.

**Coxwell, Henry Tracey**, aéronaut, born in 1819, at Wouldham, near Rochester, was educated for the army, but settled as a surgeon-dentist in London. From boyhood he had taken a keen interest in ballooning; in 1844 he became a professional aéronaut, and in 1845 established the *Aerostatic Magazine*. Thereafter he made some 700 ascents, the most remarkable being that of 1862, when he reached, with Mr Glaisher, a height of seven miles. He published *My Life and Ballooning Adventures* (2 vols. 1887–88), and died 5th January 1900. See BALLOONS AND AEROPLANES.

**Coyote**. See WOLF.

**Coypu** (*Myopotamus coypu*), a large rodent in the porcupine section of the order. It is the only known species of its genus, is common in South America on both sides of the Andes, lives (in pairs) in burrows near water, and feeds on aquatic plants. The animal measures from one to two feet in length, not including the long scaly tail; the general colour is brown varying towards yellow; the hind-feet are webbed and enable the coypus to swim well. The mother-animal swims with her young on her back, and this habit may have something to do, it is suggested, with the peculiar position of the teats, which are high up on the

flanks. The coypu is much hunted for its flesh and fur. The latter is best known under the



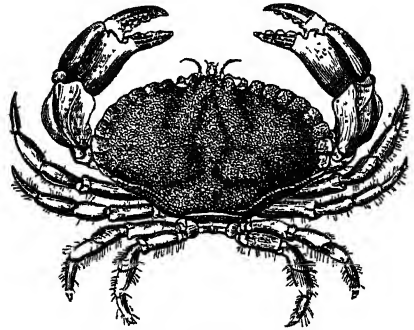
Coypu (*Myopotamus coypu*).

Spanish name of Nutria, and forms an important article of commerce.

**Cozens**, JOHN ROBERT, water-colour painter, was born in England in 1752. He was instructed by his father, Alexander Cozens, also known as an artist in water-colours, who was one of the two natural sons of Peter the Great, by a woman from Deptford who accompanied the Czar to Russia. In 1776 he visited Switzerland, with R. Payne Knight, and in 1783 returned from an extended tour in Italy with William Beckford, who commissioned many of the washed drawings which he then executed. Among his English subjects are some fine studies of trees made in Windsor Forest. In 1794 the artist's mind gave way, and in his later days he was befriended by Sir George Beaumont and Dr Munro. The date of his death has been usually stated as 1799, but there is reason to believe that he was alive after 1801. The great qualities of his art have commanded the enthusiasm of brother-painters. Turner and Girtin copied his drawings, and Constable pronounced that 'his works were all poetry,' that he was 'the greatest genius that ever touched landscape.' He to some extent extended the very limited colour-scheme of previous painters in the medium, introducing greater force and variety of tinting; and he substituted for their topographical treatment of landscape a rendering more imaginative and more perceptive of the delicacies of atmospheric effect. In composition, his works are singularly large and harmonious, and they evince an especial sympathy for nature in her moods of placid sublimity. There is a fine series of his works in the British Museum Print Room.

**Crab**, a popular name legitimately applied to any of the short-tailed (*Brachyura*) division of decapod Crustaceans (q.v.). The body is usually short and compressed; the abdomen is short and is tucked up beneath the relatively large cephalothorax; there are 1 to 4 reduced abdominal appendages, but seldom any tail-paddles; the antennæ are short. In the common Shore-crab (*Carcinus maenas*) the carapace is a wide shield, broader than long, and bent inwards at the sides; the eyes are stalked, and lie as usual above and in front of the antennules, though apparently rather external to them; the antennules have the ear-sac lodged in their dilated base; the bases of the antennæ are immovable, and the opening of the excretory organ at their base has a curious movable plate. The hindmost of the foot-jaws or maxillipedes is in part expanded into a broad plate which covers the neighbouring appendages. The great claws are generally larger in the male than in the female, and thus the market value of the male Edible Crab (*Cancer pagurus*) is said to be five times as great as that of the female. The reduced

abdominal appendages of crabs are solely used for reproductive purposes. The two anterior pairs are copulatory in the males; those that persist in the females have the eggs attached to them. The abdomen is always larger and broader in the females. The nervous system is peculiar in the centralisation of the thoracic ganglia into a single mass. The alimentary, circulatory, and excretory systems do not present any important peculiarities. The gills are always fewer than in the crayfish, never exceeding nine on each side. The gill-cavity is large, especially in the land-crabs. In the common shore-crab, the larva leaves the egg as a zoea, after repeated moults becomes a sort of hermit-crab-like form known as a Megalopa, and gradually with broadening shield, loss of abdominal



Great Crab (*Cancer pagurus*).

appendages, bending up of the abdomen, and modification of the anterior limbs becomes a miniature adult.

**General Life.**—Crabs feed chiefly on other animals both alive and dead. The Swimming Crabs (*Portunus*)—e.g. *P. pelagicus*, attack fishes. *Cardisoma carnifex*, found in the mangrove swamps of the West Indies, is fond of the fruit of a species of Anona, but is also notorious for burrowing in the cemeteries. The well-known Land-crab (*Gecarcinus ruricola*) damages sugar-canes. Many crabs are very rapid runners, especially the sand and land forms; others are powerful burrowers—e.g. the Calling Crab (*Gelasimus*), which has one of its great claws much exaggerated, and carried during locomotion over its head in such a way that it looks as if it were beckoning; others again are expert swimmers—e.g. our British pelagic *Polydora henslowii*, which has a light shell, and four of its thoracic appendages flattened for swimming. In regard to respiration it is worth noticing that the land-crabs are so far terrestrial that they are liable to be drowned in water. The male crabs are usually larger, and sometimes fight with one another as well as with other species. In some cases (*Gelasimus*) the bright colour is only acquired at the period of reproductive maturity. The sexes of the common Shore-crab (*Carcinus maenas*) are said to unite just after the female has moulted her hard shell. In all but the land-crabs the female carries about the eggs till they are hatched.

**Habitat.**—Almost all crabs are strictly marine forms, and the majority frequent shallow water. Among the terrestrial forms the best known are the species of *Gecarcinus*, swiftly moving nocturnal crabs in tropical regions of both hemispheres, chiefly vegetarian in their diet, migrating in companies to the sea for egg-laying purposes. The genus *Ocypoda* includes some land forms, and some which produce a shrill noise by rubbing the ridged surface of the second-last joint of

the right great claw against a sharp edge of the second joint. The Calling Crab (*Gelasimus*) makes large burrows, and the male closes the mouth of the hole with its exaggerated great claw. The Pea-crabs (*Pinnotheres*) live inside bivalves (*Pinna*, *Mytilus*, *Mactra*, &c.). One species (*P. veterum*) was said by the ancients to nip the mollusc when danger threatened, and to receive its share of food in return. There is no doubt as to the share of food, but no evidence that the crab rewards its host. In the genus *Telphusa* all the species live in fresh water in the warm parts of the globe. The European species (*T. fluviatilis*) is tolerably common in southern Europe, was known to the ancients both in its habit and edibility, and is often figured on Sicilian coins. As regards geological distribution, the *Brachyura* do not certainly appear before the upper Jurassic, and become gradually more numerous in Cretaceous and Tertiary strata.

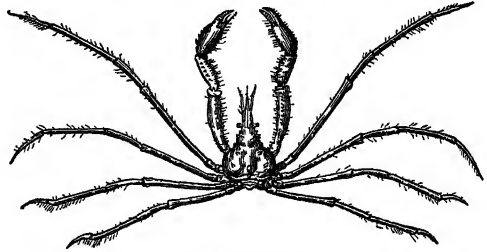
**Moulting and Amputation.**—Like other crustaceans, crabs periodically cast their chitinous and limy shells. The moults are most frequent in youth, when the rapid growth of the body conflicts with the rigidity of the armature. Extra feeding may accelerate the process. Before moulting the old shell becomes virtually dead, reserve stores are used in fresh growth, a new shell begins to form within the old, and finally with considerable, and sometimes fatal effort, the shell is cast. It is left in apparent intactness, a very image of its lost tenant. The new suit, which is at first soft, requires several hours or days to acquire firmness. The loss of internal linings, of stomach mill, of the outer covering of the eyes, &c., as well as of the entire outer armature, leaves the crab very much *hors de combat*. The period is one of great disadvantage to the crabs, not only from the fatigue and often fatality of the process, but from the state of defenceless helplessness in which they are temporarily left. In many cases crabs lose their limbs in fighting, and they may voluntarily resign them (as in *Porcellana platycheles*) to save their bodies. Sudden panic or injury is said to lead to similar self-inflicted amputation or 'autotomy.' Like many animals lower in the scale, crabs are able to make good their injuries, though several moults are required to regenerate a limb.

**Masking.**—A common habit among crabs is that of masking themselves with foreign objects. Thus both the European species of *Maia* (*M. squinado* and *M. verrucosa*) are usually overgrown by *Algæ*, *Hydroids*, and *Polyzoa*; the same is true of *Pisa*; in *Inachus* the long feet are especially well concealed by seaweeds; our common *Stenorhynchus* is often covered by a sponge growth; the Mediterranean *Dorippe lanata* uses its hind-legs to carry some living or dead object upon its back, and thus very emphatically asserts its innocence; the common *Dromia* (*D. vulgaris*) holds sponges on its back in similar fashion. See COMMENSALISM.

**Intelligence.**—As in several features of their structure, so in their intelligence, crabs appear to hold the highest place among crustaceans. Moseley observed how a sand-crab (*Ocypodaippeus*), which dreads the sea, dug itself into the sand and held on against the undertide of each great wave. Romanes refers to the alleged habit of the common crab in stationing a hard-shelled individual as sentinel during the moulting season. There seems to be not a little of the intelligent in some cases of crab-commensalism. Darwin has, however, given a crowning instance of intelligence which is worth many less emphatic. Some shells were thrown towards the hole of a burrowing shore-crab (*Gelasimus*). One rolled in, three remained a few inches from the mouth. In a few minutes the crab came

out, bearing the shell which had fallen in, and removed it to the distance of a foot. 'It then saw the three other shells lying near, and evidently thinking that they might likewise roll in, carried them to the spot where it had laid the first.'

**Common British Forms.**—The Common Shore-crab (*Carcinus maenas*); the Great Crab (*Cancer pagurus*), so much eaten; the Slender Spider-crab or Slender-beaked Crab (*Stenorhynchus tenuirostris*), with very long spider-like legs and bright



Slender Spider-crab (*Stenorhynchus tenuirostris*).

pink triangular body; the large Thorny Spider-crab (*Maia squinado*); the Common Swimming Crab (*Portunus variegatus*), common on Scotch coasts, with the last pair of legs flattened like oar-blades; the Velvet Fiddler-crab or Devil-crab (*Portunus puber*), with a brown hairy shell; the Masked Crab (*Corystes cassivelaunus*), with a carapace marked so as to suggest a mask, often found buried in the sand of English and Welsh coasts; the small Four-horned Spider-crab (*Pisa tetraodon*); the little Pea-crab (*Pinnotheres pisum*, &c.), inside bivalves, are familiar British species.

See CRUSTACEA, CRAYFISH, HERMIT-CRAB, LOBSTER; Smith and Weldon, *Cambridge Natural History*, vol. iv. (1909); Sedgwick, *Student's Text-book of Zoology*, vol. iii. (1909); Calman, *Life of Crustacea* (1911); and 'Crustacea' in Lankester's *Treatise of Zoology*.

**Crab**, ROGER, hermit, was born about 1621 in Buckinghamshire, and served for seven years (1642-49) in the Parliamentary army. He then set up in business as 'a haberdasher of hats' at Chessham, in his native county. He became possessed of the idea that it was sinful to eat any kind of animal food, or to drink anything stronger than water; and in 1651, determined to follow literally the injunction given to the young man in the gospel, he sold off his stock-in-trade, distributing the proceeds among the poor, and took up his residence in a hut. His food consisted of bran, turnip-tops, dock-leaves, and grass. The persecutions the poor man inflicted on himself caused him to be persecuted by others, cudgelled, and put in the stocks. He was four times imprisoned for Sabbath-breaking and other offences, yet still he persisted in his course of life. He published *The English Hermit*, *Dagon's Downfall*, and a tract against Quakerism; and he died at Bethnal Green, 11th September 1680.

**Crab-apple** is a term applied somewhat vaguely to any sour and uncultivated variety or species of apple. Thus *Pyrus spectabilis* of shrubberies is known as the Chinese Crab, *P. prunifolia* as the Siberian Crab, *P. coronaria* as the American Crab, and *P. baccata* of North Asia (including *cerasifera*) as the Cherry Crab. More strictly, however, the term is applied to the wild varieties of the true apple (*P. Malus*, var. *sylvestris*). Of this, again, two main varieties are distinguished, one smooth-leaved and sour (var. *austera*), the other more or less woolly-leaved and sweeter (var. *mitis*). The former

of these may therefore be considered as the crab-apple proper.

**Crabbe**, GEORGE, poet, was born on Christmas Eve of 1754, at Aldeburgh, on the Suffolk seaboard. His father, 'salt-master' and warehouse-keeper, was a clever, strong, violent man; the mother, a meek, religious woman; and of three brothers, one perished captain of a slaver, another was lost sight of in Honduras. George, the eldest, got some schooling at Bungay and Stowmarket, then from 1768 to 1774 was surgeon's apprentice at Wickham-Brook and at Woodbridge. In his first place he had to help the ploughboy; in his second he fell in love with Sarah Elmy ('Mira'), who lived with her uncle, a wealthy yeoman, at the old moated hall of Parham. A spell of drudgery in his father's warehouse—nine months in London, picking up surgery cheaply—some three years' struggling practice at Aldeburgh—at last in April 1780, with £3 in his pocket, he sailed again for London, resolved to try his fortune in literature. Eight years before he had written verses for *Wheble's Magazine*; he had published *Inebriety, a Poem* (Ipswich, 1775); and now his *Candidate* soon found a publisher, unluckily a bankrupt one. A season of penury, dire as Chatterton's, was borne by Crabbe with pious bravery; he had to pawn clothes and instruments; appeals to Lords Thurlow, North, Shelburne, found no response; and early in 1781 he saw himself threatened with arrest for debt, when he made his case known to Burke. Forty-one years later he told Lockhart at Edinburgh how, having delivered the letter at Burke's door, he paced Westminster Bridge all night long until daybreak. Burke proved a generous patron; from the hour of their meeting Crabbe was a 'made man.' He stayed at Beaconsfield; he met Fox, Johnson, and Reynolds; Thurlow gave him a bank-note for £100; Dodsley brought out his *Library*; and the very next winter he was ordained to the curacy of his native town. He resided as domestic chaplain to the Duke of Rutland at Belvoir Castle (1782-85); married Miss Elmy (1783); held four livings in Dorset, Leicester, and Lincoln shires, and spent thirteen happy years in Suffolk, at Parham, Great Glemham, and Rendham (1792-1805); returned to Muston, his Leicestershire rectory; and his wife having died there in 1813, exchanged it the next year for Trowbridge in Wiltshire. His gentle, kindly life, in which botanising had given place to fossil-hunting, was broken now and again by visits to London and its best society; he witnessed the Bristol riots (1831), as fifty-one years before he had witnessed those of Lord George Gordon. He died at Trowbridge, 3d February 1832.

Three novels, a treatise on botany, and poems untold all perished in grand yearly 'incremations'; but still, Crabbe published *The Village* (1783), *The Newspaper* (1785), *The Parish Register* (1807), *The Borough* (1810), *Tales* (1812), and *Tales of the Hall* (1819), for which last and the earlier copyrights Murray paid him £3000. Of these poems Wordsworth wrote in 1832, 'They will last full as long as anything expressed in verse since first they made their appearance;' and Jane Austen said Crabbe was the only man whom she would care to marry. Byron, too, Scott, Jeffrey, Wilson, Tennyson, Swinburne, Cardinal Newman, and above all Edward FitzGerald, must be reckoned among his few votaries. 'Though nature's sternest painter, yet the best,' Byron's verdict upon him, is truer than Horace Smith's, 'a Pope in worsted stockings,' for this refers but to the accident of metre—the rhyming heroics, which, thirty per diem, Crabbe ground out anywhere. Their subject-matter, though, is all Crabbe's own. He is as much the poet of East Anglia as Scott of the Borderland or Wordsworth of the Lake Country. Its scenery and the life

of its fisher-folk and peasantry he described with a realism greater than Zola's, if sometimes almost as tedious. Zola! nay, Crabbe has closer kinship to Balzac; and his strong, sombre pictures of sin and suffering are ever and again lit up with homely pathos and shrewd, Dutch-like humour. 'The tragic power of Crabbe,' says Swinburne, 'is as much above the reach of Byron, as his singularly vivid, though curiously limited, insight into certain shades of character.' And in old John Murray's words, 'Crabbe said uncommon things in so common a way as to escape notice;' surely he claims notice from such as rank thought higher than expression.

An admirable Life by his son, the Rev. George Crabbe (1785-1857), for twenty-three years vicar of Bredfield, Suffolk, is prefixed to *Crabbe's Works* (8 vols. 1834). See also Canon Ainger's *Crabbe* (in 'English Men of Letters' series, 1903); Keble's *Crabbe* (1888); Holland's *Selections* (1899); Courthope's essay in Ward's *English Poets* (vol. iii.); the edition of Crabbe's works by A. W. Ward (3 vols. 1905-7); René Huchon's *George Crabbe and his Times* (trans. 1907); Broadley and Jerrold, *The Romance of an Elderly Poet* (1913).

**Crab-stones**, or CRAB'S EYES, are concretions, mainly calcareous, formed in the stomachs of crayfish and some other crustaceans. Finely powdered, they were used medicinally as an absorbent and antacid; and the name is given to similar powder, whencesoever derived.

**Cracked Heels** are due to washing horses' legs and imperfectly drying them; to permitting horses to stand in accumulated filth and exposed to draughts, so that the skin becomes inflamed, tender, itchy, thickened, and by-and-by cracked; and to clipping horses' legs, especially in spring, when the roads are wet and dirty, and frost sets in before the horses are in from work. An ichorous and fetid discharge exudes, and lameness often results. In animals with round *gummy* legs it is sometimes constitutional; underbred horses with rough hairy fetlocks present the majority of cases; white heels, being more delicate, are especially affected; whilst the hind-limbs, exposed as they are to filth and cold, suffer most frequently. Cleanse carefully with tepid water, wash with a mild astringent, or dress white heels occasionally with oxide of zinc ointment, and, when black, mix a little powdered charcoal with the ointment. When the skin is dry and irritable, poultice and apply glycerine before proceeding with astringents. In cold weather, and especially when the horse is heated, interdict washing the legs; but allow them to dry, and then brush off the dirt.

**Cracovienne** (*krakowiak*), the national dance of the Polish peasantry around Cracow. It has a very marked rhythm in 2 time, and is often accompanied by singing. The Poles have a multitude of little ditties of two lines each adapted to it.

**Cracow** (Pol. *Krakow*, Ger. *Krakau*), a city of Polish (formerly Austrian) Galicia, 259 miles NE. of Vienna by rail. It stands 672 feet above sea-level, in a wide, hill-girt plain on the left bank of the Vistula, which here becomes navigable, and is spanned by a bridge (1850) leading to Podgorze. The old walls have been converted into promenades, and a line of detached forts now defends the city. Its older portion is a labyrinth of narrow, dark, and deserted streets, but contains many fine specimens of Gothic architecture in its churches and other edifices; and some handsome buildings are also to be seen in the more modern suburbs. On the Wawel rock, in the midst of the houses, rises the old castle of the Polish kings, which was degraded to a barracks, but has been restored. The neighbouring cathedral (1320-59) is a splendid pile, containing the graves of John Sobieski, Poniatowski, Kosciusko, Mickiewicz, and many more, with Thor-

waldsen's statue of Christ. The university was founded in 1364 by Casimir the Great, and reconstituted under the Jagellons in 1400. New buildings were erected in 1881-87. The second oldest university in central Europe, it was for long the centre of light for Poland. It has a library of 500,000 volumes, and many MSS. of great value for Polish history. Cracow has important fairs, and its trade and manufactures (chemicals, tobacco, beer, agricultural implements, &c.) have of late years greatly revived. Salt-mining has been in operation since 1054. Three miles west is a grassy mound, 150 feet high, reared in 1820-23 to the memory of Kosciusko. It is composed of earth taken from all the patriotic battlefields of Poland. The population has varied much, from 80,000 in the 16th century to 10,000 at the end of the 18th, 49,835 in 1869, 66,095 in 1880, 74,593 (nearly half Jews) in 1890, and 181,700 in 1921.

Cracow was founded by Krak, Prince of Poland (see the history by Lepszy, translated 1912), about the year 700, became the capital of Poland in 1320, and continued so till 1609. It was taken by the Bohemians in 1039, by the Tatars in 1241, by the Swedes in 1655 and 1702, and by the Russians in 1768. On the third partition of Poland, in 1795, it was assigned to Austria. From 1809 to 1815 it formed part of the duchy of Warsaw. The congress of Vienna established it as a republic, with a territory of 425 sq. m., under the protectorate of Russia, Prussia, and Austria. Polish sympathies there led to its annexation by Austria in 1846, but with the emergence of the republic it was restored in 1919 to Poland.

**Craddock**, CHARLES EGBERT, is the pen-name of Mary Noailles Murfree, born near Murfreesborough in Tennessee in 1850, and known as author of *In the Tennessee Mountains* (1884), *Down the Ravine* (1885), *The Prophet of the Great Smoky Mountains* (1885), *The Bushwhackers* (1899), *A Spectre of Power* (1903), and many other stories.

**Cradley** (separated by the river Stour from the village of Cradley Heath) is a Worcestershire township and an ecclesiastical parish formed in 1799 from the civil parish of Halesowen, on the borders of Staffordshire, with extensive iron trade (nail-making included).

\* **Crag and Tail**, a term used to designate a peculiar hill conformation, in which a bold and precipitous front exists on one aspect of a hill, while the opposite is formed of a sloping declivity.



Castle Rock, Edinburgh.

Fine examples of this structure occur in and around Edinburgh, where the bold 'crag' faces the west and the 'tail' slopes towards the east; as, for example, the Castle rock, precipitous and unapproachable on every side except to the east. The structure owes its origin to the juxtaposition of rocks of variable degrees of durability—the harder and more durable rocks have resisted denudation, and so protected the more readily eroded rocks that occur on the lee side of the former. The crag and tail phenomena of central Scotland and other regions which have been subjected to extreme glaciation (see GLACIAL PERIOD) is due to glacial erosion and accumulation. The crag faces the direction from which the ice came, and thus by opposing its advance induced excessive erosion

upon the ground immediately in front. A hollow has thus usually been scooped out in this place, and continued along either side of the obstruction for some little distance. This somewhat crescent-shaped hollow is well seen on the west side of Edinburgh Castle rock, sweeping round on the north by Princes Street Gardens (the old Nor' Loch), and on the south by the valley of the Cowgate. The morainic material dragged along underneath the ice accumulated in the rear of the crag, so that the strata in that position are usually covered to a greater or less depth with boulder-clay, &c. The High Street of Edinburgh is thus built upon morainic materials.

**Craig**, EDWARD GORDON, son of Miss Ellen Terry, born 1872, began to act in 1889 under Sir Henry Irving, and since 1897 has devoted himself to studying the Art of the Theatre. He maintains that it has been enslaved by acting, and music, and literature, and painting, and costume-designing; whereas the stage director should work not for statement but suggestion, and should appeal primarily to the eye by colour and mass and movement, the words and other things being allowed to help out the meaning. He has written several works on the Art of the Theatre, and influenced the stage in England, Germany, France, and Russia.

**Craig**, JOHN, Scottish Reformer, was born in 1512, and educated at St Andrews. He joined the Dominicans there, but fell under suspicion of heresy, and after a brief imprisonment (1536) went to Rome, and later to the Dominican convent of Bologna. A copy of Calvin's *Institutes* converted him to Protestantism, and on 18th August 1559 he was lying in the dungeon of the Inquisition, condemned to suffer next morning at the stake, when Pope Paul IV. died, and the mob broke open the prisons, and set the prisoners at liberty. A bandit befriended him; a dog brought him a purse of gold as he was wandering helpless through a forest; he escaped to Vienna, and there preached in his friar's habit, one of his hearers being the Archduke Maximilian. Presently the new pope, learning his whereabouts, demanded his surrender; but Maximilian gave him a safe-conduct, and in 1560 he returned to Scotland. In 1563 he was appointed coadjutor to Knox, and with him was accused by the Earl of Bedford of having been privy to Rizzio's murder; in 1567 he incurred some censure for proclaiming, under strong protest, the banns between Queen Mary and Bothwell; and in 1572 he was sent to 'illuminate the dark places' in Angus and Aberdeenshire. He came back to Edinburgh in 1579 as a chaplain to James VI., took a leading part in the church's affairs, and had a share with Melville in the Second Book of Discipline. He was the author of the 'Confession of Faith' or first National Covenant, 'subscribed by the king's majesty and his household and sundry others' at Edinburgh, 28th January 1580. He withstood the restoration of prelacy; but his comparative moderation was not seldom displeasing to the 'popes of Edinburgh.' He died 12th December 1600. His *Short Summe of the whole Catechisme* (1581) has been reprinted in fac-simile, with a valuable introductory Memoir by T. G. Law (Edin. 1883).

**Craig**, THOMAS, writer on feudal law, was born in 1538, either at Craigfintray (Aberdeenshire) or in Edinburgh. From St Andrews he passed in 1555 to the university of Paris, and in 1563 was admitted an advocate at the Scottish bar, being next year appointed justice-depute of Scotland, and in 1573 sheriff-depute of Edinburgh. Whilst head of the criminal judicature, he did not neglect the muses, as was evidenced by an epithalamium on Queen Mary's marriage with Damley and a poem on the

birth of James VI. Besides several more Latin poems, and the masterly *Jus Feudale* (1608; 3d ed. 1732), and *De Unionis Regnorum* (ed. Terry, Scottish History Society, 1910), he wrote two other Latin treatises—on James VI.'s right to succeed to the English throne, and on the homage controversy between Scotland and England. He died 26th February 1608. See *Life* by Tytler (1823).

**Craigie**, MRS PEARL MARY TERESA (*née* Richards), novelist, was born in Boston, U.S., on the 3d Nov. 1867, and educated in Boston, London, and Paris. She contributed to numerous magazines and newspapers, wrote several plays, but is best known from her novels published under her pen-name, John Oliver Hobbes—*Some Emotions and a Moral* (1891); *A Bundle of Life* (1894); *The Gods, some Mortals, and Lord Wickenham* (1895); *The Herb-moon* (1896); *The School for Saints* (1897); *Robert Orange* (1900); *Love and the Soul Hunters* (1902); *The Flute of Pan* (1905); and, almost immediately after her death on 13th August 1906, *The Dream and the Business*.

**Craigleith Stone**, a siliceous sandstone belonging to the Lower Carboniferous series, quarried at Craigleith, in the W. of Edinburgh.

**Craik**, GEORGE LILLIE, born at Kennoway, Fife, in 1798, was educated for the church at St Andrews University, but, settling in London, wrote *The Pursuit of Knowledge under Difficulties* (1831), contributed largely to the *Penny Magazine* and *Cyclopaedia*, and in 1839 became editor of the *Pictorial History of England*, supplying some of the most valuable chapters. From these his *Sketches of the History of Literature and Learning in England* (6 vols. 1844) and his *History of British Commerce* (3 vols. 1844) were reprinted. He filled the chair of English Literature in Queen's College, Belfast, from 1849 till his death on 25th June 1866. His other works include *Spenser* (1845), *Bacon* (1846-47), *Romance of the Peerage* (1848-50), *The English of Shakespeare* (1856), *A History of English Language and Literature* (1861; 9th abridged ed. 1883).—His youngest daughter, Georgina Marion (Mrs May), born in 1831, began to write at nineteen, and had at her death in 1895 published some thirty novels and stories.

**Craik**, MRS. Dinah Maria Mulock, well known as the author of *John Halifax, Gentleman*, was born at Stoke-upon-Trent in 1826. She early took the burden of supporting an ailing mother and two younger brothers, and wrote stories for fashion-books, as well as for graver publications. Her first serious appearance as a novelist was in 1849, with her story *The Ogilvies*, which was followed by *Olive*, *The Head of the Family*, and *Agatha's Husband*. But she never surpassed or even equalled her domestic novel *John Halifax* (1857), which has had, and still continues to have an extraordinary popularity, and has been translated into French, German, Italian, Greek, and Russian. The scene is laid at Tewkesbury, where a marble medallion has been placed to her memory in the abbey. A pension of £60 a year, awarded to her in 1864, she set aside for authors less fortunate than herself. In 1865 she married Mr George Lillie Craik, a partner in the publishing house of Macmillan & Co. (nephew of the subject of the preceding article), and spent a period of quiet happiness and successful literary industry at her home, Corner House, Shortlands, Kent, where she died 12th October 1887. Much of Mrs Craik's verse is collected in *Thirty Years' Poems* (1881). She wrote a good deal for the magazines, and produced in all forty-six works, viz.—fourteen more novels, and several volumes of prose essays, including *A Woman's Thoughts about Women* (1858), and *Concerning Men, and other Papers* (1888). See

Mrs Oliphant's sketch in *Macmillan's Magazine* (1887).

**Crail**, an antique little coast-town in the 'East Neuk' of Fife, 2½ miles WSW. of Fife Ness, 10 SE. of St Andrews, and 43 NE. of Edinburgh by rail. There is a fragment of a castle of David I.; and the church, which was made collegiate in 1517, is an interesting Second Pointed structure. John Knox here preached his 'idolatrous sermon,' 9th June 1559; and in 1648, James Sharp was appointed minister. The fishing is not what it once was, and the harbour has little trade; but Crail is a pleasant summer-resort. A royal burgh since 1306, it was till 1918 one of the seven parliamentary 'St Andrews burghs.' Pop. 1500.

**Craiova**. See KRAJOVA.

**Crake**. See CORN-CRAKE.

**Crambe**, a genus of Cruciferae, having a pod (*silicula*) of two unequal joints, of which the upper is globose and one-seeded, the lower abortive. *C. maritima* is well known as Sea-kale (q.v.). *C. tatarica*, of Eastern Europe, with much divided leaves and a great fleshy root, is cultivated in Rumania as caniflower, and its root is eaten either boiled or in salads.

**Cramer**, JOHANN BAPTIST, pianist, was born at Mannheim in 1771, the son of Wilhelm Cramer (1745-99), a musician of repute, who settled in London in 1772. From 1788 the son undertook concert tours on the Continent, and gained a high reputation as a facile and expressive performer. He founded the musical publishing firm which bears his name in 1828, and after some years' residence in Paris, died in London, 16th April 1858. Most of his compositions are now forgotten, but his series of *Studies* is a work of importance.

**Cramp** is a word applied to muscular contractions of an irregular kind, in a somewhat variable way.

(1) In its common use, it denotes an involuntary and painful contraction of a voluntary muscle or group of muscles. It is most apt to occur when a muscle has been fatigued; though any muscle may be affected, those of the calves most often suffer. It is especially common in pregnant women and persons of a gouty diathesis, and is a prominent feature in some diseases, especially cholera. There is no specific for preventing it; each case must be treated on its merits. The contraction and accompanying pain is usually cut short if the affected muscle be stretched—e.g. in the case of the calf-muscles, the knee must be straightened and the foot bent up as far as possible towards the front of the leg, to lengthen the affected muscles to the utmost, and similarly with other cases.

(2) *Writer's Cramp* is the commonest and best known of a group of diseases called *trade spasms*. The person affected can use his fingers for any purpose, even the most delicate manipulations, so long as he does not attempt to write; but whenever he does so, the muscles refuse to obey his will, and the pen either drops from his hand or executes spasmodic purposeless movements. Similar conditions may occur in telegraphists and pianists—in fact, in any case where frequent and continued use of particular muscular actions is necessary. These distressing and troublesome affections are often cured by means of Massage (q.v.), electrical applications, and systematic gymnastic exercises of the affected parts.

(3) *Bather's Cramp*.—A good swimmer, while bathing, is seen to throw up his arms, perhaps is heard to cry out once, and then sinks to rise no more. It is said that 'bather's cramp' has been the cause of his death. This phrase, however, is merely an apology for ignorance: what has happened, and whether it is the same in all

apparently similar cases is as yet quite uncertain. Cramp, in the ordinary sense, of one or more limbs, though very embarrassing and alarming, would not be so disastrous to a practised swimmer as to make him sink without a struggle; and, though common in bathers, cannot be accepted as the cause of all the fatal accidents like that described above. Of other theories advanced, the most probable is that sudden failure of the heart's action, a partial or total faint, is the cause of the calamity, at least in very many cases. A sudden plunge into cold water by itself causes some strain upon the heart; and swimming, about the most severe of all forms of exercise, increases its work very greatly—sometimes, it is easy to believe, beyond safe limits. The recorded experience of some who have narrowly escaped death from this cause makes it appear extremely probable that it is the real explanation of at least some of these sad accidents. No one when out of practice should attempt a long swim in cold water; and persons with weak hearts should be especially careful to avoid fatiguing themselves when bathing.

**Cramp Rings** were rings which were supposed to cure cramp and the 'falling-sickness.' They are said to have originated as far back as the middle of the 11th century, in a ring presented by a pilgrim to Edward the Confessor, which, after that ruler's death, was preserved as a relic in Westminster Abbey, and was applied for the cure of epilepsy and cramp. Hence appears to have arisen the belief that rings blessed by English sovereigns were efficacious in such cases; and the custom of blessing for distribution large numbers of cramp rings on Good Friday continued to exist down to the time of Queen Mary. The accomplished Lord Berners, ambassador to Spain in Henry VIII.'s time, writes from Saragossa to Cardinal Wolsey: 'If your grace remember me with some crampe ryngs ye shall doo a thing muche looked for; and I trust to bestow thaym well with Goddes grace.' The metal the rings were composed of was what formed the king's offering to the cross on Good Friday, usually either gold or silver. The superstitious belief in the curative property of cramp rings made out of certain pieces of silver obtained in particular ways still lingers in some districts of England.

**Cran** (Gaelic), a measure of capacity in Scotland for herrings when just taken out of the net. It amounts to  $3\frac{3}{4}$  imperial gallons, and comprises about 750 herrings on an average.

**Cranach**, LUCAS, a celebrated German painter, so named from Kronach in the bishopric of Bamberg, Upper Franconia, where he was born, 4th October 1472. Little is known of his early life, but he seems to have been instructed by his father, and, possibly, by Matthew Grundewald; to have resided in Gotha, where he married Barbara Brengbier; and to have accompanied Frederick the Wise, Elector of Saxony, to the Holy Land in 1493. Certainly he was befriended by that prince, and was his court-painter at Wittenberg, an appointment made in or before 1504. He received in 1508 a patent of nobility, and the 'motto,' or *kleinod*, of a crowned and winged serpent, with which he marked his subsequent works, instead of (sometimes in combination with) the initials which he had previously used. Monopolies for printing and the sale of medicine were also bestowed upon him. The house in which he carried on his manifold occupations was standing at Wittenberg till 1871, and his importance in the town may be gathered from the fact that in 1537, and again in 1540, he was elected burgomaster. In 1509 he accompanied an embassy to the Emperor Maximilian, and while in the Netherlands he portrayed the

prince, afterwards Charles V., then a boy of nine. After the death of the Elector Frederick in 1525, he was continued in his official position by his brother, and also by his successor, John Frederick the Magnanimous, whose captivity at Augsburg the artist shared, and whose release he is believed to have procured from the emperor in 1552. He returned with his master to Weimar, and died there on 16th October of the following year. The superiority of his earlier works, both in painting and engraving, is doubtless to be accounted for by the fact that in later life the pressure of numerous commissions necessitated the assistance of his sons, and of many other pupils. His paintings, executed in oils on panel, include sacred and a few classical subjects, hunting-scenes, and portraits.

His drawing is commonly hard and defective, but his colouring is rich, warm, and effective, and a certain homely earnestness, sometimes mingled with humour, characterises his productions. A quaint portrait of a girl in an elaborate costume from his hand is in the National Gallery, London. He was closely associated with the German Reformers, many of whom were portrayed by himself and his pupils. Figures of Luther and Melancthon, and the painter himself, are introduced in his 'Crucifixion' in the Stadtkirche, Weimar, a work engraved in Waagen's *Handbook of Painting* (ed. of 1874), and usually regarded as the artist's most important composition. Three of his copper engravings, dated 1519, 1520, and 1521, represent Luther; and among his other principal works with the burin are 'The Penitence of St John Chrysostom' (1509), and a portrait of the Elector Frederick. His wood-engravings are more numerous, including 'The Passion,' 15 cuts; 'The Martyrdom of the Apostles,' 12 cuts; and 'The Wittenberg Hagiology,' 119 cuts. He had three sons, all of whom were painters.—The second of them, LUCAS, the younger, born 1515, was a burgomaster of Wittenberg. He painted in the manner of his father, and their works are difficult to distinguish, especially as both artists used a similar mark. According to Schuchardt, however, in the productions of the son the crowned serpent appears with the wings folded, instead of erect as in those of the father. His 'Crucifixion,' or 'Nativity,' and a picture of 'The Lord's Vineyard,' symbolical of the progress of the Reformation, are in the Stadtkirche at Wittenberg, and his works may also be studied in Berlin, Munich, and at Dresden, where are his portraits of the Electors Maurice and Augustus, and a 'Crucifixion.' He died at Wittenberg in 1586.

**Cranberry** (*Oxycoccus*), a north temperate and arctic genus of small evergreen shrubs of the order Ericaceæ (sub-order Vaccinioideæ). The only British species (*O. palustris*, or *Vaccinium Oxycoccus*) grows in peaty bogs and marshy grounds, and is a small wiry shrub with creeping thread-like branches, and small oval leaves rolled back at the edges. Large quantities of the fruit, which is chiefly used for making tarts, are collected in some parts of Britain and elsewhere, although the draining of bogs has now made it scarce where it was once plentiful. The berries are an excellent antiscorbutic, and hence furnish an excellent addition to sea stores. Wine is made from them in Siberia, and a beverage made from them is sold in the streets of St Petersburg.—The American Cranberry (*O. macrocarpus*) is of similar distribution, but is a larger and more upright plant, with bigger leaves and berries. The berries are not now collected by means of a rake, but by hand, as the former method bruises them. Large quantities are exported to Europe, and the berries are also imported into Britain from Russia and other parts of northern Europe. Both kinds may be cultivated in gardens, in a peat-soil kept very moist

or round the margin of a pond.—The berries of the Red Whortleberry or Cowberry, the Preiselbeere of the Germans (*Vaccinium Vitis-Idæa*) are sold under the name of cranberries in Aberdeen and



Cranberry (*Oxycoccus palustris*):  
a, flower; b, fruit.

other places, and are used in the same way.—The Tasmanian Cranberry is the fruit of *Astroloma humifusum*, a pretty little trailing Epacridaceous shrub; while in Australia the same name is given to other plants of the same order, notably to *Lissanthe sapida*.

**Cranborne**, VISCOUNT, the courtesy title of the eldest son of the Marquis of Salisbury.

**Cranbrook**, a pleasant little market-town in the Weald of Kent, 46 miles S.E. of London. It has a fine Perpendicular church, and a large trade in hops. From the 14th to the 17th century it was the centre of the broadcloth manufacture introduced by the Flemings.

**Cranbrook**, GATHORNE GATHORNE-HARDY, EARL (1814–1906; created 1892), was born at Biadford, the son of John Hardy of Dunstall Hall, Staffordshire. Educated at Shrewsbury and at Oriel College, Oxford, where he took his B.A. in 1837, he was called to the bar in 1840, and in 1856, after unsuccessfully contesting Bradford nine years earlier, was returned as a Conservative by Leominster. In 1865 he defeated Gladstone in the celebrated Oxford University election; in 1878 he was raised to the peerage as Viscount Cranbrook. He was Under-secretary of State for the Home Department (1858–59), President of the Poor-law Board (1866–67), Home Secretary (1867–68), War Secretary (1874–78), Secretary of State for India (1878–80), and Lord President of the Council (1885–92). See *Life* by his son (1910).

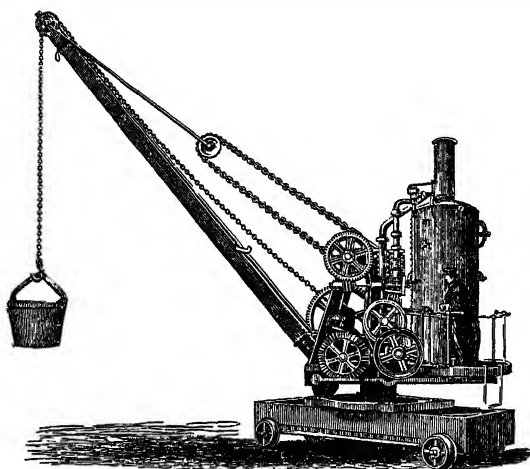
**Crane** (*Grus*), a genus of birds in the family Gruidæ, within the order Gruiformes, which also includes the Rails. They are not nearly related to storks or to herons. They frequent marshes and fens, and also the plains, and eat all sorts of vegetable food, varied occasionally with small animals of many kinds. They seem to be averse to wading. The cranes are all large birds, long-legged, long-necked, and long-billed. They seem to find it a little difficult to get going, but once started they fly steadily and swiftly. In migrating they often cover great distances, and at a great height. They have an elaborate courtship, with dances and trumpetings,\* and are said to be monogamous, pairing for life. The nest is on the ground, and there are usually two eggs. The young birds can run almost from the shell.—The Common Crane (*Grus communis*) bred in East Anglia till the end of the 16th century; nowadays it is not more than a very rare visitor. It is a stately, slate-gray bird, stand-

ing nearly four feet high, with a red, warty patch on its crown, and with remarkable inner secondary feathers which exceed the primaries in length and have free barbs. These bluish-black plumes form a graceful covering of the posterior parts of the body, and used to be much prized for decorative purposes. After the breeding season cranes become gregarious, feeding, playing, and flying together in large numbers. Both during flight and on the ground they utter characteristic trumpet-like notes, which may in part depend on the remarkable coiling of the windpipe within the breast-bone.—In the American Whooping Crane (*G. americana*) the windpipe is said to be four feet long. The flesh of the crane is palatable, especially after a diet of corn. Cranes use their bill as a dagger, and when wounded are dangerous to the eyes of a rash assailant. They may be readily tamed, and exhibit great sagacity; indeed they rank, with parrots and crows, as the wisest of birds.—The Demoiselle Crane, *Grus (Anthropoides) virgo*, with long white ear-tufts, and the Balearic Crane (*Balearica pavonina*) are both reported as having once occurred as stragglers in Britain. There are at least two North American representatives. See Blyth's *Natural History of the Cranes* (London, 1881).

**Crane**, a machine for lifting weights, worked either by hand, or by steam, or by hydraulic, or by electric power. It may be either revolving, the ordinary jib crane being of this form, or non-revolving—the overhead traveller of the workshop belongs to this class. The jib crane may be fixed, in which case the central post is securely fixed in one position, or portable, when the whole crane is mounted on a truck carried by wheels so that the crane may be moved from place to place as required. The simplest form of the first class is the hand crane, which consists of an upright revolving central post, a projecting arm, the jib, which carries a fixed pulley at its extremity, ties, which are attached to the extremity of the jib and to the framework of the crane, the winding drum with its attached gearing, and the lifting chain. The lifting chain or rope is secured to the load by an eye or hook; it then passes over the fixed pulley, and, finally, round the drum or cylinder; suitable toothed wheel gearing, worked by a handle, revolves this drum, and thus winds up, or unwinds, the rope or chain, and so raises or lowers the load. The effort applied by the men is magnified—if we neglect friction losses—in the same proportion that the peripheral speed of the handles is reduced by the gearing interposed between handle axis and drum axis. The revolving motion of the crane post enables the load to be deposited at any point within the sweep of the jib. In some forms the jib is hollow, the lifting chain then passes down inside it, diminishing the risk of fouling; in other forms the jib is of a curved form which enables the full benefit of the lift to be obtained. Hand cranes can only be used for comparatively light loads, and the speed of lift is slow; for heavy lifts and quick work power cranes are essential. The steam crane is still largely employed, and has certain advantages; it is self-contained, can, when portable, be moved by its own power to any required position; it is quick in action, economical in operation, and can be utilised for a wide range of work. Where, however, as in docks, railway yards, &c., a large number of cranes of similar type have to be installed, then it is cheaper to build a central power station and to distribute the power to each crane either hydraulically or electrically; the latter is the latest method, and has in certain cases a considerable advantage over the hydraulic system; it is now almost entirely employed for workshop travellers.

Hydraulic cranes, largely used for dock work and in steel-works, are simpler in construction

than steam cranes, much gearing being done away with; the water in the operating cylinder is under



great pressure, 700 to 1100 lb. per sq. inch. The power given out by the hydraulic cylinder is reduced and the speed of the lift made greater than that of the cylinder ram by using systems of pulleys in the inverse order; the lifting chain is attached to the cylinder and then passes round pulleys fixed to the ram head, and round other pulleys fixed to the cylinder frame on its way to the jib pulley. In the steam crane there are generally two direct-acting steam cylinders, which replace the two handles worked by hand. The illustration shows a portable steam crane. The truck carries a central post, the rest of the crane being carried on a base plate capable of rotating around the post; the steam boiler is placed in such a position on the base plate that it acts as a counterbalance to the load which has to be lifted. By means of gearing and clutches, operated by the engineman by hand or foot levers, the engine can perform the following operations: (1) lower or raise the outer end of the jib and thus increase the radius of the circle within which the load can be lifted or deposited; (2) slew the crane; (3) propel the truck along the rails; (4) hoist the loads. For the last three operations the gearing is arranged to give two speeds, slow or quick, either of which can be used, depending on the nature of the work. This crane can handle loads of 5 to 7 tons as a maximum.

Electric cranes are in most essentials similar to steam cranes, the electric motor taking the place of the boiler and steam cylinder, the series wound continuous current motor being most commonly used, as it has certain advantages, but other types are also used.

In all cranes powerful brakes are essential: barrel cranes are usually fitted with hand brakes; in steam cranes the driver puts the brakes on by use of a handle or foot treadle, so the brake is not automatic; in electric cranes it is more usual to arrange for the brakes to be on when there is no current passing through the motor—hence, as soon as the motor is shut off, or should a failure of current occur, the brake is at once put on. When in an ordinary crane the jib is raised or lowered in order to alter its radius, the load is also raised or lowered; several devices have been designed to get over this difficulty, and thus enable the load to remain at the same level while the jib is pivoted up or down. The mechanical efficiency of the lifting gear in modern cranes is about 85 per cent., and in a first-class electric crane about 70 per

cent of the electrical energy supplied to its motor is utilised in lifting the load.

Stationary power cranes are often of great size and consequent complexity; the 'hammer-headed' type has a lofty steel-braced tower on which is carried a horizontal double cantilever, the jib, which can rotate; this carries at one end the lifting crab, and at the other end the necessary lifting machinery and counter-weights. In this type, as in the Titan, the load can be moved inwards or outwards along the jib without altering its level. Such cranes are made up to a capacity of 200 tons. In the Titan form, much used in harbour and breakwater construction, the crane is portable.

The overhead traveller in a workshop or factory is a non-revolving crane; its essential parts are the main cross girders, the crab which moves to and fro along the cross girders on rails supported by them, two end carriages, on which the cross girders are supported, carrying wheels; these wheels run on rails carried by the longitudinal gantry girders; the crab can, therefore, lift and shift the load from one part to any other part of the shop by the following two motions—the crab moving to and fro along the cross girder, and the cross girder carrying the crab moving to and fro along the longitudinal girder by means of the end carriage wheels.

See *Cranes, their Construction, Mechanical Equipment, and Working*, by A. Bottcher, translated by A. Tolhausen.

**Crane, STEPHEN** (1871–1900), novelist, born at Newark, New Jersey, received a university education, was a war-correspondent in Turkey in 1897, and from 1891 became known as an eccentric poet and novelist of promise—his *Red Badge of Courage* (1896), a story of the Civil War, being his most notable work. Others were *George's Mother*, *The Little Regiment*, *The Open Boat*, *Whilomville Stories*, *The Monster*; besides *On Active Service*, *Wounds in the Rain*, and *Great Battles of the World*. In his later years he lived in England.

**Crane, THOMAS FRIDERIC**, folklorist, was born in New York city, 12th July 1844, graduated at Princeton in 1864, and from 1868 taught modern languages in Cornell University, in 1881–1909 as professor of Romance Languages. He wrote much on the literary history and philology of the Romance languages, and on the origin and diffusion of popular tales, and was one of the founders of the American Folklore Society (1888). Among his books are *Italian Popular Tales* (1885); *Le Romantisme Français* (1887); *Les Chansons Populaires de la France* (1891); and an edition (1890), for the English Folklore Society, of the *Exempla* or illustrative stories contained in the *sermões vulgares* of Jacques de Vitry, Bishop of Acre (died 1240).

**Crane, WALTER** (1845–1915), painter and socialist, was born at Liverpool, the son of an artist, Thomas Crane (1808–59). He himself was trained as an artist, and his earlier as well as much of his later work consists of book-illustrations. Among these may be named his series of 'Toy-books' (1869–75), 'The Baby's Opera' (1877), and 'The Sirens Three,' in which last the poem as well as the designs was his work. In 1862 he began to exhibit paintings at the Royal Academy, showing in that year 'The Lady of Shalott'; and he was a constant contributor to the Grosvenor Gallery from its foundation in 1877 till 1888. His pictures nearly always deal, in a somewhat decorative and archaic fashion, with subjects of an imaginative nature, such as 'The Riddle of the Sphinx' (1887). He also produced many very delicate landscape subjects in

water-colours; and published poems, illustrated by himself, *The Claims of Decorative Art* (1892), and *An Artist's Reminiscences* (1907). Associate (1889) and member (1902) of the Painters in Water colours, he was in 1893-96 art director to Manchester, and in 1898-99 principal of the Royal College of Art, South Kensington.

**Crane**, WILLIAM HENRY, comedian, born in 1845 at Leicester, Massachusetts, made his debut in opera at Utica, N.Y., but from 1870 became conspicuous as an exponent on the stage of eccentric American character, as in *David Harum*.

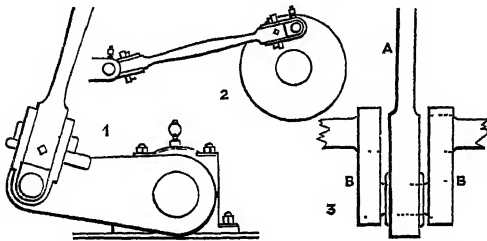
**Crane-fly**. See DADDY LONG-LEGS.

**Crane's-bill**. See GERANIOUM.

**Crananore** (properly *Kodungalūr*), a taluk in Cochin state, on one of the openings of the great Cochin backwater, 18 miles N. of Cochin town; pop. about 33,000. It is the traditional scene of St Thomas's labours. The Syrian Christians were established here before the 9th century, and the Jews' settlement was probably still earlier. It was taken from the Portuguese by the Dutch in 1661; was seized by Tippoo in 1776, retaken, sold, and destroyed and abandoned by Tippoo in 1789.

**Craniology**. See SKULL, ETHNOLOGY.

**Crank**, in Machinery, is a lever or arm on a shaft, driven by hand (e.g. a winch-handle), or by a connecting-rod, its object being to convert reciprocating motion into rotary motion. Engine-cranks which convert the to and fro motion of the piston into continuous rotation of crank-shaft are connected to the piston-rod end by the connecting-rod. They are, when single, of steel, wrought-iron, or cast-iron, the crank in this case being either a simple arm, enlarged at one end to fit over the shaft, and with a pin at the other end embraced by the rod end (fig. 1); or else a disc centred on the shaft, with crank-pin as before (fig. 2). This last form is well balanced. When double, as is usual in large engines (fig. 3), they are now often built up



of steel, the two arms being shrunk on to the shaft, and pin on to them. In two positions during each turn, a connecting-rod exerts no power of rotation. These are when rod A and crank-arms B are parallel (as in fig. 3 and opposite position), and are the *dead centres*; all the push or pull of the rod only causes pressure on shaft-bearings. To carry the crank over these points either a heavy wheel (fly-wheel) is attached to the shaft, which stores up energy during other parts of the revolution, and gives it out at these points, or else two or more cranks are so placed on the shaft that when one is on its dead centre, the others are exerting nearly their maximum effort, which is when rod and crank are at right angles. See TREAD-WHEEL.

**Cranmer**, THOMAS, Archbishop of Canterbury, was born of a good old family at Aslacton, Nottinghamshire, 2d July 1489. He learned his grammar of 'a rude parish clerk,' a 'marvellous severe and cruel schoolmaster,' who seems to have permanently cowed his spirit; still, his father trained him in all manly exercises, so that even

as primate he feared not to ride the roughest horse, and was ever a keen hunter. By his widowed mother he was sent in 1503 to Jesus College, Cambridge, where in 1510 he obtained a fellowship. He forfeited it by his marriage with 'black Joan' of the Dolphin tavern, but regained it on her death in childhood before the year's grace was up; and taking orders in 1523, proceeded D.D., and became a divinity tutor. During the quarter of a century that he resided at Cambridge he did not greatly distinguish himself; Erasmus never so much as mentions him; he was just a clever, hard-reading college don.

But in the summer of 1529 the plague was raging in Cambridge, and Cranmer removed with two pupils to Waltham. Here he met Fox and Gardiner, the king's almoner and secretary; and their talk turning on the divorce, Cranmer suggested that Henry might satisfy his conscience of the nullity of his first marriage by an appeal to the universities of Christendom. The suggestion pleased Henry; he exclaimed, 'Who is this Dr Cranmer? I will speak to him. Marry! I trow he has got the right sow by the ear.' So Cranmer became a counsel in the suit. He was appointed a royal chaplain and archdeacon of Taunton; was attached to the household of Anne Boleyn's father (Anne at the time being Henry's paramour); penned a treatise to promulgate his view; and was sent on two embassies, to Italy in 1530, and to Germany in the middle of 1532. At Rome the pope made him grand penitentiary of England; at Nuremberg he had married a niece of the Reformer Osiander—a marriage uncanonical but not then illegal—when a royal summons reached him to return as Warham's successor in the see of Canterbury. He sent his wife secretly over, and himself following slowly, was consecrated on 30th March 1533, four days after the arrival of the eleven customary bulls from Rome. He took the oath of allegiance to the pope, with a protest that he took it 'for form sake,' and with, as was usual, a contradictory oath of allegiance to the king.

That Henry looked for a pliable judge in Cranmer no man could doubt, least of all Cranmer himself, who in May pronounced Catharine's marriage null and void *ab initio*, and Anne's, four months earlier, valid; and who in September stood godfather to Anne's daughter Elizabeth. It was the samethroughout the entire reign. Cranmer annulled Henry's marriage with Anne Boleyn (1536), divorced him from Anne of Cleves (1540), informed him of Catharine Howard's prenuptial frailty, and strove to coax her into confessing it (1541). Sometimes he raised a voice of timid entreaty, on Anne Boleyn's behalf, on Cromwell's; still, if Henry said they were guilty, guilty they needs must be. He did what he dared to oppose the Six Articles (1539), naturally, since by one of them the marriage of priests was rendered felony, punishable with death; but he failed to stick to his opposition, and sent away his own wife to Germany, whence he did not recall her till 1548.

A kindly, humane soul, yet he was not ahead of his compeers—More, for instance, or Calvin—in the matter of religious toleration. We cannot acquit him of complicity in the burning of Frith and Lambert for denying the doctrine of Transubstantiation (1533-38), of Friar Forest for upholding the papal supremacy (1538), of two Anabaptists, a man and a woman (1538), of Joan Bocher for denying Christ's humanity (1550), and of a Dutch Arian (1551). In the death, however, of Anne Askew (q.v.) he seems to have borne no part; nor is there one word of truth in Foxe's legend that he coerced Edward VI. into signing the warrant for Joan Bocher's execution. With the dissolution of the monasteries he had little to do; but he

bestirred himself in promoting the translation of the Bible (q.v.) and a service-book, in curtailing the number of holy days, in the suppression of the cult of St Thomas of Canterbury, and in negotiating an eirenicon with foreign Reformers. On the path, indeed, towards Protestantism, he was ever in advance of Henry VIII., though to Henry he surrendered his right of private judgment as completely as ever Ultramontane to Pope. Thus, writing in 1540 on the sacraments, he could wind up a thesis with 'This is mine opinion and sentence at this present, which nevertheless I do not temerariouly define, but remit the judgment thereof wholly unto your majesty.' Henry repaid him with implicit confidence, and twice saved him from the plots of his enemies (1543-45).

On 28th January 1547 Henry died, and Cranmer sang mass of requiem for his soul. He had been slowly drifting into Protestantism; but now the inrushing tide swept him onward through all those religious changes by which the mass was converted into a communion—changes stereotyped in the Second Prayer-book of 1552. See ENGLAND (CHURCH OF), PRAYER-BOOK, ARTICLES, HOMILIES, CATECHISM. During this as during the preceding reign he meddled little with affairs of state, though he was one of the council of regency. What he did do was not too creditable. In gross violation of the canon law he signed Seymour's death-warrant; he had a chief hand in the deposition and imprisonment of Bishops Bonner, Gardiner, and Day; and won over by the dying boy-king's pleading, he reluctantly subscribed the instrument diverting the succession from Mary to Lady Jane Grey (1553). Herein he was guilty of conscious perjury, yet, the twelve days' reign over, he made no attempt to flee. On the contrary, he was roused to an outburst of indignation, rare with him, by a report that he had offered to restore the mass, had indeed restored it at Canterbury. In the heat of the moment he dashed off a letter, denouncing that report as a lie of the devil, which letter, unrevised, being prematurely circulated, on 14th September Cranmer was sent to the Tower, on 13th November was arraigned for treason, and, pleading guilty, was condemned to die. If he had been executed on that sentence, little could have been urged against his executioners, but he was reserved to be tried as a heretic, and, perchance, to recant his heresy. In March 1554 he was removed with Ridley and Latimer, to Bocardo, the common gaol at Oxford. He bore himself bravely and discreetly in a scholastic disputation, as also upon his trial before the papal commissioner, whose jurisdiction he refused to recognise. In October from the gaol he witnessed Latimer's and Ridley's martyrdom; in December judgment was pronounced against him; and on 14th February 1556 he was formally degraded, stripped of the mock vestments in which they had arrayed him. And now in rapid succession he signed form after form of recantation, seven in all, each more submissive than its predecessor. The last he transcribed on the morning of 21st March, and forthwith they brought him to St Mary's Church. If not before, he learned at least now from the sermon that he must burn; anyhow, when they looked for him to read his recantation, instead he retracted all that 'for fear of death' his hand had written 'contrary to the truth.' With a cheerful countenance he then hastened to the stake, and, fire being put to him, thrust his right hand into the flame, and kept it there, crying: 'This hath offended! Oh this unworthy hand! Very soon he was dead.

Among Cranmer's forty-two writings, the chief of which have been edited by the Rev. H. Jenkyns (4 vols. 1833) and the Rev. J. E. Cox (2 vols. Parker Society, 1844-46), may be noticed his

prefaces to the Bible (1540) and the First Prayer-book (1549); the *Reformatio Legum Ecclesiasticarum*—his revision, happily abortive, of the Canon Law (q.v.)—first published in 1571; and *A Defence of the True and Catholic Doctrine of the Sacrament* (1550).

See *Narratives of the Reformation*, edited by J. G. Nichols (Camden Society, 1859), with a sketch of Cranmer by Ralph Morice, his secretary; Foxe's *Acts and Monuments*; Cooper's *Athenæ Cantabrigienses* (1858); Mr Gairdner's article in the *Dictionary of National Biography* (vol. xii. 1888); Strype's *Ecclesiastical Memorials* (1721); Shakespeare's *Henry VIII.* and Tennyson's *Queen Mary*; Lives of Cranmer by Strype (1694), Gilpin (1784), Todd (2 vols. 1831, with fine portrait), Le Bas (2 vols. 1833), Dean Hook, *Lives of the Archbishops* (vols. vi.-vii. 1868), Collette (1887), Canon Mason (1898), A. D. Innes (1900), and A. F. Pollard (1905); also C. H. Smyth, *'Cranmer and the Reformation under Edward VI.* (1926).

**Crannog** (Gaelic *crann*, 'a tree,') a species of lake-dwelling common in Scotland and Ireland, which consisted of an islet wholly or partially built up from the bottom of the loch by masses of brush-wood, steadied by piling, and consolidated by stones and gravel, the whole being surmounted above the level of the water by a platform of timber, earth and stones, on which were wooden huts, often surrounded by palisades for better security. The word first occurs in historical documents in the Register of the Privy-council of Scotland in 1608, when the 'Crannokis of the Ylis' are classed with 'houssis of defence and strongholds' to be given up to the king. See LAKE-DWELLINGS.

**Crape**, a thin fabric made of silk, which has been tightly twisted, without removing the natural gum with which it is covered when spun by the worm. It is woven as a thin gauze, then boiled to extract the gum, which causes the threads partially to untwist, and thus gives a waved and rough appearance to the fabric. It is usually dyed black, and used for mourning apparel. The nature of the finishing processes in the making of crape is kept secret by European manufacturers. In Japan, crape is manufactured by using alternately weft threads twisted in opposite directions, and these are of a much closer twist than ordinary threads. When the piece is woven it is dipped in cold, then in hot, and again in cold water in rapid succession, and afterwards rolled and dried. The effect of these operations on the weft threads produces the crisp surface. Chinese and Japanese crapes are often white, with coloured designs, or in single colours, and used for shawls, scarfs, &c.

**Crashaw, RICHARD** (circa 1613-49), an English religious poet, was the son of a clergyman in the English Church, and was born in London about 1613. He was educated at the Charterhouse, and at Cambridge, where he obtained a fellowship at Peterhouse in 1637. His leanings towards Roman Catholicism prevented him from receiving Anglican orders, and in 1644 he was ejected from his fellowship by the parliament for refusing to take the Covenant. He went to Paris, adopted the Roman Catholic faith, and suffered great pecuniary distress, until about 1648, through Cowley's influence, he was introduced to Queen Henrietta Maria, who recommended him to certain dignitaries of the church in Italy. He obtained a humble office in the household of Cardinal Palotta, but in April 1649, a few months before his death, he became sub-canon of the church of Our Lady of Loretto. In 1634 Crashaw published a volume of Latin poems, *Epigrammatum Sacrorum Liber* (2d ed. 1670), in which appeared the famous line on the miracle at Cana:

*'Nympha pudica Deum vidit et erubuit'*

(The modest water saw its God and blushed).

In 1646 appeared his *Steps to the Temple; Sacred Poems, with other Delights of the Muses*—in which

there is much fervid poetry. The title of this collection, which is due to the editor, not the author, refers to its affinity with George Herbert's *Temple*. An edition (the third) was published at Paris in 1652, under the title *Carmen Deo Nostro*, with 12 vignette engravings designed by Crashaw. Crashaw has much in common with George Herbert and with Henry Vaughan, 'the Silurist'; though his conceits are more strained, his imagination is too copious, his subtlety too intricate. For him religion is 'all raptures and ecstasies, burning halos, quiring voices, soaring and shimmering wings'; St Teresa and Juan de Dios were his models. He is a great master of musical English versification, the first to succeed in irregular rhyming verse. Coleridge admitted his direct influence in *Christabel*; parallels have been found in Shelley and Swinburne; and many poets and critics in the second half of the 19th century recognised Crashaw's fascination.

There are editions of Crashaw by Turnbull (1858) and Grosart (1872-88), and of his poems by J. E. Tutin (1887 and 1900) and A. R. Waller (1904). See Mario Praz, *Secentismo e Marinismo in Inghilterra: John Donne-Richard Crashaw* (Flor. 1925).

**Crassulaceæ**, a family of succulent herbaceous or shrubby plants allied to the Saxifragæ. They grow chiefly in warm and temperate countries, especially South Africa and Mexico, and in dry, sunny situations. *Sedum* (stone-crop) and *Sempervivum* (house-leek) are the most familiar genera, largely used for bedding out and on rockwork.

**Crassus**, the surname of several old Roman families, among which that of the Licinii was most remarkable.—(1) LUCIUS LICINIUS, born in 140 B.C., was the best orator of his age, and was as distinguished for his wit as for his rectitude in the capacity of proconsul of Gaul. In 95 he was elected consul, along with Quintus Scævola, who had been his colleague in all his previous offices. During their consulship was enacted a rigorous law banishing from Rome all who had not the full rights of citizens, which imbibed the feelings of foreigners toward Rome, and was one of the chief causes of the Social War. As censor in 92 Crassus closed all the schools of the rhetoricians, believing that they exercised a bad influence on the minds of young men. He died in 91 B.C., a few days after vigorously opposing in the senate the democratic consul L. Philippus. Crassus is one of the speakers in Cicero's *De Oratore*, and indeed is the representative of the writer's own opinions.—(2) MARCUS LICINIUS, surnamed *Dives*, the triumvir, was born sometime before 115 B.C. His father was a partisan of Sulla, and on the return of Marius and Cinna to Rome in 87 made away with himself. Cinna spared the boy's life, but subjected him to a jealous and dangerous surveillance, to escape which he went to Spain. He afterwards joined Sulla (83), and distinguished himself in the battle against the Samnites at the gates of Rome. As prætor he crushed the Servile revolt by the conquest of Spartacus at the battle of Lucania (71), and in the following year was made consul with Pompey, a colleague whom he hated. On the other hand, Cæsar valued the friendship of Crassus, the most wealthy of Roman citizens. He was a keen and far-seeing speculator, and devoted his entire energies to the accumulation of money. We are told that he even bought clever slaves, and had them taught lucrative arts that he might enjoy the profits. During his consulate, Crassus gave a feast to the people, which was spread on 10,000 tables, and distributed to every citizen a provision of corn for three months. Plutarch estimates his wealth at more than 7000 talents, and Pliny states that his lands were worth 8000 talents (say £2,000,000). About 60, Cæsar, Pompey, and Crassus entered into

a private arrangement for their common benefit, which pactio is known as the first *triumvirate*. In 55, as consul with Pompey, Crassus had Syria assigned him for his province, and began to make preparations of war against the Parthians, hoping both for glory and for gain. The latter end he effected in the meantime by plundering the towns and temples in Syria. At length, however, he set out, but was misled by a treacherous guide, and utterly defeated in the plains of Mesopotamia by the Parthians. Crassus now retreated to the town of Carrhæ, intending to pass into Armenia; but was beguiled into a conference with the Parthian general, Surenas, and was slain at the appointed place of meeting. His head was cut off and sent to Orodes, who is said to have poured melted gold into the dead lips, saying: 'Sate thyself now with that of which in life thou wert so greedy.' His questor, Cassius, with 500 cavalry, escaped into Syria; but the remaining Romans were scattered and made prisoners, or put to death.

**Cratægus**, a genus of Rosaceæ, sub-order Pomeæ, very nearly allied to *Mespilus* (Medlar) and *Pyrus* (Pear, Apple, &c.), but distinguished by the acute calycine segments, and by the round or oval fruit, closed at the apex, and concealing the upper end of the bony cells. The species are pretty numerous, natives of the temperate parts of the northern hemisphere, and in general have flowers in beautiful terminal corymbs. They are all large shrubs or small trees, more or less spiny, whence the name Thorn has been very generally applied to them. The only native of Britain is the common Hawthorn (q.v.), (*Cratægus Oxyacantha*). Most of the species resemble it considerably in habit, size, form of leaf, &c. A number of them are now frequent in plantations and shrubberies in Britain, of which perhaps the most common is the Cock's-spur Thorn (*C. Crus-galli*), a native of North America from Canada to Carolina. Its leaves are not lobed; its fruit rather larger than that of the hawthorn. The Azarole (*C. Azarolus*), a native of the south of Europe, and the Aronia (*C. sinica*), a native of the Levant, are occasionally cultivated for their fruit. *C. orientalis* (or *odoratissima*) and *C. tanacetifolia* have also fruit of a considerable size. *C. Pyracantha* differs much in appearance from most of the genus; being a pretty evergreen shrub, with rich clusters of red berries.

**Cratinus**, a Greek comic poet born about 519 B.C., did not begin to exhibit till sixty-five, and died in 424. Next to his younger contemporaries, Eupolis and Aristophanes, he best represents the Old Attic comedy; but only fragments of his works have come down to us.—A younger CRATINUS belonged to the Middle School.

**Cratippus**, a peripatetic philosopher, a native of Mitylene and a contemporary of Cicero, whose son Marcus he instructed at Athens in 44 B.C.—Of the works of another CRATIPPUS, a continuator of Thucydides, only fragments have survived—one of them found at Oxyrhynchus in the 20th century.

**Craufurd**, ROBERT (1764-1812), major-general, born at Newark in Ayrshire, served against Tippoo Saib and in Ireland in 1798, gained credit even under Whitelocke at Buenos Aires, commanded a brigade in Sir John Moore's retreat, distinguished himself in important commands in the Peninsular campaigns, and fell at Ciudad Rodrigo. Probably the most brilliant leader of light troops in the Peninsula, he was headstrong, rash, and liable to outbursts of passion. Wellington was irritated by his risky operations on the Coa, but fully recognised his merit. See Innes Shand's *Wellington's Lieutenants* (1903).

**Craven** is a hill district in the north of the West Riding of Yorkshire, at the sources of the Aire and Wharfe.

**Craven, ELIZABETH, COUNTESS OF (1750-1828)**, a daughter of Lord Berkeley, married Lord Craven, but separated from him, and after his death in 1791 became Margravine of Anspach. She wrote books of travel, plays, and interesting *Memoirs*.—**LOUISA, COUNTESS OF CRAVEN (1785-1860)**, daughter of a Norwich soap-dealer called Brunton, retired from the stage in 1807 to marry another Earl of Craven.

**Craven, MRS (1808-91)**, was born in London, the daughter of a French *émigré*, who after the Restoration was ambassador at St Petersburg. Pauline de la Feronays married in 1834 Augustus Craven (died 1884), an English diplomatist, a grandson of the Margravine of Anspach. She wrote *Anne Sévérin* and other novels, a (French) Life of Lady Georgiana Fullerton, and the famous *Récit d'une Sœur*, a record of tender affection, bereavement, and mystical Catholic piety.

**Craven, WILLIAM, EARL OF (1606-97)**, served under the Prince of Orange and Gustavus Adolphus, and was so devoted to the cause of the Princess Palatine of the Rhine that it was said he was married to her. He suffered for his loyalty to Charles I., and was made Earl of Craven in 1664.

**Crawford, THOMAS (1814-57)**, sculptor, born in New York city, settled in Rome, where he worked under Thorwaldsen. His later works include the Washington monument at Richmond, and the bronze Liberty on the capitol at Washington. Mrs Hugh Fraser, author of *A Diplomatist's Wife in Japan* and many novels, is a daughter.

**FRANCIS MARION CRAWFORD**, his son (1854-1909), was born in Tuscany, and was educated at Concord (N.H.), Cambridge University, Heidelberg, and Rome. In India he studied Sanskrit, and during 1879-80 was engaged in press work at Allahabad, where he was admitted to the Catholic Church. His first novel, *Mr Isaacs* (1882), was a book of unusual merit, seizing on a new romantic element in modern Oriental life. Among its successors were *Dr Claudius* and *To Leeward* (1883); *A Roman Singer*, and *An American Politician* (1884); *Zoroaster* (1885); *The Story of a Lonely Parish*, and *Saracinesca* (1886); *Marzio's Crucifix*, and *Paul Patoff* (1887); *With the Immortals* (1888); *Sant'Iario* (1889); *A Cigarette Maker's Romance*, *Khaled*, and *The Witch of Prague* (1891); *Don Orsino* (1892); *Pietro Ghisleri*, *Marion Darche*, and *The Children of the King* (1893); *Katherine Lauderdale*, *Love in Idleness* (1894); *The Ralstons* (1895); *Taquasara* (1896); and *Corleone* (1897). *Constantinople* (1898) was a description of the city. *Ave Roma Immortalis*, *The Rulers of the South* (reprinted in 1904 as *Sicily, Calabria, and Malta*), and *Venetian Gleanings* (1898-1905) were historical works. *Marietta*, *Cecilia*, *Whosoever Shall Offend*, *Soprano*, *A Lady of Rome*, *Arethusa* appeared between 1901 and 1907.

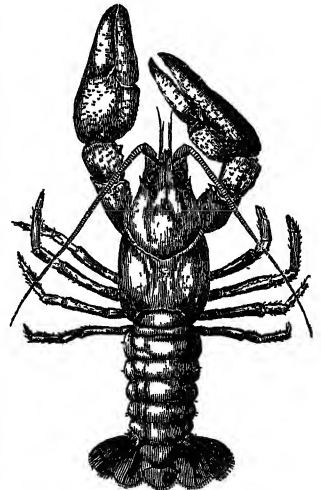
**Crawford, WILLIAM HARRIS (1772-1834)**, born in Virginia, was U.S. senator, minister to France, secretary of the treasury in 1816, and Democratic candidate for the presidency in 1824.

**Crawford and Balcarres, ALEXANDER WILLIAM CRAWFORD LINDSAY, EARL OF**, born in 1812, was educated at Eton and Cambridge, and succeeded his father in 1869. He gained a high reputation for his works on religion, philosophy, and art; and his researches into the annals of his own house enabled him in 1848 to prepare the case for his father's (Lord Balcarres's) claims to the premier earldom of Scotland, as 24th Earl of Crawford (cre. 1398). Besides *Lives of the Lindsays* (1835), and the *Earldom of Mar* (1882), he wrote *Letters on the Holy Land* (1838), *Progression by Antagonism* (1846), and *Sketches of the History of Christian Art* (1847), by which he is best remembered. His dominant idea, however, was, the formation of a

perfect library, to which for nearly half a century he devoted great industry and learning; and the library at Haigh Hall, near Wigan, was probably unrivalled among private collections. He died in Florence, 13th December 1880; his body, which for over seven months had been missing from the mausoleum at Dunecht, near Aberdeen, was found in a wood close by in July 1882.—His son and successor, **JAMES LUDOVIC LINDSAY (1847-1913)**, was elected president of the Royal Astronomical Society in 1878-80, and F.R.S. in 1878, and received the degree of LL.D from Edinburgh University in 1882. In 1888 he presented to the nation the admirably equipped observatory at his seat of Dunecht, 12 miles W. of Aberdeen; and the apparatus, with the magnificent astronomical library, were transferred to the Royal Observatory on Blackford Hill, Edinburgh. See **LINDSAY**.

**Crayer, CASPAR DE**, a Flemish historical and portrait painter, was born at Antwerp in 1584. He lived first at Brussels, and afterwards at Ghent, where he died in 1669. The churches at Ghent contain many of his paintings, which are also common all over Flanders.

**Crayfish** (*Astacus*, Fr. *écrevisse*), a large freshwater crustacean, in the long-tailed (*Macrura*) division of the order Decapoda. The body consists of two great divisions, the head and thorax protected by a rigid shield, and the abdomen or tail of six separate rings. The integument exhibits the characteristic Arthropod combination of lime and Chitin (q.v.). There are altogether twenty segments and nineteen pairs of appendages, not including the eyes. The sensitive antennules and antennae, the six appendages crowded round the mouth, the great claws, the four walking legs, the little swimmerets under the tail, and the pair of large terminal paddles make up the series. These appendages, so different in form and function, are all homologous.



Crayfish (*Astacus fluviatilis*).

The muscles are well developed for working the tail, the appendages, and the stomach mill. The nervous system consists of brain and ventral chain of ganglia. The eyes are stalked and compound; the ear-sacs with their fringes of auditory hairs and inclosed foreign particles floating in a gelatinous fluid lie at the bases of the antennules, which also bear olfactory bristles. The most remarkable feature in the alimentary system is the gastric mill, a complex masticating apparatus in the fore-gut, the essential mechanism of which consists in the rapid clashing of three teeth—one dorsal and two lateral. On the walls of the stomach there are two limy concretions (gastroliths) which store lime preliminary to moulting. There is a large digestive gland opening into the small mid-gut; the hind-gut is long and straight. The circulatory system consists of a dorsal heart, whence the blood passes by arteries and capillaries to the body, thence

by venous channels to the gills, and thence back again to the heart. The *respiratory system* includes twenty pairs of feathery gills lying under the shelter of the sides of the great shield. The ceaseless baling movement of one of the mouth appendages secures a current of water. The *excretory system* is represented by a 'green-gland' or kidney, lying behind the base of the antennæ, on which its opening, shielded by a prominent knob, may be readily seen. The *reproductive system* consists of three-lobed essential organs with paired ducts opening on the thoracic legs.

The eggs are laid in November or December, and are glued by a secretion to the abdominal legs of the mother. The young are hatched in May to July. They do not differ in any important features from the adults, and the crayfish has thus very much abbreviated the typical life-history. The young escape from the inclosing egg-cases, to which they, however, adhere for a while by means of the strongly incurved claw-tips. The female with its crowd of attached young presents a curious and interesting appearance. The young crayfish moults eight times during its first year of life, five times in the second, twice in the third. The male is adult in its third year, and continues for some time at any rate to moult twice a year. The female is mature in the fourth year, and has only one annual moult. The moulting is in part the result of the fact that the inclosing armature does not grow with the growth of the body. Reserve products of lime and glycogen accumulate before moulting; the old shell virtually dies; a new armature (at first soft) begins to be formed; the animal grows; the old husk, including the hard structures of the stomach, is cast; and the crayfish is left perfectly limp and helpless. The fatigue of the process is shown in the great mortality.

The crayfish is exclusively a fresh-water form, barring the fact that some related genera (*Engæus*, *Cambarus*, *Parastacus*) appear to be for the most part terrestrial. They usually make burrows by the sides of streams, and often lie at the mouths of their holes in wait for passing prey. They are chiefly nocturnal. In their diet they are strikingly omnivorous, eating most things available, from worms to water-voles. Dead animals, molluscs, worms, and insect larvæ form their chief sources of supply. In captivity they may be kept for a while on bread crumbs. In certain cases they do not refrain from eating one another. Their chief enemies are said to be eels and otters.

Crayfishes, though fresh-water forms, have a peculiarly wide distribution. The English and Irish crayfish is a variety of *A. fluviatilis*, and is by authorities designated *A. torrentium*. It occurs all over Europe, except in Scandinavia and Scotland, but is locally limited by the presence of sufficient lime in the water for shell-forming purposes. Another variety of *A. fluviatilis*, *A. nobilis*, is also widely distributed on the Continent. This variety is much cultivated in France and elsewhere for the sake of its dainty though not abundant flesh. They are in best condition from May to August. In ponds for artificial breeding, the animals often fall victims to disease, probably of a fungoid character. In rivers they are sometimes netted, sometimes lured by a light in the darkness. Numerous other species occur both in the Old and New World, and along with the southern forms (*Parastacidae*) may be fairly called cosmopolitan. In the United States, where they are very common, their burrows sometimes cause *crevasses* or ruptures in the artificial dykes of rivers. The largest species measures over a foot in length. Crayfish-like forms appear in the Middle Mesozoic times, and a somewhat doubtful *Astacus* (*A. philippi*) has been found in the Carboniferous Limestone of Ireland. It is

probable that they were originally marine. The term crayfish is often extended to the nearly related marine form, the Norway Lobster or *Nephrops norvegicus* (see LOBSTER); and fishmongers often reserve the form 'crawfish' for the 'spiny lobster.' See Huxley's *Crayfish* and the article CRUSTACEA.

**Crayon** (Fr., 'a pencil'). Though used in French, and occasionally in English, to designate pencils generally, including those made of lead, the word crayon is more frequently applied in England to those small cylinders of charcoal, or of pipe-clay or chalk coloured with various pigments, which are used for drawing. Cohesiveness is given to the paste of which the cylinders are formed by means of gum, wax, soap, &c. Crayon drawings are often remarkable for the delicacy and softness with which objects are represented, but they are deficient in power. See PENCIL, CHALK.

**Cream** is the fat of Milk (q.v.). It exists in minute globules throughout the bulk of milk as it comes from the cow. In virtue of being lighter than the watery portion of milk, cream gradually rises and forms a thin yellowish greasy layer on the surface. *Deconshure cream*, or *clouted* (i.e. clotted) *cream*, is obtained by heating milk in a shallow wide pan on a hot plate or over a slow charcoal-fire. The milk should stand in the pan for twenty-four hours before heating. It usually takes from half an hour to three-quarters of an hour to heat the milk completely; but it must not boil. It then stands for twenty-four hours, when the cream is skimmed off, and a little sugar thrown on the top. *Whipped cream* is cream or milk beat up with white of egg by means of a whisk. *Lemon cream*, *Vanilla cream*, &c. are made with milk, white of egg, and sugar, and flavoured. *Cream cheese* may be made of rich cream, or cream, milk, and rennet, tied up in a clean wet cloth, and kept for some days in a cool place, then put in a finer cloth, and placed for a day or two in a mould, with a weight upon it (see CHEESE). The term cream is used frequently for anything superior in quality; thus the French, in referring to persons in the height of fashion, speak of *la crème de la crème*, 'the cream of cream.'

**CREAM SEPARATORS** (Centrifugal).—The best-known forms are the 'Alfa Laval' and 'Melotte.' Though they differ considerably in form and in detail, the principle involved in the work of separating the cream is common to all. Advantage is taken of the difference existing between the specific gravity of cream and the watery part of milk. While yet warm the milk coming from the cow is run into a strong, spherical, steel vessel revolving at high speed. As the milk is carried round within the vessel (whether revolving horizontally or vertically) it rises up the sides and stands as a wall, thus forming a lining of milk while the speed is maintained. The heavier part inclines outwards, and the light cream is forced inwards and forms an inner layer. From the positions indicated the separated cream and milk are conducted into different channels, and finally into different vessel receptacles. The advantages, as compared with the old method of flat setting (see MILK), are that the cream is got off immediately; no time is allowed for the development of acidity in either the skim milk or cream, and more of the cream present can be removed—the proportion being as 13 is to 11. Small machines driven by hand, separating 16 gallons of milk an hour, do not give quite so good results as those driven by steam. A steam turbine has been adopted as the means by which power is communicated. See BUTTER, DAIRY.

**Cream of Tartar** exists naturally in grape-juice, but being insoluble in alcohol, it is gradually

deposited, in the form of argol, as the sugar of the juice becomes converted into alcohol by fermentation. In the preparation of cream of tartar the argol is dissolved in hot water, to which charcoal or fine clay is added, to take up the colouring matter; by boiling and filtering a clear colourless solution is obtained, from which, on cooling, the cream of tartar separates as crystals. These crystals, after being exposed on linen for several days, become whiter and constitute the *crystals of tartar*, or, when ground to powder, the *cream of tartar*. Although cream of tartar is, practically speaking, the bitartrate of potash,  $\text{KHC}_4\text{H}_4\text{O}_6$  (see TARTARIC ACID), yet it usually contains from 5 to 10 per cent. of tartrate of lime, while adulterants, properly speaking, may also be present. The tartrate of lime is derived from the clay added to purify it, and is more or less present in all commercial samples. Cream of tartar is used for making tartaric acid and baking-powder, and as a mordant for dyeing wool. Cream of tartar is readily soluble in hot water, though it takes 60 parts of cold water to dissolve one part of it. *Soluble cream of tartar* is prepared by dissolving together 2 parts of Borax (q.v.) and 5 parts of cream of tartar, evaporating to dryness and powdering. Cream of tartar has an acid taste and gritty feel. When taken repeatedly in small doses of a scruple to a drachm, it acts as a refrigerant and diuretic; in doses of one to two drachms, it is useful as an aperient; and in larger doses of from two to three drachms it acts as a purging agent, accompanied by flatulence and griping. *Imperial liquid* is prepared by dissolving about a drachm of cream of tartar in a pint of boiling water, and adding a little lemon-peel and sugar to flavour it, when an agreeable refrigerant drink is obtained, which is highly serviceable in allaying thirst in feverish cases. Cream of tartar whey is obtained by adding two drachms of the salt to a pint of milk.

**Cream of Tartar Tree**, the remarkable gouty-stemmed tree *Adansonia Gregorii* of north-western Australia. It is of the natural order Malvaceae, and is closely related to the Baobab (q.v.) of tropical Africa, to which the name Cream of Tartar Tree is also applied.

**Crease**, a Malay weapon. See KRIS.

**Creasote** (Gr. *kreas*, 'flesh'; *sōzō*, 'I preserve') is an oily substance obtained from the tar produced by the destructive distillation of wood. When Coal-tar (q.v.) is distilled, a certain portion called creasote oils passes over, and from this much of the creasote of commerce is obtained. This, although similar in some respects to wood creasote, is quite distinct chemically. The coal product consists largely of carbolic acid, along with creasol and xyleneol, while the wood product, to which alone the name creasote rightly belongs, consists of guaiacol, creasol, and phlorol. As it contains several substances, so its boiling-point ranges from  $392^\circ$  to  $428^\circ$  ( $200^\circ$ – $220^\circ$  C.). The leading character of wood creasote is that it instantly coagulates albumen, but does not coagulate Collodion (q.v.), in this respect differing from carbolic acid. It has a very remarkable power of arresting the decay of meat or wood, and when meat is treated with so small a proportion as one-hundredth of its weight of creasote, and exposed to the air, it does not putrefy, but becomes hard and dry, assuming the taste and odour of smoked meat. Indeed, there can be no doubt that hams cured by means of wood smoke owe their preservation and flavour to some extent to the volatile creasote in the smoke. Railway sleepers and wood liable to be frequently wet are often saturated with the coal-tar creasote; or, where economy is not so essential, with the

wood creasote, and are thereby preserved indefinitely. In toothache, where the cause of pain is a carious tooth with an exposed, inflamed nerve, a drop of creasote, carefully inserted, after previously cleansing the cavity, will often give relief. In this case it acts by coagulating the albumen and destroying the nerves. Creasote acts powerfully on the skin, producing a white stain when applied to it. A few drops added to a pint of ink preserve it from mouldiness. Medicinally, it is given in bacterial lung diseases such as phthisis and bronchitis, as it is of value owing to its antiseptic qualities. It may be inhaled by means of an atomiser. Only beechwood creasote should be used.

**Creasote Plant** (*Larrea mexicana*), of the order Zygophyllaceae, growing abundantly on the borders of the Colorado Desert, emits a strong odour of creasote. The plant forms a dense scrub, and binds the loose sand. It is xerophytic in character. Its smell protects it against animals.

**Creasy**, SIR EDWARD SHEPHERD (1812–78), born at Bexley in Kent, from Eton passed to King's College, Cambridge, in 1832, and in 1834 was elected a fellow. Called to the bar in 1837, he went on the home circuit for upwards of twenty years, and presided for three or four years as assistant-judge at the Westminster Sessions Court. In 1840 he became professor of History in University College, London; in 1860 chief-justice of Ceylon. Invalided home in 1870, he went out again in 1871, but had to return finally to England in 1873. He was the author of *The Fifteen Decisive Battles of the World* (1851), *Invasions of England*, *History of the Ottoman Turks*, *Imperial and Colonial Constitutions* (1872).

**Creationism**, or CREATIONISM. See PRE-EXISTENCE.

**Creatin**, or KREATIN (Gr. *kreas*, 'flesh'), a constant and characteristic constituent of the striped muscle of vertebrates. It was discovered by Chevreul in 1835, but little was known about it till Liebig published his researches on the *Chemistry of Food* in 1847. Its chemical formula is  $\text{C}_4\text{H}_7\text{N}_3\text{O}_2$ . Except in one doubtful case, it has always been found as above indicated; it is very uncertain if it ever occurs in unstriped muscles, and it has never been demonstrated in invertebrates. A dehydrated form, known as *Creatinin*,  $\text{C}_4\text{H}_5\text{N}_3\text{O}$ , occurs as a constant constituent of urine, and has also been demonstrated in fish muscles. Under the influence of acids, creatin becomes creatinin, and by hydration the transformation may be reversed. As these changes may readily occur during extraction, there is often doubt whether creatin or creatinin is present.

**Creation**. According to the accredited results of modern scholarship, there are two accounts of the creation in the book of Genesis. The first (Genesis i. 1–ii. 4a) is derived from the document known as P—the Priestly Code—which was composed in the period 538 B.C.–444 B.C. The second (Genesis ii. 4b–25) belongs to the document known as J—the Jahwistic document—which is of much earlier date, 900–750 B.C. (see BIBLICAL CRITICISM). Both these narratives agree in respect to the exalted position which they assign to man in the universe, but they differ upon almost every other point. The first describes the process of creation as lasting for six days—each day being marked by a special fiat of God. On the first day light is created, on the second the firmament dividing the upper and lower waters, on the third dry land, the seas, and vegetation, on the fourth the heavenly bodies, on the fifth water animals and birds, on the sixth land animals, and man as the crown and climax of all. The second narrative, which is probably incomplete, omits any reference to the seven days and the making of the world, and

places the creation of man anterior to that of the beasts. It describes how the earth was fertilised by a mist, how man was formed out of the dust and animated by the breath of life, how trees were made to grow and animals to live for the sake of man, and how finally woman was created as his companion and helpmeet. The second account is the more ancient and primitive of the two. The first is more interested in ecclesiastical institutions, and derives from the story a basis and justification for the observance of the Sabbath.

Modern investigation seems to have proved conclusively that the Genesis narratives of the creation are connected—remotely perhaps, but still connected—with Babylonian and other Semitic myths. According to the Babylonian tablets, the story of creation was as follows: In the beginning, before heaven and earth existed, when the primal father Apsu (ocean) and the primal mother Tiāmat mingled their waters the gods were created. The lower deities, headed by Tiāmat, revolted against the higher gods. Marduk, however, suppressed the rebellion and destroyed Tiāmat. Out of part of her body he made the heaven, with bars to keep back the upper waters. After this he created the heavenly bodies, the beasts and creeping things. The story is incomplete, as some of the tablets are missing and parts of others undecipherable, but the coincidences with the Genesis narrative are too striking to be altogether accidental. In both stories the world is made out of water and darkness. There is a noticeable resemblance between the words Tiāmat and Tehom, the latter of which is the Hebrew term used to describe the watery abyss that existed prior to the act of creation. The primal waters are, in each case, divided by a firmament. The creation of the heavenly bodies on the fourth day is very similar to the parallel account on the fifth Babylonian tablet. In both cases the work of creation redounds to the glory of the Creator. The Babylonian tablets end with a hymn of praise to Marduk. In the Genesis story Yahweh himself expresses approval of the result. But though the coincidences are remarkable, the differences between the two accounts are equally striking. In summing up Gunkel's account of 'the glaring contrasts' between the Babylonian and Old Testament records, Dr Whitehouse in his illuminating article on Cosmogony in *Hastings's Dictionary of the Bible* says: 'In the Babylonian epic we have wild, grotesque, tumultuous mythology expressed in poetic form. In the Biblical account we have serene, majestic, calm and sober prose. In the one the gods rise into being in the course of the drama. In the other, God pre-exists and remains from the first the creative source whose command summons each new order of created beings into existence.' It is this difference that constitutes the contribution which the Old Testament makes to the subject. There can be no doubt that the statement in Genesis is based upon the common Semitic mythology—but that mythology is purified and brought into agreement with the Jewish conception of God. The Babylonian epic is frankly polytheistic, and anthropomorphic. It bears all the marks of a 'myth,' and is akin to the myths which we find in Hindu and Greek poetry. The writer of the Genesis narrative has transformed the myth into a theodicy, excised the pagan elements, and used the old material to exalt the glory and majesty of Yahweh.

Such being the origin of the story in Genesis, it is impossible for us to regard it in the light of a revealed record of the process of creation. Similar stories are found in most nations. There are few mythologies which do not attempt to solve the riddle of the universe. Genesis gives us the noblest theory known to ancient thought—but still

it is only a theory, and to regard it as a scientific statement, which must be maintained at all costs, is absolutely out of the question in view of the discoveries of modern science, theology, and Biblical criticism. (1) The Bible is not a manual of science. It was not intended to reveal the facts and processes of the working of natural laws. Its purpose is to reveal the will of God to man. (2) The methods by which the revelation is made, according to the modern conception of inspiration, preclude the possibility of a Divine communication giving the details of the order of creation. The assumption that God revealed to a seer of the 5th century B.C. a scientific account of the origin of the world would raise many difficult problems. Why did he not reveal our modern medical knowledge to the physicians of the time and so enable them to remedy human suffering? Why should the secret of the origin of the universe have been made known, while other secrets, which would have been of much greater value to the race and have made the lot of men easier and happier, were denied to mankind? (3) It is impossible to square the statement in Genesis, *as it stands*, with the findings of modern science. Many attempts have been made, but it is only in so far as they have done violence either to Genesis or modern science that they have met with any success. The most glaring differences are (a) Genesis represents the world as having been created in six days. Modern science has proved that the process must have taken millions of years. (b) Genesis assumes the fixity of species from the very first. Each species, as it exists to-day, was created 'after its kind.' The modern theory of evolution strongly maintains that species have been developed out of each other. (c) Light existed, according to Genesis, before the sun and moon were created. The writer fails altogether to recognise the fact that the existence of day and night depends upon the existence of the sun and moon. (d) The conception of the world as a flat disc covered by a canopy and bounded below and above by waters is absolutely impossible in view of the discovery of Copernicus. (e) The narrative conflicts with modern geology alike in the order which it assigns to the different stages in the process of creation, in the time which it allots for its completion, and in the manner in which it groups together different living forms. There is an excellent discussion of this point in Driver's commentary on Genesis.

The value of the creation story lies not in the details, but in its general conception. The solution of the riddle of the universe is to be found in God alone. No materialistic explanation is satisfactory. Science and religion alike require us to trace back the first cause of everything to God.

See article on Cosmogony by Whitehouse in *Hastings's Bible Dictionary*; article on Creation by Zimmern and Cheyne in *Encyclopædia Biblica*; Gunkel, *Schöpfung und Chaos*; Zoeller, *Theologie und Naturwissenschaft*; Driver, 'The Cosmogony of Genesis' in *Expositor*, 1886; Ryle, *Early Narratives of Genesis*; Commentaries by Dillman, Skinner, Bennett.

**Creationism, or CREATIANISM.** See PRE-EXISTENCE.

**Crébillon**, PROSPER JOLYOT DE, born at Dijon on 13th January 1674, studied law. His tragedy of *Idoménée* (1703) was followed by *Atrée et Thyeste* (1707), *Electre* (1709), and *Rhadamiste et Zénobie* (1711)—the last his best play. But he soon fell into neglect, and produced nothing for more than twenty years. He was then pushed forward as a dramatic rival to Voltaire by Madame de Pompadour and other enemies of the great writer, elected to the Academy, awarded a pension of 1000 francs, and appointed royal censor, and one of the royal

librarians. His tragedy of *Catiline*, for which the king furnished the properties, was brought out with great success in 1748. Among his other works were *Xerxès*, *Sémiramis*, *Pyrrhus*, and *Le Triumvirat*, the last of which was written when he was eighty-one years old. He died on June 17, 1762. He was a very unequal writer. An oppressive gloom pervades the tragedies which he founded on Greek legend; but occasionally he writes naturally and powerfully. 'Not a few of his verses have a grandeur which has been said to be hardly discoverable elsewhere in French tragedy between Corneille and Hugo' (Saintsbury). Next to Voltaire, he was the best tragic dramatist of his age in France. There are editions of his works by Perelle (2 vols. 1828) and Vitu (1885).—CLAUDE PROSPER JOLYOT DE CRÉBILLON, the younger son of the dramatist, was born in Paris on February 14, 1707. He was educated at the Jesuit College of Louis le Grand, and after writing a number of slight pieces for the stage, acquired great popularity as an author of prose fiction. In 1740 he married an Englishwoman, Lady Stafford. One of his books, *Le Sopha, conte moral*, having given offence to Madame de Pompadour by its indecency, he was banished from Paris for five years, but on his return in 1755 was appointed to the censorship. He was believed by his friends to be dead long before he died on April 12, 1777.

**Crèche** (Fr., 'manger'), a sort of public nursery where, for a small payment, the children of women who have to go out to work are fed, nursed, and taken care of during the work hours of the day.

**Crécy-en-Ponthieu**, or CRESSY, a village in the French department of Somme, on the Maye, 12 miles N. of Abbeville. Crécy is celebrated on account of the brilliant victory obtained here, 26th August 1346, by Edward III., with 40,000 English soldiers, over a French army amounting, according to Froissart, to 100,000 men under the command of the Count of Alençon. In this great battle, one of the most honourable to English prowess recorded in history, perished the flower of the French chivalry, as well as the blind king of Bohemia, who was fighting on the side of France. Altogether about 30,000 of the French soldiers bit the dust. In this battle the Black Prince distinguished himself greatly. See the article ICH DIEN, and a work by H. Bellac (1913).

**Credence**, a small table placed near the altar or communion-table, at its south side, on which the bread and wine intended for consecration are placed in readiness. In the Greek Church this is called the *trapeza prothessōs*, or simply *prothesis*, but is always placed north of the altar, usually in a structural side-chapel. Archbishop Laud was a great stickler for the credence, and pleaded the authority of Bishop Andrewes and other bishops for its use. There are ancient credences in not a few Anglican churches. The introduction or restoration of credences was one of the marks of the Oxford movement; and they were judicially pronounced legal.

**Credi, Lorenzo di** (1459–1537), painter, was the fellow-pupil, lifelong friend, and executor of Leonardo da Vinci.

**Credit**. See BANKING, BILL OF EXCHANGE.—A Letter of Credit is a letter addressed to a correspondent at a distance requesting him to pay a sum therein specified to the person named, or to hold the money at his disposal, and authorising the correspondent to reimburse himself for such payment, either by debiting it in account between the parties or by drawing on the first party for the amount. For Cash Credit, see CASH ACCOUNT. See also CIRCULAR NOTES, MARGINAL CREDIT.

**Crédit Foncier**, a system of lending money on the security of landed property, established by the French government in 1852. Its peculiarity is that the loan is repayable by a terminable annuity, the amount and currency of the annuity being so calculated that when the last payment is made the loan and the interest on it will be extinguished. Or it may be described as a loan repayable by instalments. The borrower, however, has the right of anticipating repayment. The three original companies were in the same year incorporated into one.

**Crédit Mobilier**, a company founded in Paris in 1852 to make advances on movable property, in contrast to the Crédit Foncier (q.v.). Its declared object is especially to promote industrial enterprises of all kinds, such as railways and mines.

**Crediton**, or KIRKTON, an urban district in the middle of Devonshire, in a narrow vale on the Creedy, a tributary of the Exe, 7 miles NW. of Exeter. Its church is a fine old cruciform structure. The traditional birthplace of St Boniface (q.v.), the apostle of Germany, Crediton was the seat of a bishopric from 910 to 1050, and from 1897 has a bishop suffragan under Exeter. Pop. 3500.

**Cree**, a tribe of North American Indians of Algonquian stock, found especially around Lake Winnipeg and the Saskatchewan River. Old enemies of the Blackfoot Indians, they are now peaceful fur-traders, numbering some 10,000.

**Creech**, THOMAS (1650–1700), translator of Lucretius, was headmaster of Sherborne and rector of Welwyn, Herts. He died a suicide.

**Creech**, WILLIAM (1745–1815), an Edinburgh bookseller, Lord Provost in 1811–13, who published the first Edinburgh edition of Burns, the works of Blair, Beattie, Dugald Stewart, and Mackenzie.

**Creeds**, the authorised expressions of the doctrine of the church at large, or of its several main sections. The creeds of Christendom grow in complexity, in elaborate analysis and inventiveness of doctrinal statement, as they succeed one another. The so-called *Apostles' Creed* is probably the earliest form of Christian creed that exists, unless we give the precedence to the baptismal formula at the close of St Matthew's Gospel; but it is not to be attributed to the apostles or any of them. It is doubtless apostolic in substance; but in its present form it cannot pretend to be so ancient by four hundred years, though Irenæus repeats a creed not much unlike it. It is doubtless the Roman or Latin form of the creed which prevailed in all the early churches. The *Nicene Creed* sprang out of the Christological conflict in which early in the 4th century Arius (q.v.) maintained the view of Christ's person which Athanasius (q.v.) denounced; see also CHRIST, CHRISTIANITY. The Council of Nicea was summoned in 325 by Constantine to settle this controversy, and the Nicene Creed was the result. Christ was declared not merely to be of like substance (*homoiousios*) but of the same substance (*homoousios*) with the Father. At the Council of Constantinople (381) the additional tenet of the divinity of the Holy Spirit was added, and the creed completed in the form in which it is familiar, except the memorable phrase 'and from the Son' (*filioque*). This phrase, teaching the procession of the Holy Spirit from the Son, which was destined to be the subject of controversy between the Eastern and Western Churches (see GREEK CHURCH), seems to have been added by the Western Church during the 5th and 6th centuries. The so-called *Athanasian Creed* is probably a product of the 5th or 6th century, much later than Athanasius, but represents his doctrine of the Trinity, as apprehended and elaborated by the Western Church, first in Gaul; see the article ATHANASIAN CREED. The Oriental

churches never formally accepted any creed except the Nicene (without the *filioque*). The *Professio Fidei Tridentina*, called the 'Creed of Pope Pius' (1564), arose out of the *Decrees of Trent*, and is practically the Confession of Faith of the Roman Catholic Church (q.v., and see TRENT). For Post-Reformation creeds, see CONFESSIONS, ARTICLES. The non-Episcopal churches of Britain, the Dominions, and the United States do not as a rule recite any of the creeds in public worship or formally include them in their standards, though Presbyterians and other orthodox dissenters adhere to their doctrines.

See the relevant articles in Hastings's *Encyclopædia of Religion and Ethics* (1908 et seq.); the *Catholic Encyclopedia* (1907-15), or the revised Wetzler and Welte (1893-1903); the Protestant Hauck-Herzog, *Realencyklopädie* (1896-1909); Schaff's *Creeds of Christendom* (1877); *A History of Creeds and Confessions of Faith*, by Curtis (1912); Warnack's *History of Dogma*; also ARTICLES, ATHANASIAN CREED, CONFESSIONS, DOGMA, THEOLOGY.

**Creeks**, or MUSCOGEES, a once powerful tribe of American Indians, of Appalachian stock, who, reduced by war to some 25,000, were in 1832 removed from Georgia and Alabama to Indian Territory (Oklahoma). They numbered 18,700 in 1909. See *Bull. 73 of the Bureau of American Ethnology* (1922).

**Creepers** (*Certhia*), a genus of Passerine birds, the type of the family Certhiidae. The bill is long, much curved, laterally compressed, and pointed; the tongue is long, narrow, sharp-pointed, and jagged near its tip; the tail is rather long. The feet, which are somewhat slender, are well adapted for tree-climbing, and the stiff feathers of the tail are also employed for support. The Common Creeper (*C. familiaris*) is found in all temperate parts of the



Common Creeper (*Certhia familiaris*).

northern hemisphere, wherever woods abound. It is a permanent resident, but is never numerous or gregarious. It is not so well known as many other birds, in consequence of its restless habits, its rapid movements, and prompt retirement to the farther side of the tree from the spectator. The Scots name, *Bark-speeler* ('climber'), describes its almost constant habit, as it searches for insects and their larvae in the crevices of the bark. The nest is usually in a hole of a decayed tree. The creeper, larger than the wren, is dark gray above, with spots of yellow and white; the under parts are white. The Nuthatch (q.v.) is closely allied.—Creeper is also a name for Climbing Plants (q.v.).

**Crefeld.** See KREFELD.

**Creighton, MANDELL** (1843-1901), born at Carlisle, from Durham School gained a postmastership at Merton College, Oxford, in 1862, and was elected a fellow in 1866. He became vicar of

Embleton, Northumberland, in 1875, first professor of Ecclesiastical History at Cambridge (1884), Bishop of Peterborough (1891), and of London (1896). His chief works were *Simon de Montfort* (1876), *History of the Papacy during the Reformation Period* (5 vols. 1882-94), and *Queen Elizabeth* (1897; cheaper edition 1899). His wife published in 1902 a volume of his *Historical Essays and Reviews*, and in 1904 his *Life and Letters*.

**Creil**, an iron-manufacturing town of the French dept. of Oise, 25 miles SE. of Beauvais; pop. 11,000.

**Crema**, a town of Lombardy, 27 miles NW. of Cremona, with a cathedral (1341); pop. 10,000.

**Cremation** seems to have been the almost universal custom of the Aryan peoples—of the Aryan settlers in India, of Greeks, Romans, Slavs, Kelts, and Teutons—in disposing of their dead. The graves of north Europe throughout the 'bronze age' contain only jars with ashes. It was Christianity that gradually suppressed the practice of cremation. In India it is still a usual method for disposing of corpses, and is also practised by numerous uncivilised peoples of Asia and America (see BURIAL). Beginning in Italy about 1870, a return to the practice has been strongly insisted on by many in modern Europe. This is opposed mainly on grounds of kindly feeling for the dead, and for religious reasons connected with the belief in the resurrection of the dead. Advocates of cremation assert that the question is solely a sanitary one—the prevention of the pollution of water, or the contamination of air. By burning, the body is reduced more swiftly to its constituent elements, without disrespect to the dead or hurt to the living. In reply to the juridico-criminal difficulty that cremation might be made to destroy the evidence of murder (as by poisoning), advocates of cremation answer that the properly organised system of medical inspection, provided for by the act of 1902, under which all cremations take place, has obviated this objection. In Italy cremation has been legal since 1877. In Germany the first crematorium was erected at Gotha in 1878, and by the end of the year 1921 it and the other German institutes had cremated over 171,900 bodies. Crematories have been built in most of the great provincial centres of France. Throughout Europe there are strong societies for the promotion of the method. In England the Cremation Society, established in 1874, purchased ground at Woking, and there erected a crematory in 1885; others have since then been built in London. In 1900 an act gave local authorities power to expend money in building crematories, and Hull was the first important town to build a municipal crematorium. There are crematories at Manchester, Glasgow, Birmingham, Liverpool, Leicester, Darlington, Leeds, Bradford, and Sheffield. In Great Britain 341 persons were cremated in 1898; 1134 in 1911; 2009 in 1922. In the United States cremations have increased rapidly. A special form of Siemens's regenerative furnace is used in Germany; elsewhere at the present day various systems are employed, and incineration is effected by the agency of coke, gas, oil, and electricity, the former being used in this country, and the latter in the United States. The time occupied in the reduction of an adult varies from 1 to 1½ hours, and the ashes weigh from 5 to 7 lb. Crematories for the garbage of towns are called Destructors (q.v.).

See Sir Henry Thompson, *Modern Cremation* (4th ed. 1900); books by A. C. Freeman (1906, 1910); *Cremation in Great Britain* (1909); Lord R. S. Gower, *Cleanliness v. Corruption* (1912); *Transactions of the Cremation Society of England*. The John Crerar Library, Chicago, publishes a list of books and pamphlets on cremation, including the Cremation Association of America collection.

**Crémieux, ISAAC ADOLPHE** (1796-1880), born of Jewish parents at Nîmes, became an advocate

in Paris, entered the Chamber, and in 1848 was a member of the provisional government. Imprisoned at the *coup d'état*, he took up professional work till 1870, when he was a member of the government of national defence; and he died a senator. He founded the *Alliance Israélite Universelle*.

**Cremona**, capital of a province in northern Italy, on the north bank of the Po, 60 miles SE. of Milan. Famous are its cathedral (1107-1606), octagonal Baptistery, Palazzo Pubblico, Campo Santo, and belfry with the loftiest campanile in Italy (396 ft.). In the 16th, 17th, and 18th centuries it was greatly celebrated for its violins, the most famous makers being the Amati, Stradivarius, and the Guarneri. Pop. 60,000.

**Cremonne Gardens**, near Battersea Bridge, on the north side of the Thames, a very popular place of amusement for Londoners down to 1877.

**Creole** (Span. *criollo*), in general an individual born in the country but not of indigenous blood, a term applied, especially in the former Spanish, French, and Portuguese colonies of America, Africa, and the East Indies, to natives of pure European blood (*sangre azul*), in opposition to immigrants themselves born in Europe, or to the offspring of mixed blood, as mulattoes, quadroons, Eurasians, and the like. Creole dialects are corruptions of French, Spanish, Portuguese, English, or Dutch, arising in various colonies, and may be studied in such formal treatises as Thomas's *Creole Grammar* (1869) and Quentin's (Paris, 1872). Cable's stories revealed the charm of the Creole phraseology of Louisiana.

**Creosote**. See CREASOTE.

**Cres.** See CHERSO.

**Crescendo**, in Music, means a gradual change from piano to forte and fortissimo, marked thus —, or *cresc.* The converse is *decrescendo*. The swell of a good organ produces a perfect crescendo.

**Crescent**, a figure resembling the waxing moon with the horns turned upwards, was Hittite and a Greek before it became a Turkish emblem (see CONSTANTINOPLE); but it was not adopted by the Turks from the Greeks—it had been used by them hundreds of years before in central Asia. Genghiz Khan's Tatars had the crescent on their banners, and so had the Janissaries of Sultan Orchan. The Turkish Order of the Crescent (see ORDERS) was founded in 1799.

**Cress**, a name given to a number of widely distributed plants belonging to the family Cruciferae, which have a mustard-like taste and antiscorbutic and diaphoretic qualities. Of the Common Cress (*Lepidium sativum*) there are several varieties (e.g. Curled Cress). The Poor Man's Pepper is the Broad-leaved Cress (*L. latifolium*). The Virginian Cress (*L. virginicum*) is cultivated for salads. The allied genus *Barbarea* supplies the Winter Cress or Yellow Rocket of gardens (*B. vulgaris*). The Bitter Cress (*Cardamine amara*), the Lady's Smock or Cuckoo-flower (*C. pratensis*), and the Hairy Cress (*C. hirsuta*) are natives of temperate and northern countries. Water Cress (*Nasturtium officinale*) is an aquatic perennial of the same family, largely cultivated in England. For the so-called Indian Cress, see TROPÆOLUM.

**Cressida**. See TROILUS.

**Cressy**. See CRÉCY-EN-PONTHIEU.

**Crest**. See HERALDRY.

**Cresswell**, SIR CRESSWELL, judge, born in Newcastle in 1794, was educated at Charterhouse and Cambridge, and called to the bar in 1819; in 1830 he was appointed recorder of Hull, and in 1834 K.C. He was returned to parliament by Liverpool, and in 1842 Peel made him a puisne

judge. He sat in the Court of Common Pleas till 1858, when he was appointed first judge of the newly created Probate and Divorce Court. He died 29th July 1863.

**Crestien de Troyes**. See CHRÉTIEU.

**Creston**, a city of Union county, Iowa, with large machine-shops and railway-carriage works; pop. 8000.—There is a smaller town of Creston in Wyoming, and a third in Illinois.

**Creswick**, THOMAS, R.A. (1811-69), was born at Sheffield. In 1828 two of his pictures found a place in the Royal Academy's exhibition. He loved to paint the beautiful streams and glens and wooded dells of his native land; and these, which, along with some coast scenes, form the subject of his best paintings, are represented on his canvas with great delicacy of finished detail and truth of aerial perspective, the figures introduced being frequently from the brush of Andsell, Cooper, Friih, and other artists. He was well known as a book-illustrator, and he contributed to the publications of the English Etching Club.

**Cretaceous System**, the highest division of the Mesozoic or Secondary strata, rests conformably upon the Jurassic System (q.v.), and is overlaid unconformably by the oldest deposits of the Eocene System (q.v.). The Cretaceous strata of Britain are confined chiefly to the east and south-east of England. They form the Yorkshire Wolds, extend over large parts of Norfolk, Suffolk, and Hertford, and compose the Chiltern Hills, Salisbury Plain, the Downs, and the south part of the Isle of Wight. They form a broad basin in the north of France, and stretch eastward from Belgium, Holland, Denmark, and the south of Sweden, through the great plains of northern Europe to the south end of the Ural Mountains—often concealed under younger formations. They enter largely into the composition of many of the Mediterranean coast-lands. The chief petrological feature of the Cretaceous strata of western and northern Europe is the great development of white chalk in the Anglo-French area, and its gradual replacement, when followed eastwards in Germany, &c., by earthy limestones, shales, sandstones, &c. The most marked characteristic of the Cretaceous system in southern Europe is the great development in that region of massive marine limestone (hippurite limestone).

In North America Cretaceous strata are prominent in the western states and territories, and in the Gulf states, whence they extend up the Mississippi valley to the Ohio; they appear at intervals between South Carolina and New Jersey, as also on the Pacific border and in the coast-range, at the mouth of the Mackenzie River, and in Greenland. In India the system is marked in the Deccan by a massive series of basalt-rocks, 4000 to 6000 feet thick, and covering an area of 200,000 sq. m. In Australia and New Zealand there is a considerable development of Cretaceous rocks, sometimes coal-bearing. The following is the succession of cretaceous strata in England:

Upper Cretaceous—	
Upper Chalk.....	600 feet.
Middle Chalk.....	200 "
Lower Chalk and Chalk Marl.....	450 "
Chloritic Marl and Upper Greensand.....	250 "
Gault.....	200 "
Lower Cretaceous—	
Lower Greensand .....	550 "
Wealden Series.....	1850 "

The Wealden Beds consist largely of clay and sand, and are almost entirely of fresh-water origin. In Yorkshire the strata which occur on the same horizon as the Wealden beds of the south are of marine origin. The Lower Greensand, consisting of sand, clay, &c., are marine. The Gault (q.v.), a tough blue clay, is likewise marine, and so also are

the shallow-water sands of the Upper Greensand and the Chloritic Marl (q.v.). The most characteristic rocks of the system are the chalk-beds. The basement of these beds is the argillaceous chalk known as Chalk Marl. The Lower Chalk is a grayish-white chalk, while the Middle Chalk is a pure-white chalk, containing in its upper portions layers of flint nodules. A hard layer of yellowish limestone called Chalk-rock lies at the top of this division. The Upper White Chalk is a thick massive white chalk, containing numerous layers of nodules and occasional sheets of flint. All these chalks are of marine origin.

Continental Cretaceous.	Equivalent English Strata.
Danian . . . . .	(wanting).
Senonian . . . . .	Upper Chalk.
Turonian . . . . .	Middle Chalk.
Cenomanian . . . . .	Lower Chalk and Chalk Marl.
	Chloritic Marl.
Albian . . . . .	Upper Greensand.
	Gault.
Neocomian . . . . .	Lower Greensand.
	Wealden.

The Cretaceous strata of Britain being almost exclusively of marine origin, it is not surprising that land-plants seldom occur, and that they are met with chiefly in the fresh-water beds near the base of the system. They consist chiefly of ferns, cycads, and conifers—a flora resembling that of the preceding Jurassic period—though dicotyledons occur in the Lower Greensand. The Upper Cretaceous rocks of Germany, however, have furnished many remains of dicotyledons, such as extinct species of maple, oak, walnut, beech, laurel, magnolia, &c. A similar admixture of forms occurs in Cretaceous strata of North America.

Amongst animals the Protozoa played a very important part—the white chalks and earthy limestones being very largely composed of the minute shells of foraminifera, such as Globigerina, Rotalia, and Textularia, which still swarm in the ooze of the Atlantic. Sponges, such as Ventriculites, Siphonia, &c., were very abundant, and sea-urchins also occurred in great numbers. Star-fishes and brvozoans were fairly common, as were also, amongst brachiopods, Terebratula and Rhynchonella. Ordinary bivalves were very numerous. In the Danian beds carnivorous gasteropods begin to abound, and they include a number of existing genera. Cephalopods are not only the most abundant, but also the most characteristic fossils of the cretaceous rocks. Amongst them are a great variety of Ammonites and many forms of Belemnitide. Amongst the fishes were ganoids and various kinds of the shark tribe, together with the earliest representatives of the Teleostei—which include most living genera of fishes. The waters of the period seem also to have swarmed with reptiles, such as Ichthyosaurus and Plesiosaurus. Winged reptiles were also present, such as Pterodactylus. Amongst dinosaurs were Cetiosaurus, Megalosaurus, and Iguanodon. Another remarkable reptile was the serpent-like Mosasaurus. Besides these, there were lizards, chelonians, and crocodiles. The American cretaceous system is likewise characterised by the presence of huge dinosaurs and other reptiles—some of them being European types, while others are peculiar. One of the most remarkable features of the American rocks is the occurrence in them of the toothed birds—Ichthyornis and Hesperornis.

No break separates the Jurassic from the Cretaceous system. At the beginning of cretaceous times most of the British and Irish area existed as dry land. Over the south-east of England lay the estuary of a large river, flowing probably from the north. The Wealden beds are the delta-deposits of that river, the English and French beds of this division covering an area of 20,000 sq. m. The sea into which

that river flowed occupied a considerable area in the north of France, spread over the Low Countries into Hanover, filled the basin of the North Sea, and overflowed a portion of eastern England. Wealden beds occur in north-west Germany, and indicate the delta of a river, like that of the British area, flowing from the north. While land-conditions predominated in northern and middle Europe, an open sea covered vast areas in southern Europe. Gradual subsidence of the sea-bottom took place during the deposition of the Wealden series, and eventually the great deltas became submerged, and a wide sea covered most of what are now the low grounds of the British area, and passing eastwards, submerged vast regions of middle Europe up to the slopes of the Ural Mountains. The depression was greatest in the western areas, where in the deep clear waters there gradually accumulated the calcareous matter which subsequently formed our white chalk. There is no deposit forming at present which is quite analogous to white chalk. The extreme purity of the chalk, consisting as that rock does of 95 per cent. and more of carbonate of lime, is difficult to account for on the supposition that the sea in which it formed was comparatively shallow. The sea of western Europe may have been dotted with small islands. In the Mediterranean basin, a deep open sea would seem to have persisted all through the cretaceous period. Open water appears at this time to have extended through the Mediterranean area into Asia, covering there also vast tracts of what is now dry land, and communicating with the Indian Ocean. The conditions of climate seem to have been remarkably uniform over vast regions of the earth's surface. Ferns, cycads, and conifers flourished in the lands within the Arctic Circle, and the waters of the same region were tenanted by cuttle-fish, ammonites, and huge reptiles.

**Crete** (Gr. *Krētē*; Venetian, *Candia*; Turk. *Kirid*), the largest island in the Greek Archipelago, forming the central and major part of the semi-circular bar which, beginning with the islands of Cerigo and Cerigotto off Cape Malea, and continued by Casos, Carpathos, and Rhodes to Cape Krio, shuts the Aegean Sea from the main Mediterranean. Crete is about 140 miles long, with an average width of less than 30 miles, and consists of a chain of mountains, mainly composed of hippuritic limestone with older volcanic intrusions, which rise at short intervals into five main *massifs*: (1) at the west end, the White Mountains of *Splákiá* (*Aspra Vouná*), the most extensive group, with several summits over 7000 feet, and *Hágios Theódoros*, 7882 feet; (2) *Psiloríti* (anc. *Ida*), a hogback rising to 8193 feet; (3) *Kophíno*, 3888 feet, a southern offshoot of the main spine; (4) *Lasíthi* (anc. *Diète*), with *Aphenti Christos*, 7165 feet; and (5) at the east end, the *Sítia Mountains*, with *Aphenti Kavousi*, 4850 feet. The low intervening lands are widest between *Psiloríti* and *Lasíthi*, and this advantage has always caused the most populous urban settlements (successively *Phæstus*, *Cnossus*, *Gortyna*, and *Candia*) to be situated in that gap. The lowest interval, however, is between *Lasíthi* and *Aphenti Kavousi*, the so-called *Isthmus of Hierapetra*. There are also low but narrow coastal tracts. On the north-west, below the face of the White Mountains, is the small lowland of *Canea*; on the north centre, under *Psiloríti*, the more rugged lowland of *Mylopotamo*; and under *Lasíthi* that of *Mirabello*. There is only one true lowland plain of considerable extent, the *Messará* in the gap between *Psiloríti* and *Lasíthi*; but isolated upland plains, generally lacustrine, and sometimes drained by subterranean outlets (*katoióthra*), are characteristic of Crete, and have largely determined its social character by supporting the moun-

tain population in independence of the coast towns.

The coasts offer only one perfectly protected roadstead for large craft, the Bay of Suda on the north coast, west of the centre. Its depth and great extent (8½ sq. m.), which render it much less suitable for small ships than for large, deprived it of importance in antiquity; but with the growth of modern steam shipping its superiority has asserted itself, and since 1840 has determined the position of the political capital, Canéa. The other harbours of the island are either open bays or very small and unsafe coves. The largest islets, Dia, off Candia, and Gavdo (anc. *Clauda*), off Sphákia, are distant from the main coast, and the first is uninhabited. There are no rivers of importance.

Lying in the track of the wet westerly winds, and possessing much high land which retains precipitation in a frozen form until late spring, Crete has abundance of springs and a sufficiently saturated soil. At the same time, its southern latitude and neighbourhood to Africa make its valley lands the warmest in the Greek area. Consequently it is extremely productive, and can support by its own resources a relatively larger population than other Greek islands. It is famous for the richness of its flora; but, on the other hand, the wild fauna is extraordinarily meagre, owing to the density of population and the resultant disappearance of forests. A wild goat (*Capra aegagrus*) exists, but is seldom seen; and other game is very scarce. Horses, mules, and asses serve the vehicular traffic of the island, but, like all the other domestic animals, are of rather small and mean breeds.

The population is about 300,000, all of Greek race except an insignificant sprinkling of Europeans, Jews, and Bengázi Arabs; but about one-ninth of the Greeks profess the Moslem religion and call themselves Turks. The stature of the Sphákiote mountaineers is much above the average, and the type throughout the island is fine. Short heads and dark coloration prevail; but there is a considerable admixture of blonds, ascribed variously to Venetian and Slavonic strains. The Sphákiotes believe themselves to be original Dorians, but apparently have some Albanian blood. The towns are Candia (Gr. *Heraklion* or *Megalópolis*), about 25,000; Canéa (Gr. *Chánia*), about 23,000; and Rétimo (Gr. *Rethymnos*), under 10,000. No other centre of population is better than a village, large or small; but it is important to observe that in rural, and generally mountainous, districts live and have long lived five-sixths of the population of the island. Hence in many a revolution the will of the Cretans has been carried out by the villages.

*History.*—The importance of Crete has been very various at different epochs, and the apparently unequal treatment of its history which follows is really in due proportion. Before the status of peoples had come to depend on cosmopolitan trade, Crete profited above her neighbours by a singular combination of natural advantages. Protected by insular position, but not too far from the kinder coasts of Egypt, Syria, and Asia Minor to communicate with their societies, of which one, the Egyptian, had already advanced far; blessed with unusually wide and fertile lands for an Ægean island, and a temperate climate; possessing so large a development of coast-line that none of her subsequent 'hundred cities' was more than half a day's journey from the sea, Crete was an ideal nursery of nascent civilisation of the European type; and there, as a fact, such a civilisation first developed. But as it grew to adolescence other civilisations, partly engendered by it, made good their footing in wider continental regions, and Crete, unable to expand her territory, fell behind and apart, and lapsed into an insignificance which has

continued to our own day. Her renewed importance, or rather notoriety, in the 19th century was due to accident. Had she been included in the Greek kingdom after the Liberation, her insignificance would have persisted unchanged. But her relegation then to the condition of an Ottoman province, the most outlying, predominantly Christian, Hellenic, and irreconcilable, made her a constantly active factor in European politics; and she received from the great Powers, who had agreed to preserve the Ottoman empire intact as a primary condition of the maintenance of their mutual balance, a measure of attention never before paid to her.

(1) *The Minoan Period.*—This designation of the whole brilliant prehistoric period in Crete down to the opening of the Age of Iron is convenient, because the most notorious historical feature of the period was the rule of the Minos dynasty in Cnossus. It opens obscurely in a *Neolithic Age*, before 4000 B.C. At Cnossus and Phæstus thick beds of neolithic deposit have been found to contain pottery, stone implements, and idols of stone and clay; and at Mágasá, near Sitia, in the east of the island, are remains of a stone-built house of the period. The neolithic Cretan pottery, which constitutes our main evidence, testifies, almost from the beginning, to a sense for symmetrical form, brilliance of surface, and effective decoration. The idols are of distinctly individual style, and quite different from the types of marble idol which became characteristic of the neighbouring Cycladic islands at a later period. Yet there was some communication with other Ægean islands, for Melian obsidian was in use for implements.

The use of metal, at first for colouring-matter and then for the fabrication of implements, seems to have become known about 3000 B.C. Pure copper, which occurs in Crete itself, especially on the dependent islet of Gavdo, was earliest employed; but this was soon replaced by bronze, the tin in which, since it must have been brought from outside, demonstrates the existence of oversea communication. Since about the same time the Cretans began to make stone vases closely resembling in form those made in Egypt under the Old Empire, it is reasonable to suppose that they derived their knowledge of bronze, their tin alloy, and perhaps the actual composite metal in ingots from Egypt, where bronze was already in general use. Nor is it improbable that they owed to the same region the impulse to decorate their pottery with painted, instead of incised, designs. The new fashion made the body-colour at first light and the design dark; but under the influence of the old black incised ware the reverse—light design on dark ground—gradually became prevalent, and spiraliform patterns were introduced, perhaps from the Cyclades. This *Early Minoan Age* was a period of oversea communication with Egypt, as we have seen, and also with other Ægean islands and coasts, as is proved by the presence of idols of Cycladic types and Cycladic marble. Peaceful parallel development seems to have gone on at several centres in the island, no one having yet established overlordship. Cnossus and Phæstus both show evidence of continuous inhabitation in this period, as in the preceding neolithic age; but far the richest remains of it have come to light in East Crete—e.g. at Mokklos, where were found the finest of the stone vases mentioned, and also much thin gold jewellery of astonishingly good design and workmanship. Vasiliké, on the Isthmus of Hierapetra, is another productive Early Minoan site.

It is not till we reach a date about 2000 B.C. that the cities which were going to be greatest in prehistoric Crete are seen to emerge as overlords. The first to attain wealth seems to have been Phæstus, which dominated the rich Messará plain;

but it was closely followed by Cnossus, which depended less on the rolling uplands and fat valleys behind modern Candia than on the sea, its port at the mouth of the Kaiatos River being safer than any harbourage on the south coast. Both cities erected great palatial and religious buildings during what are called the *First and Second Middle Minoan periods*, roughly contemporary with Dynasties xi.-xiii. in Egypt. These buildings have been explored since 1900, the one by Sir Arthur Evans, the other by the Italian mission under F. Halbherr and L. Pernier. In the ruins of both immense quantities of a very beautiful black glazed ware with white or polychrome decoration, admirable both in fabric and form, have been brought to light; and since fragments of this singular Cretan ware (long called 'Kamares' from the cave on Ida where it was first noticed) have been found in Egypt, Melos, and the Argolid, it is clear that overseas communications were well established. Engraved stones and clay tablets or labels prove that a system of writing, which had already developed linear hieroglyphic characters from earlier pictographs, was in use; and the fragments of painted fresco, the stone vessels, and the obvious imitation of metal forms by potters testify to an abundant and rich apparatus of domestic life. On the East Cretan sites, however, which had flourished in the early Minoan period, there is no such subsequent evidence of culture and prosperity; and their eclipse suggests that the days of free local development had been closed by the imperial aggression of one or both of the great central cities. Whether either of these lorded it over the other we do not know; this only is certain, that, while the Phaestian palace outlived the Second Middle Minoan Age, that at Cnossus was destroyed by fire about 1800 B.C. It may have been sacked by the Phæstians, or by a body of raiders from the sea; on the other hand, it may have perished by accident. In any case it began to be rebuilt almost at once, and ere the Middle Minoan Age closed was furnished with as rich and various an art as before. A century or so after the burning of Cnossus, Phaestus suffered ruin in its turn; and since in the period immediately succeeding (*Late Minoan I.*, contemporary with Dynasty xviii. in Egypt) all the East Cretan towns rose to renewed prosperity after a long eclipse, it looks as if Phaestus, not Cnossus, had been their oppressor. Cnossus, now supreme, advanced to its apogee, rebuilt its palace on an enlarged scale, and equipped it with the amazing wealth of furniture and ornaments, the discovery of whose remains by Sir Arthur Evans from year to year after 1900 made the greatest archaeological sensation of the time. Whoever had oppressed the East Cretan towns before, it was Cnossus now. By about 1500 B.C. (*Late Minoan II.*) they are again in eclipse, with the exception of a settlement on the rocky islet of Psira, whose natural advantages seem to have made it a secure refuge for a while. Art-products bearing the hall-mark of Cnossian Late Minoan style are found not only all over Crete, but in the other Ægean isles, on the southern mainland of Greece, and in Egypt. Phaestus, though rebuilt, was by comparison mean and provincial. On all grounds it looks as if Cnossus now lorded it alone over the island, and reached out far over the Ægean to Tiryns and Mycenæ, and even up to the northern isles and coasts. There can be little doubt that it was this epoch of Cnossian supremacy which left to classic Greece so many memories connected with the name of Minos, and that the *thalassocrætia* or searlordship of Crete, of which tradition told Herodotus and Thucydides, actually existed then.

The remains of this period at Cnossus, Phaestus, Hágia Triáda, and other lesser sites, mostly

situated in East Crete, show us a luxurious, sport-loving people whose princes lived in elaborately decorated structures of stone, with well-developed systems of lighting, ventilation, drainage, and sanitation; while even the commoner folk had good stone houses. The dress of both men and women among the better class was full and rich. The precious metals were abundant; the arts of sculpture, painting, and engraving were far advanced; and a system of writing in linear syllabic or alphabetic characters was perfected. The clay tablets, found in great numbers, prove that book-keeping was understood, and that a decimal system of reckoning was in use. The prevalent religion was of a comparatively high type, the idea of supreme divinity being expressed in feminine form, and the link with humanity supplied by a son-consort. There is evidence of a considerable apparatus of cult, and of the practice of various ritual acts. Since the written documents cannot be read, we do not yet know to which family the language belonged; and this inability, coupled with the insufficiency of our craniological and iconographic evidence, prevents any certainty about the racial affinities of the Minoans. Their social system we should judge to have been monarchical, and it is evident that the dynast of Cnossus had an imperial position, and exacted tribute from other towns in Crete and perhaps abroad. Much knowledge of the sea and its life is evinced, and it is clear that Egypt was visited by Cretans, and Crete by Egyptians. The latter people knew the former, perhaps, as *Keftiu*. The presence of a strong Cretan element in the finer art-products of this period which have been discovered in southern Greece, as well as in the Cyclades, makes it most probable that the Cnossian empire extended over the European Ægean coasts, while its cultural influence went to Sicily and even north Italy on the west, and to Asia Minor and Syria on the east. The story of Dædalus preserved a memory of this splendid age to later times.

On this flourishing society in Cnossus, and at the same time in all other Minoan towns, a great blow fell, probably in the first part of the 14th century B.C. When the storm has passed we see all the cities in relative abasement, but preserving a culture unchanged in type, without alien admixture. Accordingly it has been conjectured that the authors of the cataclysm were themselves men of Minoan culture, perhaps whilom dependants of Cnossus grown strong, but forced out of south Greece by a force yet stronger, that of the first Indo-European wave. The *Third Late Minoan period*, thus begun, is marked by a general distribution of Ægean art-products over the Mediterranean and its coasts, and by conspicuous uniformity in the types of their decadent forms and decoration. It seems as if Ægean and perhaps Minoan populations had been dispersed by some centrifugal force, and had found their way both west and east. Sicily, where later legend placed the death of Minos, becomes full of their influence, and Cyprus, in another direction, even more so. Legend and archaeological evidence combine to indicate that they reached southern Syria and were perhaps identical with the Cherethim or Philistines of the Bible story.

Two or three centuries later another general catastrophe overtook Crete, and thereafter we find northern types of dress, weapons, burial, houses, &c., as well as implements of iron, intruding among remnants of moribund Minoan culture. The Achæans had appeared in south Europe and west Asia, and to them we must ascribe the ending of the Minoan Age. In the Homeric epics, whose original composition falls probably within a century of this epoch, Crete is Achæan.

(2) *The Historic Period.*—It is evident, however, that the influence of the old culture was slow to die. Homer represents the Cretans as bold searovers still, and at a subsequent period, contemporary with the earliest classical renaissance in Greece proper, they had a remarkably prolific and individual, if somewhat formalised, art. The 'Geometric' cemeteries have supplied many products of it in ceramic and metallurgy, while the Idaean cave sanctuary has illustrated it with splendid votive shields; the excavation of Præsus has shown us its terra-cottas and jewellery, and a fine archaic Apollo from Eleutherna has reminded us of the known names of its sculptors, Dipœnus and Skyllis. But the most precious witness to Cretan civilisation in the early part of the first millennium B.C. is the code of laws, relating to inheritance, land-tenuie, and other domestic matters, which has been found inscribed in archaic Greek characters at Gortyna (H. Deka). By this time the Dorian element had become the strongest, and Crete was regarded throughout the Greek period as a typical Dorian region, whose civic institutions had much in common with the Spartan. The best known of these were the *syssitia* or public meals. Like the Spartan *ephoroi*, the Cretan *cosmi* exercised a very intimate and paternal control over both public and private life; but Aristotle, in a famous chapter of his *Politics* (ii.), showed himself doubtful of the utility of such excessive state supervision. Of external history Crete has none during the Greek period; internally she was divided into many small autonomous city states, everlastingly at feud under the leadership of Cnossus, or Gortyna (which had succeeded Phæstus as lord of the Messará), or Cydonia.

So troublesome was mountainous Crete to conquer, and of so little worth, that even Alexander and his successors left her alone; but Rome, which did not long tolerate independent islands in the Mediterranean, finding Crete implicated with the Cilician pirates, subdued her after a three years' war (67 B.C.). First as a separate senatorial province with Gortyna for capital, and then as a joint governorate with Cyrenaica, Crete obeyed the Roman empire, and as part of the prefecture of Illyria, after Constantine, remained Byzantine till the Saracens came in 823 A.D. They held the island for more than a century, till Nicéphorus Phocas drove them out in 960 and restored it to the Eastern Empire. With the rest of the Greek isles and mainland it passed into Latin hands after 1204, and was sold by Boniface of Montserrat to Venice.

The Venetians were destined for about 460 years to keep Candia, as they now named the island and its new capital (from *Khandax*, a fort built by the Saracens near Cnossus); but they never quite pacified it. The mountain spirit of the Cretans and their irreconcilable hatred of the Latin church led to repeated risings, one of which, provoked by misgovernment and supported even by resident Venetians, lasted three years (1361-64). If the republic sent harsh governors, she promoted trade; and remains of fine fortified harbours, docks, and galley-slips still attest the material prosperity of Crete under Venetian rule as eloquently as the huge landward fortifications of Candia and Canéa attest the insecurity of Venetian hold on the interior. Yet the victorious Turks were slow to dispossess Venice, and made no strong effort till 1645. Capturing Canéa and Retimo in that year, they advanced on the capital in 1648. Its tremendous walls kept them out for twenty-one years, and the siege is among the most famous in history. If it had not been for the energy infused into the operations from 1667 onwards by Ahmed Kuprili, the great Albanian vizier of Mohammed IV., Crete might never have been Ottoman. With Candia lost in 1669, Venice held on to three islets,

Suda, Grabúsa, and Spinalonga, for half a century more, but retired from the last in 1718.

The Turks thought it worth while at first to encourage apostasy to Islam by promises of the rich plain lands, and soon brought over about a third of the whole population to their faith and interest. The descendants of these converts, reduced to less than one-half their number, make the 'Moslem Question' in the island to-day. Against their insolence and exactions (many of them joined the Janissary Order), rather than against actual Turks, the Christians revolted more than once (e.g. in 1770), but could make no headway till Mahmud II. himself had undermined Janissary power. With the Greeks of the mainland they rose at last with success in 1821, cleared the Moslems out of all the island except the fortresses, and would have reduced these had not the sultan prevailed on his Egyptian viceroy to save them and reconquer the interior. This Mehemet Ali did, and eventually he retained the island under his effective if despotic rule till 1840, the Powers having refused in 1830 the request of the Cretans for union with the new Greek kingdom. His governor, Mustapha Ali, remained on in the island till 1852; but with the end of his strong and comparatively enlightened administration peace departed from Crete. The Porte, recognising that it could not diagoon the island as of old, tried to secure power by making concessions, the least possible, to the Christians; but continually playing them false, it provoked insurrection after insurrection, until, after a more serious one than usual (1866-68), whose suppression cost the Turks a very heavy price, a measure of constitutional government was conceded by the Organic Statute of 1868. Its cumbrous machinery, however, worked ill, and matters were not much improved by the Pact of Halépa (1878), which followed on the unrest provoked in Greek lands by the Treaty of San Stéfano.

(3) *Recent Period.*—But these palliative measures, for purposes of practical government, were still-born. The elaborate duplicated executive and judiciary (to every Moslem a Christian assessor, or *vice versa*) could only have worked successfully with abundant goodwill to help; and goodwill was conspicuously absent on both sides. The Christians, having obtained something never before conceded to *rayahs*, had still not obtained what they desired—complete autonomy—and were aware that since the Berlin Treaty the Powers could be induced more easily than of old to interfere in internal Ottoman affairs. The Moslems grudged to the Christians their newly conceded privileges, and especially their majority in the Assembly and the administration. But if neither party was minded to make the machine of government work well, both intended to get as much as possible of the spoils of office before it should break down. As a result financial troubles soon appeared, and an abortive rising in 1889 led to the virtual annulling of Christian privileges. Though these were restored in 1894, and a Christian governor-general, Karatheodory Pasha, formerly Prince of Samos, was appointed, the financial situation, going from bad to worse, paralysed government and brought discontent to the point of desperation. Revolt was once more organised in the hills, and broke out in 1896 with the investment of Vámos; and though, after the relief of this town and some punitive operations, the sultan tried conciliation and revived the Halépa Pact, the slow realisation of his promises, and the constant incitement of the Christians by emissaries of an Athenian society, the Ethniké Hetairia, brought about a renewed outbreak of trouble in Canéa on February 4, 1897. The Greek government's hand was forced; an expeditionary force under Colonel Vassos landed ten

days later; and the Powers, having occupied the fortified towns, proclaimed a blockade of the coast. The whole interior was now in open rebellion, and such Moslems as had been able to escape massacre were crowded into the towns. This state of things lasted with little change for more than a year, the warships and occupying forces of Great Britain, France, Russia, and Italy keeping back the insurgents; but Moslem fanatics hastened the end by pillaging Christian property at Candia and incidentally killing some members of the British garrison. The Turkish troops were forcibly deported by Admiral Noel on November 14, 1898, and the Ottoman flag was hauled down except on Suda Island. The four Powers undertook to administer Crete, and appointed Prince George of Greece their first high commissioner. For a short time they conducted the government, but in June 1899 handed it over to the Cretans, themselves occupying the chief towns till 1908.

In spite of the enactment of a constitution, the Cretans complained of arbitrary government; and, under the lead of Venezélos (q.v.), a party raised the standard of revolt in 1905, demanding the recall of Prince George and the consummation of national union with Greece. The Powers refused to countenance these demands, but proposed a revision of the constitution and certain reforms, one of which, the admission of Greek officers to reorganise the police and militia, paved the way for the withdrawal of the international troops. On September 25, 1906, Prince George resigned his high commissioner-ship, and the king of the Hellenes was allowed to nominate Alexandros Zaimis, an ex-premier of Greece, to hold office for five years. The latter's tenure was characterised by the strengthening of ties with Greece through the substitution of Greek gendarmerie officers for Italian, and the raising of a loan from the Greek National Bank; and also, less legitimately, by the Assembly voting union, the executive taking the oath of allegiance to King George, and an election being held of Cretan deputies to sit in the Greek Chamber (1910). This election, however, was declared void by the king of the Hellenes under pressure from Turkey and the Powers. After returning themselves in the census of 1911 as Greek subjects, the Cretan Christians were sharply reminded of their real status by the Powers, who were still anxious that 'reformed' Turkey should not be unduly embarrassed. An attempt by the Porte to enforce its sleeping rights of suzerainty by appointing *cadis* to Crete in May 1911 had, however, to be abandoned. In September the Powers announced that, on the completion of M. Zaimis's term, the office of high commissioner would not be filled again. In June 1912, encouraged by the Tripolitan war, Cretan deputies attempted to take their seats in the Assembly at Athens, but were kept out by the Greek government. Still the whole trend of events for many years had brought the island nearer and nearer to union with the Hellenic kingdom; and the war begun in October 1912 by the allied Bulgarians, Serbians, Montenegrins, and Greeks against the Turks raised the question again in acute form. In the first weeks of the war, after the startling early successes of the allies, the Cretan deputies were welcomed to their places in the Greek Chamber, and a Greek governor of Crete was appointed by the Hellenic government. In the peace negotiations Greece claimed the island, and the Powers agreed by the Treaty of London (December 1913) to confirm that claim. Since this date it has been recognised Greek territory, strongly Venezelist in its sympathies. In the Great War its remoter coves were undoubtedly used by German submarines, which made the straits, west, south, and east of it, the most dangerous part of the Mediterranean; but there

is no reason to suppose that the island population or administration connived generally at such use.

The National Assembly has now vanished with all other provisional features of the autonomous régime, and the Greek system of centralised administration has taken the place. The law is the code in use in Greece, and the Metropolitan of Candia and his seven bishops act under the Metropolitan of Athens. The Moslem population steadily dwindles, no opportunity being lost to promote its impoverishment and emigration.

Olive-oil, wine, carob-beans, oranges, lemons, and soap are the chief products. Home-grown cereals are insufficient for the island's own consumption. External trade is slack, owing to want of good harbours and of the seafaring habit among the population. Internal trade is hampered by the badness of roads and all means of communication. The main attraction to foreigners has been offered in recent years by archaeological excavations at Cnossus, the Dictæan Cave, Zakro, and Palaiakastro (British); Phaestus and H. Triáda (Italian); Gournia, Vasiliké, Mochlos, and Psira (American); and various cemeteries and lesser sites—e.g. Tylissos (Cretan). Their results have been gathered mainly into a new museum built at Candia. The western part of the island has been but little explored archaeologically, and its chief town, Canéa, though the residence of the foreign consuls, has much less to interest a visitor than Candia.

For general history and travel, see K. Hoeck, *Kreta* (3 vols. 1823-29)—a compendium of literary authorities; J. H. Freese, *Short Popular History of Crete* (1897); H. Laroche, *La Crète Ancienne et Moderne* (1898); V. Raulin, *Description physique de l'île de Crète* (1867); Greek works by Stavakis (1890) and Xanthoudides (a history, 1909); R. Pashley, *Travels in Crete* (1837); T. A. B. Spratt, *Travels and Researches in Crete* (1865); W. J. Stillman, *The Cretan Insurrection of 1866-68* (1874). For archaeology, see A. J. Evans, *Palace of Minos* (vol. i. 1922); R. M. Burrows, *The Discoveries in Crete* (1907; new edition 1912); A. J. Evans in *Annual of British School at Athens* (cf. also D. G. Hogarth, R. L. Bosanquet, R. M. Dawkins, and others in same periodical); A. J. Evans, *Scripta Minoa* (vol. i. 1909); C. H. and H. B. Hawes, *Crete the Forerunner of Greece* (1909); F. Halbherr, L. Pernier, and others in *Monumenti Antichi* and in *Rendiconti dell' Acad. dei Lincei*; R. B. Seager, reports on excavations at Mochlos, Psira, Vasiliké, and Pakhyammos (University of Pennsylvania publications, 1907-16); H. B. Hawes, *Gournia* (1908); A. Mosso, *Palaces of Crete* (1907) and *The Dawn of Mediterranean Civilisation* (1910); D. Funken, *Kretisch-Mykenische Kultur* (1920); F. Noack, *Homeric Palasts* (1903); H. R. Hall, *Egean Archaeology* (1914); *Monumenti Veneti dell' Isola di Creta* (1906-8; Istituto Veneto). For maps, see at GREECE the map of Ancient Greece.

**Crétin**, GUILLAUME (d. circa 1525), typical French poet of his time, enjoyed a considerable reputation in his day, but his obscurity and tricks of rhyming contributed largely to his later neglect.

**Cretinism** (Fr. *crétin*, 'an idiot;') probably from *chrétien*, 'a Christian, an 'innocent'), idiocy or defective mental development, associated with bodily deformity or arrested growth, occurring, along with Goitre (q.v.) or enlargement of the thyroid gland, in the lower mountain valleys of the Swiss and Italian Alps, of the Pyrenees, of Syria, India, and China. In Europe it is rarely found above 3000 feet, and haunts chiefly valleys surrounded by high and steep walls of rock, which exclude the light and limit the free circulation of air. In some such localities it is extremely prevalent. Cretins are always pitiable and frequently repulsive objects; they are generally dirty, shameless, and obscene; their appetite is commonly voracious; the mouth is large and open, the tongue often protruded, the eyes small, the nose flat and broad, the skull flattened above and

expanded at the sides, the forehead retreating, the complexion cadaverous; in addition to which, the whole body is dwarfish, the skin thick and coarse, the hands and feet large, the limbs often rickety, the belly protuberant. Recent investigations have shown that the connection between cretinism and goitre is an extremely close one. The disease called Myxœdema (q.v.) closely resembles cretinism, except that it comes on during adult life; and it has been proved to be always associated with destructive change of the Thyroid (q.v.) gland. A similar condition has been found to follow the removal of the thyroid gland by surgical operation in a large proportion of cases. Loss of function of the thyroid gland seems to be the essential factor in the production of cretinism, while goitre consists in its enlargement. Treatment, as in myxœdema, by the administration of a preparation of thyroid gland, and the implanting of thyroid glands from animals, has been found to improve the condition of adult 'cretins'; and cretin infants treated with thyroid preparations have recovered, but the treatment must be continued for life. See GLANDS.

**Cretonne**, a printed cotton fabric used for curtains or for covering furniture, introduced about 1860. Unlike chintz, it is generally thick and strong for a cotton fabric, and with a twilled, crape, basket, wave, or other figure produced on the loom. A cretonne is rarely calendered or glazed.

**Creuse**, a river in central France, which flows 146 miles north-westward till it falls into the Vienne, a tributary of the Loire, 12 miles N. of Châtellerault.

**Creuse**, a department of France between Haute Vienne and Puy-de-Dôme, has an area of 2150 sq. m.; pop. (1872) 274,663; (1901) 277,831; (1921) 228,344. Low mountains and chains of hills, 2000 to 3000 feet high, occupy the greater part of the land. The climate is moist and variable, and the soil thin and light, interspersed with stretches of heath and pasture in the southern hilly district, but better in the lowlands of the north-east. The rearing of cattle forms the chief industry, and large quantities of chestnuts and fruit are grown.

**Creusot**, or **Creuzot**, LE, a town in the French department of Saône-et-Loire, 14 miles SSE. of Autun, and 236 SSE. of Paris. Situated in the midst of a district rich in coal and iron, it owes its importance to the establishment here in 1837 of great ironworks, amongst the largest in Europe, with collieries, coke furnaces, smelting furnaces, rolling-mills, factories which produce cannon and ordnance, engines, locomotives, &c. There are also glass-works here. Pop. (1846) 4012; (1921) 38,396.

**Creuzer**, FRIEDRICH (1771-1858), classical scholar, born at Marburg, studied there and at Jena, and held chairs at Marburg and, from 1804, at Heidelberg. His first and greatest work was his perversely ingenious and learned *Symbolik und Mythologie der alten Völker, besonders der Griechen* (4 vols. 1810-12), giving a symbolical explanation of ancient mythologies (see MYTHOLOGY). His next was a complete edition of Plotinus (3 vols. Oxford, 1835). He produced and also edited some of Cicero's works, and published 10 vols. of *Deutsche Schriften*, including an autobiography.

**Crèveccœur** (Fr., 'heart-breaker'), a once famous Dutch fort, 4 miles NNW. of Bois-le-Duc.

**Crèveccœur**, JEAN HECTOR SAINT-JOHN DE (1731-1813), was born at Caen, educated in England, and in 1754 settled in the United States, where he bought an estate near New York, and became a notable agriculturist. He suffered much in the Revolutionary war, being imprisoned as a spy in New York and shipped to England as a prisoner. His glowing account of the climate and fertility of America, in *Letters of an American Farmer*, brought

hundreds of French families to the Ohio valley. And his idyllic descriptions of life in the New World seemed to realise Rousseau's state of nature, and helped to mould French thought and aspirations. His influence has been traced in Chateaubriand, in Campbell, Southey, and Coleridge. He was French consul at New York (1783-93), but returned to France. See Life by Julia Post Mitchell (1917).

**Crevillente**, a town of Spain, 20 miles WSW. of Alicante; pop. 11,000.

**Crewe**, a town of Cheshire, 43 miles SE. of Liverpool, with a great railway junction and huge railway works, established in 1843. About 1840 there were only two or three houses where Crewe now stands; in 1851 its population was 4491, in 1921 46,477. It has art and technical schools. Crewe was incorporated in 1887. Lord Crewe's seat, Crewe Hall, by Inigo Jones, was destroyed by fire in 1866, but rebuilt.

**Crewe** (ROBERT OFFLEY ASHBURTON CREWE-MILNES), MARQUESS OF, son of Lord Houghton (q.v.), was born in 1858, and educated at Harrow and Trinity College, Cambridge. He was successively Assistant-secretary for Foreign Affairs (1883-84), Lord-lieutenant of Ireland (1892-95), Lord President of the Council, Lord Privy-seal, Colonial Secretary (1908-10), Secretary for India (1910-15), and Lord President of the Council and President of the Board of Education in Mr Asquith's Coalition Ministry (1916). Heir to his maternal grandfather, Baron Crewe, he was made Earl of Crewe in 1895 and Marquess in 1911. He was Chairman of London County Council (1917), and ambassador to France (1922). He published a volume of verse in 1891.

**Crewel-work**. See EMBROIDERY.

**Crewkerne**, a market-town of Somersetshire, in the fertile valley of the Parret, 15 miles SE. of Taunton, has a cruciform Perpendicular church, with a splendid west front, and a grammar-school (1499) in modern buildings; pop. 3700.

**Cribb**, TOM. See PUGILISM.

**Cribbage**, a game at cards, probably of English origin—according to Aubrey, it was invented by Sir John Suckling, the cavalier poet. It is played with a pack of fifty-two cards; the scores accrue in consequence of certain combinations in play, hand, and crib. The scores are marked on a cribbage-board pierced with holes. Cribbage was formerly called *noddy*, and is mentioned under that name in an epigram by Sir John Harrington (1615). The earliest description of the game is in *The Compleat Gamester* (1674).

**Crib-biting** is a bad habit and an unsoundness met with especially in the lighter breeds of horses, and those spending a considerable amount of leisure in the stable. The animal seizes with his teeth the manger, rack, or any other such object, pulls on it, and makes at the same time a peculiar noise as if swallowing air. Crib-biting springs often from idle play; may be first indulged in during grooming, especially if it is conducted in the stall and the animal be needlessly teased or tickled; is occasionally learned, apparently, by imitation; and in the first instance is frequently a symptom of indigestion. It may be suspected where the outer margins of the front teeth are worn and ragged, and will soon be proved by turning the animal loose where he can find suitable objects to lay hold of. It usually interferes with thriving and condition, and leads to attacks of indigestion. It can be prevented only by the use of a muzzle or throat-strap; but in those newly acquired cases resulting from gastric derangement, means must further be taken to remove the acidity or other such disorder.

**Criccieth** (pron. *Krikkieth*), a Carnarvonshire watering-place, one of the Carnarvon boroughs,

home of Mr Lloyd George, on Cardigan Bay, 4 miles W. by S. of Tremadoc. Across the bay—good land submerged in punishment of one man's drunkenness, according to Welsh legend and Peacock's *Misfortunes of Elphyn*—is Harlech Castle. Criccieth Castle, also a ruin, dates from British times, but was strengthened by Edward I. Pop. 1900.

**Crichton, JAMES**, surnamed the 'Admirable,' son of Robert Crichton of Eliock, Dumfriesshire, Lord Advocate of Scotland, was born 19th August 1560, and educated at St Salvador's College, St Andrews, where George Buchanan was his tutor, and where he graduated M.A. in 1575. In 1577 Crichton left Scotland, and was for two years in France, where he seems to have served in the French army. There is no trustworthy evidence that he distinguished himself as a disputant at the university of Paris. In July 1579 he was at Genoa, and addressed the senate in a Latin oration, which was printed. Next year he reached Venice, and printed a Latin poem addressed to Aldus Manutius, grandson of the founder of the Aldine press. Aldus took the youth under his patronage, and issued a printed handbill announcing a great scholastic disputation in which Crichton was to take part. The young Scotsman was there described as a skilled athlete, scholar, poet, linguist, with unparalleled powers of memory. In 1581 (according to Aldus) Crichton went to Padua, and overcame all the scholars there in public disputations. At the end of 1583 Aldus issued an edition of Cicero's *De Universitate*, dedicated to Crichton's memory, and asserted there that his versatile protégé had died in July. Some confusion has arisen from the fact that another James Crichton was in Italy at the same time or soon after. In 1584 the second Crichton visited Milan. There late in that year he published an elegy on the death of the archbishop, Cardinal Borromeo, and two gratulatory odes—one addressed to the cardinal's successor, Gaspar Visconti, and the other to Charles Emmanuel, Duke of Savoy, on his marriage. Early next year (March 1585) he issued a collection of scattered Latin poems dedicated to the chief-magistrate of Milan. Bernardini Baldini addresses this second James Crichton in Latin verses as a kinsman of the other, whose death by 'a wicked hand' he deplores; and the survivor's reply confirms his evidence. In 1601 one Thomas Wright, in *Passions of the Mind*, related that when in Italy he heard that a young (unnamed) Scotsman, 'of most rare and singular parts,' was attacked and basely killed by an (unspecified) Italian prince. John Johnston, in *Heroes Scoti* (1603), states that Crichton was killed at Mantua by a son of the duke in a nocturnal brawl, and that he was buried at Mantua. The Mantuan state papers, while leaving some points obscure, show that the first-named Crichton was killed by Vincenzo Gonzaga, the duke's son, between the hours of one and two in the night of the 3d July 1582. Crichton had entered the duke's service in February, had drawn up a scheme of fortification, defeated all comers in theological disputation, and by his popularity had gained Vincenzo's enmity. According to the prince's own story, which is not consistent in all points, Crichton met the prince with a disreputable companion, and insisted on taking the wall of them; Crichton, being thrust aside, killed the prince's friend, and was mortally wounded by the prince before either recognised the other. Public opinion in Mantua and elsewhere was strongly against the prince; and the duke, though he hushed the matter up, seems to have taken the less favourable view of his son's conduct and character. Johnston in 1603 first used the epithet 'admirable' in describing Crichton ('*omnibus in studiis admirabilis*'). But Crichton chiefly owes

his repute and surname to Sir Thomas Urquhart (q.v.), who wrote an extravagant account of his scholastic and athletic prowess in his *Discovery of a most exquisite Jewel* (1652). The testimony of Aldus to Crichton's versatility is alone worthy of serious consideration; but Aldus was in the habit of praising extravagantly promising young strangers at the Italian universities. That Crichton's power of memory was extraordinary is, however, independently corroborated by Burchelati in his *Epitaphiorum Dialogi Septem* (1583); and there is no reason to doubt his linguistic facility or his skill as a fencer. Harrison Ainsworth wrote a novel on Crichton's apocryphal career in 1837.

See articles in the *Dictionary of National Biography* and in the *Gentleman's Magazine* for March 1888 (both by Sir Sidney Lee); a genealogical paper by John Stuart in *Proceedings of Society of Antiquaries of Scotland* (1855), ii. 103-118; and for the Mantuan papers and the second James Crichton, see Mr Douglas Crichton in vol. xliii. (1909), 296-308.

**Cricket.** All games which are played with ball and hand may be divided into two classes. The first consists of those games in which the ball, when struck with bat, racket, or some other kind of weapon, is in motion; the second when the ball is at rest. In the first class are the games of cricket, tennis, rackets, fives, and polo; in the second, golf, billiards, and croquet. The greatest of those in the first class, and perhaps the greatest of all, is cricket, the national summer game of the English race throughout the world. The derivation of the word cricket is uncertain, but there is no sound reason why Professor Skeat in his *Etymological Dictionary* is not correct when he says that the word is derived from *crice*, a staff. There are other authorities who contend that the old French word *cricquet*, a stick used in the game of bowls, is the origin; but the great authority of Professor Skeat is on the side of *crice*, and his view is now generally adopted.

Records have been very far from continuous on the subject, but there can be no doubt that in some shape or other a game with bat and ball has been played ever since the middle of the 13th century. There is a drawing in a book called *Chronique d'Angleterre depuis Ethelberd jusqu'à Hen. III.*, in which, apparently, two men are playing with bat and ball. In the Bodleian Library there is a MS. showing monks playing with fieldsmen. In the *History of Guildford*, by Russell, it is stated that cricket was played there in the middle of the 16th century; but if the opinion of Stow in his *Survey of London*, published in 1593, is correct, however old the game was in some shape or other it was thought little of, because it is not mentioned; indeed he speaks of the ball contemptuously as used 'by noblemen and gentlemen in tennis-courts, and by people of the meaner sort in the open fields and streets.'

The history of the game may conveniently be divided into four epochs, and each epoch was created by the style of bowling in vogue at the time. The first began at whatever time in the Middle Ages cricket was first played, and lasted till about 1750, and during this period the bowling was all along the ground. The grounds were naturally rough, and the bat was more like a hockey-stick than a modern bat; but in a sense it was well adapted to play the style of bowling the player had to contend with. That the scores were not bigger was owing to the rough pitches, which often caused the ball to rise an inch or so, and thus to pass over the narrow bit of wood that projected nearly at right angles to the upright stick, and which was the operative part of the bat. The wicket was originally a hole in the ground, and there was no such thing as being bowled out; the striker was

either caught or run out, the latter mode of dismissal being caused by the fieldsmen putting the ball into the hole before the batsman could get in his bat. It may have been that the frequent damage the hand of the fieldsmen sustained was the immediate cause of the development of putting up a stump, but at what date this took place is unknown. From one stump it was only a short step to putting up two, and these were 12 inches high, placed 24 inches apart, and a third was afterwards laid along the top. From about this date, whatever it was, to bowl out a batsman became an important part of the game, and the unfairness of so many of the best balls passing through the broad wickets without hitting a stump brought about a change which brings us to the next epoch.

From 1750 onward rather more attention was paid to the grounds, which became slightly smoother, and as years went on the run-getting increased so much that not only was a third stump added at some date, probably about 1755, but bowlers began to pitch 'length-balls' instead of bowling 'sneaks.' The Hambledon men, led by the famous David Harris, were the pioneers of this new style of bowling; and the game became more scientific, and the bat was made something like the shape of to-day. No doubt the pitches became smoother and smoother till, in 1796, the scoring rose so high that the stumps were raised two inches; but it was not until 1817 that the present dimension of wicket—27 inches high and 8 inches broad—was finally fixed upon; and this has not been altered up to the present date. It is a curious fact that the distance of 22 yards between wickets has been the same in all probability for 200 years.

We have now come to the third epoch, when round-arm bowling was introduced in 1826, but not formally permitted till 1844. No doubt previous to that date the scoring on better pitches grew so large that bowlers gradually raised their arm, but the rule was strict that no jerking was legal. To define a jerk is impossible; but nobody can jerk a ball unless his hand or arm, or both, is touching his body when the ball leaves the hand. To keep the hand clear of the body was very likely the cause of raising it, till finally, in 1826, William Lillywhite and Jem Broadbridge of Sussex brought in the system of round-arm bowling, after very strong opposition; and this system was finally made legal in 1844. From 1826 to 1864 was the duration of the third epoch, and the latter part of this period was no doubt a glorious time in cricket, for though the wickets were rough as compared with those of the present day, they were not so rough as to be dangerous to bowling with the arm never raised above the shoulder. Bowlers on the whole had the best of it, but there were many fine batsmen, and, except owing to bad weather, drawn matches in first-class cricket were unknown. In 1862 the famous Edgar Willsher was no-balled at Kennington Oval by John Lillywhite for bowling with his arm above the shoulder. Willsher left the ground in wrath, and there was almost a riot; but this incident led to the fourth epoch, for in 1864 a new rule was passed which permitted bowlers to bowl with the hand at any height, and this is the position up to the present day, but the ball must not be thrown or jerked.

We have now exhausted to a certain extent the history and development of the game in its broadest sense, but it is curious and instructive to see that the real factor which has been the cause all along of changes and development has been run-getting. Batsmen learn to adapt themselves to different kinds of bowling, and succeed so well that too many runs are got, and this generally leads to changes in the rules; and this will proceed still further. The wickets are now so easy to bat on

that there is a danger that in first-class cricket really fast bowling will die a natural death, as the work is too hard, and generally bowlers and fielders are worked too much. The great success of Messrs Macdonald and Gregory in the tour of Australian cricketers in England in 1921 seems at first sight to prove that there is a future for fast bowling; but the war had a great effect on English cricket, and England had never been so weak in the last sixty years as she was in 1921, and the summer was very dry and suitable to fast bowlers. In Australia the perfect wickets make fast bowling easy, and slow bowlers of Mailey's stamp are the most successful.

The method of the game is now so well known that only a brief description is necessary. There are eleven players on each side, and two batsmen are at the wicket, and to get them out is the object of eleven opponents, two of whom are bowling, one at each end, and the other nine fielding. For all practical purposes there are five ways of getting the batsman out; though there are others, which seldom occur—such as hitting the wicket with the bat, obstructing the field, hitting the ball twice and starting to run, &c. The first stage is the bowler delivering the ball at a wicket which is defended by a batsman. If the ball hits the wicket so as to dislodge a bail the batsman is bowled out (No. 1). If the batsman hits the ball, and it is caught by any of the fieldsmen or the bowler before it touches the ground, the batsman is caught out (No. 2). If the ball is not hit, but taken by the wicket-keeper, who stands close behind the stumps, and the wicket is broken when the batsman is outside the popping-crease—a straight line 4 feet distant from, and parallel with, the wicket—the batsman is stumped (No. 3). If the batsman hits the ball and with his colleague at the other end runs, and either wicket is knocked down or put down before the batsman who is running towards that wicket has got his bat grounded or one of his feet over the popping-crease, the batsman is run out (No. 4). If the ball is not hit, but hits the batsman on the leg, and, in the opinion of the umpire, was pitched between wicket and wicket and would have hit the wicket if it had not been interfered with, the batsman is out l.b.w. (No. 5). Runs are made not only from the bat; they come from wides (balls which in the opinion of the umpire are outwith the batsman's reach), no-balls (balls jerked or thrown, or delivered while the bowler's foot is beyond the bowling-crease), byes (obtained by the batsmen running after the ball bowled has passed the wicket), and leg-byes (obtained by the batsmen running when the ball has struck some part of the batsman's body).

The object of each side is to get more runs than its opponents, and in one, two, or three day matches each eleven bats twice; but it frequently happens that one side is so superior to the other that it can win the match batting once to the other's twice. If a side leads by 150 runs in a three-day match, or by 100 runs in a two-day match, or 75 runs in a one-day match, it has the option of compelling the other side to go in again. In old days there was no option; there was a compulsory follow on when a side was 80 (afterwards 120) runs behind. If one side following on cannot equal the number of runs got by the other in its first and only innings, it is beaten in one innings, a fate that makes the iron enter into the soul of a keen captain.

Some few years ago the very easy wickets caused one of the minor developments of the game. Now the ball never shoots—that is, keeps close to the ground after pitching—and batsmen of the first class have become so numerous that it is almost impossible for them to be bowled out. Bowlers try and get them caught, and the practice has now

developed into a system, of bowling wide at the wicket on the off side to tempt batsmen to hit at the ball and get caught. Batsmen did not run the risk, and refused to fall into the trap by simply leaving the ball alone, and the game became slow and dull. To a great extent this is the case still, but it is not so noticeable, as the public became weary of it, and the expense of the game is so great that gate-money is essential. But whereas in old days the bowler had but one object before him, which was to bowl the batsman out, he has now another, which is to get the batsman caught, and to do this balls off the wicket are more efficacious than if they were straight. It often happens, however, that a first-class batsman gets so firmly set that he is impervious, especially on a wicket that is not of the fastest, which may be called a half-stump wicket, as the ball never rises more than half the stump high. But human nature being what it is, a batsman sometimes gets himself out by committing, perhaps, one act of indiscretion; he lashes furiously at an off-ball, or rushes out to a slow without gauging its length, but he is out because he has been indiscreet, and not because the bowler has beaten him. If it were not for these occasional lapses few three-day matches on fast wickets would be finished.

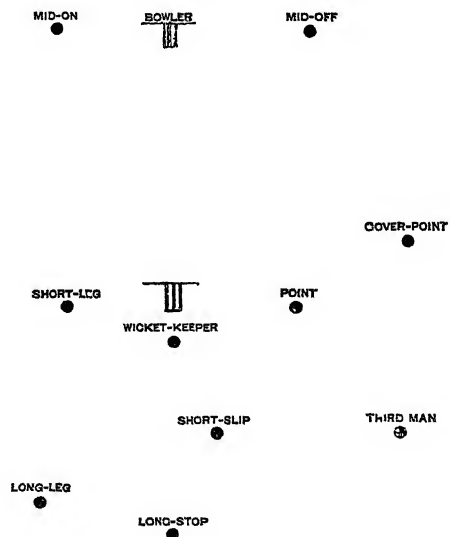
This large run-getting is never seen in a wet summer like 1910. There must always be many drawn matches in England, because rain prevents play, but matches are frequently finished in a rainy season in two days because slower-paced bowlers are helped by the softer pitches. The batsman has something to do; the bowler can make the ball bite the ground and turn or hang—i.e. stop and come on at a different pace—and a real duel is seen on more or less equal terms between bowler and batsman. It was a well-known fact that there were more keen, exciting matches with close finishes in 1910 than in any other year during the thirty years previous to 1912. It is absolutely true to say that there is nothing in any game to compare with a close finish in a cricket match. The excitement is not over in a short time—it frequently lasts the whole day; and it is safe to say that no situation is more trying to the nerves than that of a batsman who has to bat when every run or minute that he stays at the wicket is of importance in a match such as the test, university, or public school matches; and this is the charm of cricket. Perhaps the five best examples of such a match were the test matches at the Oval and Manchester in 1882 and 1902, the university matches of 1870 and 1875, and the Eton and Harrow match of 1910.

International cricket is now confined to the matches between England, Australia, and South Africa, of which the most important are those between England and Australia; but whereas those in this country have been limited to three days, and very frequently drawn, those in Australia and Africa are played to a finish. Apart from international cricket, the annual matches between Gentlemen and Players and that between Oxford and Cambridge Universities attract the most interest; but the backbone of English cricket is county cricket, which in the populous counties excites great interest.

It is impossible to do more than glance at the list of great players. W. G. Grace stands supreme as the greatest cricketer that ever lived. In his absolute prime, between 1868 and 1876, as a batsman he stood in a class by himself, and was a very successful bowler as well. Shrewsbury, on tricky, soft wickets, was perhaps even more difficult to get out; and other batting giants since 1870 have been Stoddart, A. G. Steel, A. P. Lucas, Gunn, W. Barnes, Ranjitsinhji, Jackson (a great player when his side was in a tight place), R. E. Foster,

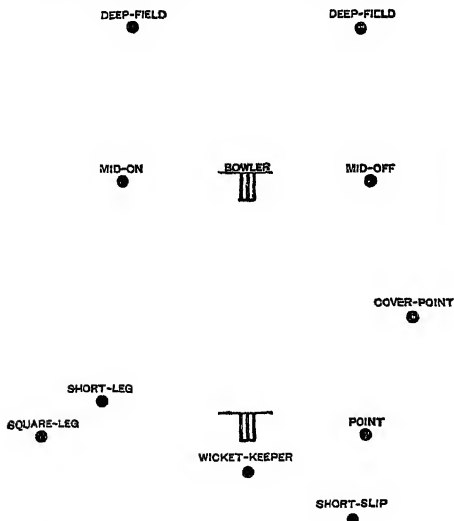
Fry, Maclaren (especially in Australia), Hayward, Hobbs, Sutcliffe, and others. Among faster bowlers, Richardson and Lockwood stand alone, and Alfred Shaw, Peate, Biggs, A. G. Steel, Lohmann, Hirst, and Blythe among the slower. England has always been rich in all-round cricketers—W. G. Grace, A. G. Steel, Jackson, Peel, Hirst, Rhodes, and Braund being as great as any. The Australians have specialised more; their cricketers do not as a rule shine conspicuously both as batsmen and bowlers, except Giffen, Noble, Armstrong, and J. M. Gregory; though Giffen's merits as a batsman have been overestimated. On the other hand, very few of the Australian bowlers are really useless as batsmen; on the contrary, they are often seen to play most doggedly at a pinch. The greatest Australian bats have been C. Bannerman, Murdoch, Scott, McDonnell, Darling, Trumper, Gregory, Bardsley, Duff, and Macartney, and none of these could be called bowlers, but they were all splendid batsmen. Their greatest bowlers have been Spofforth, Palmer, Turner, Trumble, and Macdonald. On the Australian wicket Palmer and Turner were perhaps the best; but in England Spofforth's claim to be the finest bowler the world has ever seen would be agreed to by most judges of the game. South Africa is a new arrival, but in G. A. Faulkner it has produced one of the greatest all-round cricketers that have ever been seen; but its bowlers have mainly been of the slow googly type, in which they have excelled.

The positions taken by the fieldsmen depend not only on the style of bowling, but the style of batsman as well. A hard cutter like Tarrant playing fast bowling on a fast wicket may want a second third man standing deep against the ropes to save 'fours,' and a strong player off his legs often finds himself confronted with two short-legs. In old days the placing of the field to fast bowling was very seldom varied, and was as under:



If a batsman especially strong as a square-leg hitter, like the late Mr R. A. H. Mitchell, were batting, long-leg would be moved to a position near the ropes in a line with the wicket; and to a cutter like the present Lord Cobham, nearly fifty years ago, third man would be moved back against the ropes, mid-on put third man, and short-leg would stand nearer the bowler, and become a hybrid mid-on. But as a general rule the above diagram shows the positions of the fieldsmen to fast bowlers.

To slow bowling the field was as follows :



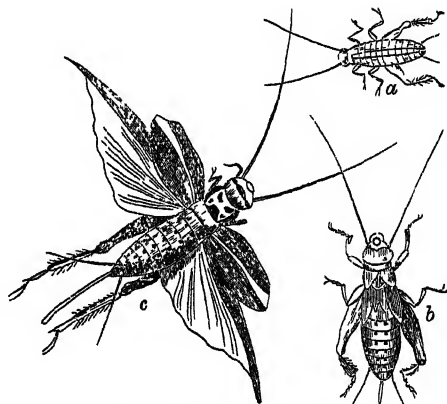
This was the position of the field to slow bowling and to the normal batsman. Many batsmen, however, could not hit hard in front of them, so one of the outfields was brought in and became perhaps a third man or a fine short-leg.

In the present day it may be said there is no fixed principle of placing the field, and the first change was the complete abolition of long-stop. The great Australian wicket-keeper, Blackham, in 1878 showed that this could be done on true grounds and to accurate bowling; and after he retired the practice became universal of standing back to fast bowling. The abolition of long-stop enables the captain to put an extra man in the slips or between mid-off and cover-point. The appearance of the googly bowler—i.e. the bowler who breaks both ways—and the bowler with a swerve has revolutionised the placing of the field. Frequently, to googly bowlers, there is no fieldsman in the slips at all, and no point, but cover-point stands more like a deep-point. There are two deep-fields, and one short-leg square with the wicket and another very fine. To very fast bowlers, such as the late Tom Richardson and Mr Jones, the Australian, the wicket-keeper stands back, and there are four slips; and George Hirst, when bowling his swerve, has three short-legs, two behind the wicket and one square.

See Nyren's *Young Cricketers' Tutor* (1833, 1893, 1902); Egan's *Book of Sport*; Wm. Caffyn's *Seventy-one Not Out* (1900); R. Daff's *Kings of Cricket* (1893); *The Jubilee Book of Cricket*, by Prince Ranjitsinhji (1897, 1901); *Cricket*, by W. G. Grace (1891); *How We Recovered the Ashes*, by P. F. Warner (1904); *The Badminton Manual* (1889; 7th ed. by Steel and Lyttelton, 1904; new ed. by P. F. Warner, 1920).

**Cricket** (*Gryllus*), a genus of orthopterous insects akin to grasshoppers. Long feelers, a rasping organ on the wing-covers of the males, wings closely folded lengthwise, but often along with the wing-covers degenerate, great powers of leaping, and a retiring, more or less subterranean habit of life, are some of the more important characteristics of the family (Gryllidae) of which the cricket is a type. The females are fertilised by means of peculiar spermatophores, and as in allied Orthoptera there is no marked metamorphosis in the life-history. In the genus *Gryllus* the head is blunt, the antennae are long and thin, the wings are always present, the hind-legs are very broad and

strong, and the females have a straight protruding egg-laying organ.—The Field Cricket (*G. campestris*) is very common throughout Europe in fields and meadows (local in England), and is very well known from the sound, by means of which the male captivates his mate. The body is compressed, the head is black and shining, the wing-covers are brown and yellow at the roots. As in other crickets, the noise of the males is made by rubbing the wing-covers against one another. The under side of one of the nervures bears over a hundred sharp transverse ridges or teeth. These insects hide in burrows in the ground, and sometimes do much damage to vegetables. The female lays numerous eggs in the burrow, and the larvæ remain as such through the winter.—The House Cricket (*G. domesticus*) has a lank, yellowish-brown body an inch long. A recent arrival in the United States, it is common throughout Europe in houses, is said to occur in the open air in Madeira, and even in Britain occasionally wanders out of doors in summer. It hides in nooks and crevices, and loves the neighbourhood of the fire, especially in winter. Its merry note has become associated with ideas of domesticity (as in Dickens's *Cricket on the Hearth*).



House Cricket (*Gryllus domesticus*):  
a, full-grown larva; b, pupa; c, perfect insect.

Without the heat of the fire, it becomes more or less dormant in winter. It remains quiet during the day, but hunts about actively at night



Mole Cricket and eggs (*Gryllotalpa vulgaris*).

for crumbs and other scraps both animal and vegetable. For the sake of both food and warmth it often frequents bakehouses. The larvæ are wingless, and the pupæ have only rudimentary wings. The loudest noise made by a cricket is probably that of a Sicilian species (*G. megal-*

*cephalus*), which is said to make itself heard 'at a distance of a mile.' Closely allied to the above genus is *Myrmecophila*, a wingless cricket with extremely strong hind-legs. Only the females are known, and these live parasitically in ants' nests. The Mole Cricket (*Gryllotalpa*) belongs to the same family, and is distinguished by the enormous burrowing fore-legs, by the large size of the anterior ring of the thorax, and by the absence of an ovipositor in the females. The only European species (*G. vulgaris*) is a large and formidable insect, sometimes attaining a length of two inches. It is of a grayish-brown colour, with a silken sheen. It burrows like a mole in fields and meadows, but is sometimes seen in flight in the evenings. Numerous eggs, inclosed in a cocoon, are laid underground. The larvæ are long in becoming adult. The mole cricket often does damage by biting at the roots of vegetable crops. Like the field cricket, however, it feeds very largely on ground insects and the like. A South American and West Indian species (*G. didactyla*) damages the sugar-canes.

**Cricklade**, a town in Wiltshire, on the Isis or Thames, 7 miles NNW. of Swindon. Enfranchised under Edward I., it returned two members to parliament till its disfranchisement in 1885, the 'borough' since 1782 having included forty-four parishes and parts of six. Cricklade with Wootton-Bassett now forms a rural district; pop. 11,000.

**Crieff**, a town of Perthshire, on the Earn's left bank, 26 miles NNE. of Stirling, and 18 W. of Perth by two branch-lines opened in 1856-66. It is situated in the midst of exquisite scenery, enjoys a pure dry climate, has a large hydropathic (1867), two old market-crosses, some handsome new churches, and Morrison's Academy (1859). Its famous cattle fair was transferred about 1770 to Falkirk; the manufacture of woollens was introduced in 1812. Of many seats in the neighbourhood, Drummond Castle (1491), Lord Ancaster's, is famous for the formal magnificence of its gardens. Pop. 6000.

**Crillon**, LOUIS DES BALBES DE BERTON DE, surnamed 'Le Brave,' was born at Murs in Provence in 1541. Under Francis of Lorraine, Duke of Guise, then the model of military chivalry, he was trained for war, and, still a boy, covered himself with glory at the siege of Calais, and at the capture of Guines. His heroism was rewarded with a number of church benefices, which he intrusted to the care of learned clerks. He distinguished himself further at Dreux, Jarnac, and Moncontour. Wounded at Lepanto (1571), he was yet sent to carry the news of the victory to the pope and the French king. His noble heart abhorred the treachery and horrors of St Bartholomew, but he took part in the siege of La Rochelle in 1573. Faithful to his king in his struggle with the Catholic League, after his death he gave hearty allegiance to Henry IV. When the peace with Savoy was concluded, Crillon retired to Avignon, and, after the fashion of a true Catholic warrior, ended his days 'in the exercise of piety and penance,' December 2, 1615. A somewhat melodramatic story is told how once when listening at church to an account of the crucifixion, the old hero, brandishing his sword, cried out: 'Where wert thou, Crillon?'

**Crime**, in its legal, as opposed to its moral or ethical sense, is an act done in violation of those duties for the breach of which the law has provided that the offender, in addition to repairing, if it be possible, the injury done to the individual, shall make satisfaction to the community. A private wrong, or civil injury, on the other hand, is an infringement on the rights of an individual merely, for which compensation to him is held to be suffi-

cient. Legal criminality is not a permanent characteristic of actions as such, but one decided by considerations of expediency. Without changing its absolute moral character, the same action may, and very often is, criminal in one country or generation, and no crime in another country or generation. It cannot, however, be supposed that the criminality or non-criminality of an action does not exercise an important reflex influence on the moral judgment of the community with respect to the particular action. Malice or evil intention is essential to the character of most crimes, for though there may be an immoral act which it is inexpedient to punish, it can rarely be expedient to punish what is not an immoral act. But it is not necessary that the evil intention shall be an intention to commit the particular crime which was in fact committed. There is sufficient *mens rea* to found criminal liability, if the offender had an intention to do any act which is either criminal or simply illegal without being criminal. Certain statutory offences may be committed though there is on the part of the offender no guilty knowledge or intention; e.g. the possession of unsound meat for sale, or the sale of an adulterated article of food, is a criminal offence, though the offender did not know the meat to be unsound or the article to be adulterated. The law can take no cognisance of a bare intention which has not ripened into any sort of act. How far Attempts (q.v.) are punishable is always a question of difficulty. The general rule seems to be that if such acts can be unequivocally connected with the criminal intention, they are punishable, though not to the same extent as the completed crime—e.g. if the act is one of a series which, if not interrupted, would result in the commission of the crime, even though the accused voluntarily desisted from further attempts. Pupils under seven years of age, and insane persons, as being incapable of design or intention, are regarded in the eye of the law as incapable of crime; as regards children between seven and fourteen it must be shown that they had capacity to know their act was wrong. In the case of persons under sixteen, otherwise known as juvenile offenders, magistrates have a large discretion to substitute for ordinary punishment confinement in a reformatory school. The legal definition of insanity is well settled in England and Scotland, but is totally inadequate from the medico-psychological point of view. The law of responsibility in drunkenness and *delirium tremens* also requires amendment. Ignorance of law is no defence—e.g. a foreigner, killing his opponent in a duel in England, is guilty of murder. In some cases ignorance of fact is important—e.g. where bigamy is charged against a woman who had reason to believe her husband dead. The defence of *compulsion*, if completely established in fact, is generally sufficient in law. The subjection of a servant to a master, or of a child to a parent, will be no defence. In England, a wife who commits an ordinary crime in her husband's presence and by his instructions is *prima facie* presumed to have committed it under such compulsion as to entitle her to be acquitted; but this rule does not extend to murder or treason, or to any crime committed by her outwith the actual presence of her husband.

In England criminal offences are distinguished as 'indictable'—i.e. those which admit of trial by jury on an indictment—and 'non-indictable'—i.e. those which are tried summarily without a jury. Originally these two groups were exclusive of each other; but, under modern statutes, they now overlap to some extent. Again, crimes are divided into *Misdemeanours* (q.v.) and *Felonies* (q.v.), the latter being a higher species of offence than the former. The Criminal and Judicial Statistics give

annual data as to the number of trials and convictions, and as to prisons and prisoners. See CRIMINAL LAW.

**Crime'a** (Tatar Krym, anciently the Tauric Chersonese), a peninsula of south Russia between the Black Sea and Sea of Azov, joined to the continent of Russia by the Isthmus of Perekop, 18½ miles long by 5½ miles broad at its narrowest part, was formed by the Moscow government in October 1921 into a republic in federal union with Russia. The peninsula is about 200 miles from east to west, by 125 miles from north to south, with about 625 miles of coast-line, and an area of about 15,000 sq. m. In shape it is an irregular quadrilateral, projecting eastwards into the peninsula of Kertch, which terminates at the Strait of Yenikalé. Along the Siwash or Putrid Sea on the north, and the Sea of Azov, the coasts are flat and open. To the west of the wide bay of Kaffa or Theodosia the south coast becomes rocky and elevated, and forms a succession of capes and small gulfs. Balaklava, and more especially Sebastopol, have fine harbours.

In the character of its surface, the north, and much the larger part of the Crimea, is only a continuation of the South Russian steppe. The southern part, from Cape Chersonese to the Strait of Yenikalé, only about one-fifth of the whole peninsula, is highland, traversed by a mountain-chain, the continuation of the Caucasus—a region geologically, climatically, and botanically distinct from the rest of Russia. The limestone mountains from Cape Chersonese to Baffa Bay show deep erosion, presenting the ruins of a vast tableland, sloping gently northwards into the steppe, but hanging in abrupt precipices southwards. Chatîr Dag or Tent Mount (anciently Mons Trapezus or Table Mount), 5450 feet, is a quadrilateral mass of over 8 sq. m., isolated on all sides, and seems to be exceeded in height by Roman Kosh. In the hilly district about Kertch are thermal and naphtha springs, and mud volcanoes. There are some fifty small rivers and rivulets, all fordable except after the melting of the snows and heavy rains. There are about four hundred salt lakes, rich in salt. The climate is healthy, and generally mild. But in winter the steppe is exposed to cold winds, frost, and snowstorms, while the south coast is sheltered and warm. The steppe, though not fertile, yet grazes innumerable herds of cattle, and yields porphyries and various coloured marbles. The northern mountain-slopes are laid out in pastures, thickets, orchards, and gardens watered from the rivers. In the uplands are still magnificent forests of oak, beech, elm, ash, willow, &c. On the southern slopes grow sea-pine; lower down is an Italian vegetation of laurel, pomegranate, fig, arbutus, and vine. Here are famous health-resorts, with Livadia and other former imperial residences. Good wine is largely produced, and some exported. Though the Crimea was once famous for its coin, it has suffered much from drought, and much good land is now uncultivated. The fauna is not rich. Of wild quadrupeds are the hare, fox, and small rodents. All the domestic animals of the steppe have been introduced, as also the two-humped camel. The Crimea has a highly prized oyster. The limestone mountains contain porphyry, diorites, and greenstone. Good coal is mined.

The population numbers about 760,000, of whom the greater part are Tatars, with a quarter of a million Russians, besides Greeks, Jews, Bulgarians, Germans, &c. The capital is Simferopol (q.v.), the old Tartar capital being Bakhiserai (q.v.). The Crimea is connected by railway with the mainland, the lines running to Sebastopol and to Theodosia and Kertch. It has from earliest times been a bone of contention for successive nations, and the

double or more manifold names of many places, Greek, Tatar, Turk, Russian, record the dominations they have successively undergone. For the early history of the Crimea, see BOSPORUS (*Cimmerian Bosphorus*). In the 13th century came the Tatars, the last of the Ghirei dynasty abdicating in favour of Russia, 1787. The Crimea formed part of the republic of Taurida (1918), and in 1920 saw the collapse of Denikin's adventure, and of Wrangel's.

**Crimean War.** For close upon forty years Britain had been at peace with all the great powers of Europe, but in 1853 a war-cloud arose on the eastern horizon. Russia had long cast a covetous eye upon Constantinople and the Sultan's possessions, and had contrived in various treaties to lay the foundation of a claim to something like a protectorate over the Christians of the Greek Church in Turkey, amounting to three-fourths of the Sultan's subjects in Europe. As early as 1844 the Emperor Nicholas had proposed to divide with Britain the inheritance of the 'sick man,' so he called Turkey; and in 1853 he began to urge his claims in a form which Turkey could not accept without ceasing to remain an independent state. The other great powers intervened as mediators, but in vain; and meanwhile a Russian army took possession of Moldavia and Wallachia. After nearly a year of fruitless diplomacy, negotiations were broken off, and Britain and France agreed to support Turkey by armed intervention. War was proclaimed against Russia on 28th March 1854.

The war thus undertaken lasted two years. At first, England and France stood alone in their support of Turkey; but early in 1855 Sardinia boldly joined the alliance, and sent a contingent to the seat of war. The other powers remained neutral throughout the contest. The chief scenes of operation were the Black Sea and the Baltic. In the spring of 1854 a powerful British and French fleet appeared in the Gulf of Finland; but the Russian fleet declined the combat, and kept safe behind the granite fortresses of Cronstadt and Sveaborg, which, owing to shallow water and difficult navigation, could not be attacked by the large vessels composing the allied fleets. The only thing of importance effected, besides imprisoning the enemy's navy and ruining his commerce, was the destruction of the fortress of Bomarsund, and the capture of the Åland Islands, on which it was situated. The second Baltic campaign, in 1855, was a repetition of the first. Sveaborg was bombarded and partially destroyed, but again the want of gun-boats confined the real services of the fleet to a strict blockade of the Russian coasts.

In the Black Sea the Russian fleet followed the same tactics as in the Baltic, and took refuge in the fortified harbour of Sebastopol, sinking vessels across the entrance to keep out the enemy. On land, the Turkish forces, under Omar Pasha, had sustained during the winter of 1853-54 an heroic contest on the Danube against the Russian invaders. The French and British troops sent to the aid of the Sultan were landed at first in European Turkey, chiefly at Varna (April and May 1854). But the valiant defence of Silistria by the Turks themselves rendered our advance in that direction unnecessary; after using every effort for six weeks, the Russians had to retire baffled from before the place. The allies having suffered great loss from cholera at Varna, it was resolved to carry the war into the Crimea; and on 14th September an army of 25,000 British under Lord Raglan, as many French under Marshal St Arnaud, and 8000 Turks, landed on the west coast, 30 miles north of Sebastopol. On the 20th they attacked and completely defeated a Russian army strongly posted on the steep heights above the river Alma; then taking

up position near Balaklava, to the south of Sebastopol, they commenced the siege of that vast fortress. The Russians made repeated attempts, with overwhelming masses of troops, to force the allied position, which led to the sanguinary battles of Balaklava (25th October) and Inkermann (5th November).

Balaklava was mainly a cavalry action, and did far more credit to our soldiers' gallantry than to their commanders' generalship. It will ever be memorable for the glorious charge of the Light Brigade, who, in obedience to a bungled order, rode a mile and a half beneath a murderous fire against the Russian army in position. Faster and faster grew the pace, until with a cheer that was many a hero's death-cry, they broke right into the battery, sabred the gunners, and burst through a column of infantry. Then they paused, and cut their way back; but out of the six hundred who had ridden forth, not two hundred returned. 'It is magnificent, but it is not war,' was the comment of a French general. Inkermann, known as the Soldiers' Battle, was fought on a dark and drizzly morning of autumn. Taken unawares, and short of cartridges, 8000 British sustained for several hours a hand-to-hand fight against six times that number of Russians, till 6000 French came to their aid, and completed the rout of the enemy.

Throughout the ensuing winter, the allies, especially the British, suffered terrible hardships, owing partly to the rigour of the climate, but more to the shameful breakdown of the system for provisioning the army. The supplies of food, clothing, and other necessities were often sent where they were not wanted. The hospitals, too, were frightfully mismanaged; barely 12 per cent. of our total loss in the war (20,656) dying in battle, the rest in hospital. To Florence Nightingale, a lady of gentle birth, was due the establishment of proper nursing in the military hospitals, not merely then, but thereafter.

The prodigious extent and strength of the fortifications of Sebastopol (q.v.), together with the skill and obstinacy of its defence, protracted the siege for nearly a twelvemonth, and rendered it well-nigh the greatest in history. In March 1855 died the Czar Nicholas, whose ambition was the cause of the contest; but under his son and successor, Alexander II., Russia continued to sustain the enormous drain on her population and resources. The trenches, or lines of attack, had drawn closer and closer to the Russian works, till at one point the foes were well within speaking distance; at last, on 8th September 1855, after a three days' tremendous cannonade by the allies, the French stormed and carried the Malakoff fort, the key of Sebastopol. That night the Russians evacuated the city, or rather its blazing ruins. Except for the surrender of Kars in Circassia, after its gallant defence by the Turks under Colonel Williams, a British officer, the war ended with the fall of Sebastopol. In March 1856 a treaty of peace was signed at Paris, by which Russia lost all she had gained or attempted to gain; but the article prohibiting Russia from building arsenals or having war-ships on the Black Sea (q.v.) was abrogated in 1871. See Kinglake's *Invasion of the Crimea* (8 vols. 1863-87), and books on the war by Sir E. Hamley (1891), Sir D. Lysons (1895), Stelling (1895), and Sir W. H. Russell (1855 and 1895).

**Criminal Conversation.** See ADULTERY.

**Criminal Law** is that branch of law which deals with crimes and their punishment. Crimes are a specific class of wrongful acts which the state, in the public interest, intervenes to punish. The object of criminal law or of criminal proceedings always is the punishment of the offender.

On the other hand, the object of civil law or of civil proceedings is the redress of the wrong by compelling compensation or restitution to the injured party. In the case of all crimes the law treats the wrong-doing as not merely an injury to an individual, but as a matter of public concern. Where a crime has been committed the person injured cannot prevent proceedings being taken to secure punishment, for the criminal has to answer for his deed to the state itself.

Prior to any distinction between criminal and civil procedure, prior even to legal procedure of any kind, the principle of retaliation or private vengeance was operative. The system of *talis*—that is, of inflicting an evil upon the wrong-doer in proportion to the wrong he has inflicted on you, 'an eye for an eye and a tooth for a tooth'—is found in the early laws of the Hebrews, Greeks, and Romans, in early systems of Teutonic law, and, indeed, universally in primitive communities. In Rome, as in England, the early law recognised and regulated this system of self-help which the state was as yet not strong enough to prevent or repress. A notable advance in civilisation was made when a fixed money payment for specified injuries was substituted for the *talis*, so that private vengeance could be exacted by the injured party only where the culprit failed to offer the prescribed reparation. In the Anglo-Saxon era the right of private vengeance for an injury was called *fēth* ('feud'). But the law gradually compelled the injured party or his kinsmen to accept a pecuniary *Wer-gild* (q.v.) in lieu of blood revenge; and, when the idea gained ground that wrong-doing was injurious not only to the victim of the wrong, but also to the state, a fine, known as the 'wite,' was also exacted on behalf of the community from the wrong-doer.

When the state intervenes directly to punish certain classes of wrongful acts, these acts become crimes as distinct from mere private wrongs. In the case of such acts, the idea of punishment supersedes the idea of compensation to the community or to the injured party. Thus the distinction between crimes and civil wrongs does not consist of any intrinsic difference in the nature of the wrongful acts, but in the different aims of the legal proceedings taken upon them—the aim being, in the case of a crime, the punishment of the wrong-doer, and, in the case of a civil wrong, the enforcement of the right of the injured party to redress. Hence a wrongful act may be either a crime or a civil wrong; or it may be, and often is, both. Hence, too, the particular classes of wrongs which are recognised as crimes vary from one legal system to another, and, under any one legal system, vary from era to era. Thus, theft in Roman law was a civil injury, but in English law is a crime. Again, many acts are now criminal in England which formerly either were not wrongs at all, or were wrongs giving rise merely to claims for damages.

The strength of criminal law lies in its prohibitions and punishments being in accordance with the moral sense of the community. The principles which should determine the measure and method of criminal punishment have been much discussed. Beccaria's work, *On Crimes and Punishments*, published in 1764, has exercised a strong influence throughout western Europe in securing more humane consideration for criminals; and English jurists of the 18th century, such as Bentham and Romilly, accomplished much towards the abolition of the aimless severities which formerly disfigured the criminal law of England. But the question as to the principles on which penalties should be awarded for crime is still unsolved. The main ends and purposes of criminal punishment are, it is generally admitted, to deter, to prevent, and to reform; but it is no less generally recognised that the methods

of punishment hitherto in use in criminal law are clumsy and imperfect instruments to these ends. To some extent, indeed, these several ends tend in practice to be antagonistic. Thus it is difficult to devise forms of punishment which shall be at once deterrent and reformatory, at once dreaded and yet not injurious, mentally, morally, or physically. Again, it is urged with truth that punishment can be effectual as a deterrent only if it is certain in operation; but it is difficult to secure certainty in the administration of criminal law, and at the same time to adapt the punishment to the special needs of the individual culprit. In recent years, in England and Scotland, attempts have been made to surmount these difficulties by instituting various classes of places of penal detention—the convict prison, the reformatory, the industrial school, the Borstal institution, &c.; by making special provision for the trial and punishment of youthful offenders (8 Edw. VII. chap. 67); by empowering criminal courts, having regard to the character, antecedents, age, health, or mental condition of the person charged, to refrain from inflicting punishment or to release him 'on probation' on his entering into a recognisance to be of good behaviour, and to appear for sentence when called on during a certain period (7 Edw. VII. chap. 17); and by enabling a court, on pronouncing a sentence of penal servitude on a person who is an 'habitual criminal,' to add a further sentence of 'preventive detention' after the end of the penal servitude, if it deem such a course expedient for the protection of the public (8 Edw. VII., chap. 59).

Criminal law deals both with the substantive law of crimes and with the procedure by which offenders are tried and brought to punishment. The substantive portion of criminal law defines the conduct which constitutes each particular crime (see *CRIME* and the several articles on particular crimes, *MURDER*, *THEFT*, *PERJURY*, &c.), and also the general elements necessary to a criminal act, the facts which exempt from criminal responsibility, such as tender age, compulsion, or lunacy, and the facts which justify an act otherwise criminal, such as self-defence. In general, the law punishes only acts and not omissions, and ignorance that an act is criminal is no excuse. A principal—i.e. the person by whom the criminal act itself was done—and accessories before the fact are all equally punishable. In English law an accessory after the fact—i.e. a person who, knowing that a felony has been committed, shelters the felon or actively assists him in escaping punishment—is also liable to punishment.

Criminal procedure in English law differs from that in most other systems of law in resembling more closely the procedure of an ordinary civil action. In Scotland, as in France and other Continental countries, criminal proceedings are instituted by public officers, and a criminal prosecution is of the nature of a public inquisition by the authorities of the state. Thus in Scotland the Lord Advocate and the subordinate public prosecutors acting under his control are directly responsible for the investigation of suspected crimes and for the institution and conduct of criminal prosecutions. In England, on the other hand, the duty of demanding the punishment of a criminal is laid primarily on the person injured by the criminal act, though the proceedings are taken in the name of the king as representing the state, and every citizen, whether injured or not, has a right to set the law in motion. The law may also be set in motion by the police. By recent statute, a public officer, the Director of Public Prosecutions, has authority to institute or carry on criminal proceedings in any court and intervene in any criminal proceeding actually commenced, and take the further conduct of the

case out of the hands of the private prosecutor or the police (42 & 43 Vict. chap. 22; amended by 47 & 48 Vict. chap. 58, and 8 Edw. VII. chap. 3).

Both in England and Scotland the procedure by which offenders are brought to punishment is of two kinds—ordinary (or, as it is called in Scotland, solemn) and summary. In both countries the fundamental distinction between these two modes of proceeding is that, in solemn, or ordinary, procedure the guilt or innocence of an accused person is determined by a jury, while in summary procedure the accused is condemned or acquitted by the magistrates (or, in Scotland, by the sheriff) without the intervention of a jury. In many other respects the proceedings for the trial of an offence differ according as the offence is tried by a jury or summarily. In particular, in the former case, the accused must be formally committed for trial, and the trial proceeds on an indictment; in the latter case, the accused need not be formally committed, and the trial proceeds on an information or complaint.

The vast majority of criminal cases, being offences of a more or less trivial character, are disposed of summarily. In England and also in Scotland the method of procedure in courts of summary jurisdiction is minutely regulated by statute with a view to secure simplicity and despatch, and the procedure in a summary trial is very similar in both countries. Where the accused is tried by a jury on an indictment, the procedure differs in England and Scotland. In England the magistrate before whom a charge is made issues a summons to the accused to attend or grants a warrant for his arrest; or, as frequently happens, the accused is arrested without a warrant. When the accused appears before the magistrate the witnesses are examined in his presence, and he is at liberty to put questions to them either personally or by counsel. The statements of the witnesses, technically termed depositions, are read over to, and signed by, the witnesses respectively, as well as by the magistrate. The accused may then say anything he desires in answer to the charge, he being warned that whatever he says will be taken down in writing and may be used in evidence against him. Whatever the accused then says is taken down in writing, and signed by the magistrate, and may be read at the trial without further proof. The prisoner's witnesses, if any, are next examined. Thereafter the justice (or, if there be more than one, the majority) may either discharge the accused or commit him for trial, which practically means that he is either sent to prison to await his trial or is admitted to Bail (q.v.). The commitment is for trial either at quarter sessions or at the assizes. A written or printed accusation, called a 'bill of indictment,' setting forth the precise charge which the prisoner is called upon to answer, is laid before a grand jury consisting of from twelve to twenty-three persons. The grand jury, after being sworn in open court and 'charged' by the presiding judge, retire to their room, and, after hearing the witnesses for the prosecution, find either a 'true bill' or 'no bill.' The prisoner himself has no right to give evidence before the grand jury; but twelve of them must agree before they find a 'true bill' or 'ignore' a bill. (The Grand Juries (Suspension) Act, 1917, provided for the suspension of grand juries during the war and for six months after its termination.) Where the grand jury have found a true bill, the next step is to 'arraign' the prisoner—i.e. to call him to the bar of the court, read to him the indictment, and ask him whether he is guilty or not of the offence charged. If he pleads 'not guilty,' petty jurors, twelve in number, are sworn, and the trial proceeds before the judge and jury in open court. The counsel for the prose-

cution 'opens' by an address directing the attention of the jury to the main questions at issue, and then examines the witnesses for the prosecution, who are afterwards cross-examined and re-examined. Counsel for the accused then examines the witnesses for the defence, including the accused himself if he desire to give evidence on oath. This right was conferred on the accused by the Criminal Evidence Act, 1898, and it is the duty of the judge to make it clear to him that he has this right. Where witnesses, other than the accused, give evidence as to the facts, counsel for the accused opens the case for the defence, and at the close of the evidence may make a second speech on the evidence, and the prosecuting counsel has a right to reply on the whole case. If no evidence has been adduced for the prisoner other than his own evidence, the address of the counsel for the defence is the last. Thereupon it is the duty of the judge to sum up the case to the jury, who then consider their verdict, which must be unanimous. If the verdict be 'guilty,' the accused is sentenced; if it be 'not guilty,' he is discharged. The Poor Prisoners' Defence Act, 1903, makes provision for a prisoner who is without means, and can show a fair defence, having a solicitor and a counsel assigned to him, and the expenses of his defence being paid out of public funds. By an Act of 1907 (7 Edw. VII. chap. 23)—which, however, does not extend to Scotland or Ireland—a Court of Criminal Appeal has been created for England. To this court a person convicted on indictment has an unfettered right of appeal on any question of law; a right, in case of his obtaining leave either from the Court of Criminal Appeal or from the judge who tried him, to appeal on any question of fact, or of mixed fact and law; and a right, on obtaining leave from the Court of Criminal Appeal, to appeal against the sentence passed on him.

In Scotland the proceedings in a criminal prosecution on indictment commence with an application for warrant to arrest, which may be granted by any magistrate. The accused, on being arrested, is entitled at once to the services of a law-agent, and such law-agent is entitled to have a private interview with the accused before he is examined on declaration and to be present at that examination. The examination on declaration takes place before a sheriff or a magistrate, who must give the accused warning that he is not bound to answer any questions, and that what he says may be used in evidence against him. What he says, or a statement by him that he declines to answer, is written out and read over to him, and is signed by him and by the sheriff or magistrate. The accused is entitled to apply for Bail (q.v.) immediately after he has emitted a declaration. If bail is not allowed, the accused is, in the usual case, committed to prison either for further examination or until liberated in due course by law. Committal for further examination means that he is detained for such limited period as is necessary to enable the procurator-fiscal to examine witnesses and determine whether the evidence is sufficient to justify him in asking that the prisoner be committed for trial. The 'precognitions'—i.e. the evidence—of the several witnesses are taken by the procurator-fiscal in private and separately, and, except in exceptional circumstances, a witness is not put on oath at precognition. Where the first committal is only for examination, the magistrate, if he thinks that the precognitions show a *prima facie* case, grants a warrant committing the accused for trial. The precognitions are then sent to the crown agent to be submitted to crown counsel, who may order the accused to be liberated, or may order the case to be tried by sheriff and jury, or may indict the case for trial in the High Court of Justiciary.

Where the trial is in the High Court, the indictment, which runs in the name of the Lord Advocate, is prepared by crown counsel, and a copy of it is served on the accused. It sets forth the crime charged, and contains a list of the witnesses to be examined at the trial and a list of the articles or documents to be produced at the trial. Two 'diets' are fixed. The first of these diets, called the 'pleading diet,' is held before the sheriff. If the accused pleads guilty at this diet, he is sentenced by the sheriff or remitted to the High Court for sentence. If he pleads not guilty, the case is continued for trial at the second diet, at which diet, if the accused adheres to his plea of not guilty, the case is laid before a jury of fifteen persons, empanelled to try it. The witnesses for the prosecution are examined, and then the witnesses for the defence. The accused himself is a competent but not compellable witness. When all the evidence has been led the prosecuting counsel and the counsel for the accused address the jury, the former speaking first and not having any right of reply. The judge sums up, and the jury return their verdict, which need not be unanimous, but may be by a majority. If the verdict be 'not guilty' or 'not proven,' the accused is assoiled and dismissed. If it be 'guilty,' sentence is pronounced. A sentence in the High Court cannot be reviewed, except in case of a sentence of 'preventive detention,' pronounced under the Prevention of Crimes Act, 1900, on a prisoner who is an 'habitual criminal,' against which an appeal lies under that act to a court of appeal consisting of not less than three judges of the High Court.

**Criminology** is a recently invented term denoting a new science—the branch of anthropology which deals with crime and criminals, sometimes called 'criminal anthropology.' The science is largely based on the researches and views of Dr Cesare Lombroso, born of Jewish stock at Verona in 1836, who, after serving as an army surgeon and holding posts at Pavia and Pesaro, had at his death in October 1909 been for many years professor of psychiatry and of criminology at Turin. He wrote numerous works on insanity, criminal insanity, the anthropometry of criminals, the close connection between insanity and genius, the criminal (1875), crime, its causes and remedies (1899), as well as spiritualism. He held that the congenital habitual criminal is marked by conspicuous physical and mental defects. Arrested cranial development and deformity, heavy jaws, ugly features, and many other minor abnormal physical characters are associated with moral insensibility, low intelligence, vanity, and irregular emotional peculiarities verging on insanity. The occasional criminal who yields to severe or special temptations was treated as belonging to a wholly distinct category. These anthropological views, by no means universally admitted, would naturally lead to somewhat sweeping changes in the treatment of criminals.

See, besides the works of Lombroso, *The Criminal*, by Havelock Ellis (1890); *Modern Theories of Criminality*, by De Quiros (1911); *Criminal Psychology*, by Hans Gross (1911); and other works translated by the American Institute of Criminal Law and Criminology; *The English Convict*, by Charles Goring (1913; new ed. 1919); also the articles PRISONS, REFORMATORY AND INDUSTRIAL SCHOOLS, INSANITY, CAPITAL PUNISHMENT.

**Crimp**, a person who usually keeps a sailors' boarding-house, and who professedly occupies himself in finding employment for seamen. Crimps, or 'runners,' as they are often called, and the disreputable persons who are associated with them, live by pandering to the follies and vices of the lower and less provident class of seamen. Their object is to get hold of the sailor and his effects,

keep him by means of drink or drugs in their power until his wages are paid, and fleece him of his money, and even of his clothes.

**Crinan Canal**, an artificial waterway, 9 miles long, in the west of Argyllshire, between Loch Gilp, a branch of Loch Fyne, and Loch Crinan, in the Sound of Jura, at the head of the peninsula of Kintyre. Constructed in 1793-1801 at a cost of £183,000, to avoid the circuitous passage of 70 miles round the Mull of Kintyre, it has 15 locks, and admits vessels of 200 tons. In 1859 the three reservoirs feeding it burst, and government had to repair the damage at a cost of £12,000. The receipts seldom cover the year's expenditure. Enlargement has been proposed.

**Crinoidea** (Gr., 'lily-like'), a class of Echinodermata, sometimes called feather-stars or sea-lilies, and well known in fossil form as encrinurites or stone-lilies. While agreeing in general structure with starfishes and other Echinoderms, the Crinoids present many peculiarities. They are fixed permanently or temporarily, mouth upwards, by a stalk, which is usually jointed. The visceral mass is enclosed in a cup at the apex of the

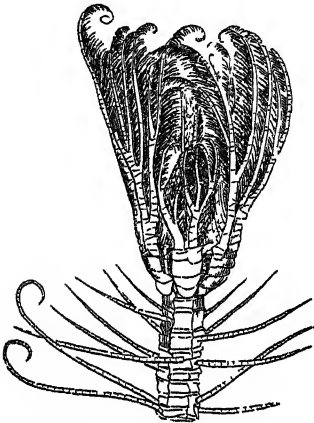


Fig. 1.—Pentacrinus.

stalk. As in most other Echinoderms, there are numerous limy plates, forming the stalk, the supporting cup, the framework of the arms, &c. The anus lies near the mouth. The 'arms,' though typically five (towards 200) by branching; they usually bear lateral pinnules, which produce a feathered appearance. Water enters the body-cavity by numerous pores on the oral surface, and passes by 'stone-canals' into the ring round the mouth which sends a radial vessel up each arm. The tube-feet are small and delicate, and serve for respiration and food-wafting. Besides the usual nerve-ring round the mouth and the radial cords arising from it, there is an 'aboral nervous system' which controls the movements of the animal. The sexes

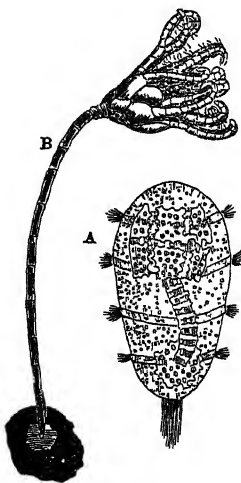


Fig. 2.

A, free-swimming larva, with skeleton of adult forming inside; B, fixed stalked young (Pentacrinus-like) stage.

are separate and similar, and the germ-cells are formed in the pinnules of the arms.

**Mode of Life**—Most of the living Crinoids fix themselves in larval life and remain attached. The Comatulids, however, break off from their stalk at an early stage, and in *Holopus* the stalk is represented by a leathery non-calcified outgrowth from the calyx. The stem of the stalked forms is usually anchored to a rock or other foreign object, but in some cases the animal grows more loosely on a muddy bottom. Like the extinct forms, the modern stalked Crinoids grow in masses, forming beds of sea-lilies on the ocean floor. Over a hundred specimens have been dredged in a single haul. When they move about, as in the Comatulidæ, they do so by alternately bending and straightening the arms. The food, which consists of minute organisms (protozoa, diatoms, small crustacea, &c.), is wafted down ciliated grooves on the pinnules and arms to the mouth. The known larvæ are actively free-swimming by means of cilia. Comatulata and some others are the hosts of curious parasitic Chaetopod worms (Myzostomidæ), which cause deformities on the arms. Like many other Echinoderms, the Crinoids have the power of regenerating lost parts. Broken-off arms may be replaced, and even the renewal of the visceral mass has been observed.

**Important Forms and Classification.**—The best-known genus is the cosmopolitan *Antedon* or *Comatulata*, of which *A. rosacea* is the most abundant

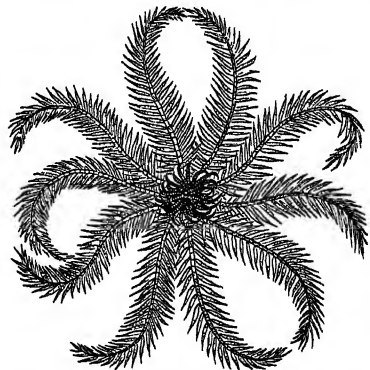


Fig. 3.—Free Adult, showing wreath of anchoring hooks.

species, frequently dredged off British coasts. Along with the large genus *Actinometra* and some others less important, *Antedon* represents the family of Comatulids, which differ from other Crinoids in being stalked only in their youth. Professor J. Vaughan Thompson has the credit of having discovered the young stalked stage of *A. rosacea*, and thus revealing the existence of a most interesting habit. The free *Antedon* swims gracefully by bending its ten arms, and then settles down again for a while, anchoring itself by means of an inferior wreath of clawed attaching processes. Among permanently stalked Crinoids may be mentioned the genus *Pentacrinus* (e.g. *P. asterius*), from the Atlantic and Pacific, often at great depths; *Rhizocrinus* (e.g. *R. lofotensis*), from the Atlantic, usually abyssal; *Holopus*, from the Caribbean Sea, with very massive arms, and only a single extant species.

**Distribution.**—Most of the modern stalked Crinoids are distinctively deep-water animals, and many have been dredged from over 2000 fathoms. The stalk serves to raise the essential part of the animal out of the fine ooze on the sea-floor. Many Comatulids frequent shallow water; thus the British Rosy Feather Star is found at about 10 fathoms. The peculiar *Holopus* is also found in shallow water in the Caribbean Sea.

The great majority of the Crinoids are extinct, and the class must be regarded as decadent. As compared with about a dozen recent genera, there are over 200 known as fossils. They were represented in the Lower Cambrian, and attained great development in Silurian, Devonian, and Carboniferous times. Besides Crinoidea in the strict sense, there are allied classes of great zoological interest which are wholly extinct—the Cystoidea, Blastoida, Edrioasteroidea, &c. The last-named class, also known as Thecoidea, is probably nearest the root-stock of the Echinoderms, from which the free forms or Eleutherozoa (starfishes, sea-urchins, &c.) diverged in one direction, and the stalked forms or *Pelmatozoa* (Crinoids, Cystoids, &c.) in another.

See **ECINODERMATA**; **STARFISH**, &c.; F. A. Bather, 'Echinodermata,' in *Lankester's Treatise on Zoology*, part II. (1900); E. W. MacBride, 'Echinodermata,' in vol. I. of *Cumbridge Natural History* (1906); F. Jeffrey Bell, 'British Echinodermata,' *Brit. Mus. Catalogue* (1892); P. H. Carpenter, 'Stalked Crinoids,' *Challenger Reports*, xi. (1884); Jaekel, *Stammesgeschichte der Pelmatozoen* (1889); Wachsmuth and Springer, *Revision of Palaeocrinoidea* (Phila. 1879-85).

**Crinoline**, the name originally given by the French *modistes* to a fabric of horse-hair (Fr. *crin*, 'hair'), capable of great stiffness, and employed to distend women's attire. It was applied in a general way to those structures of steel wire or hoops, by means of which women between 1855 and 1866 attained enormous dimensions—12, even 15 feet in circumference. Such fashion of expansion was not new. There was the *fardingale* of Queen Elizabeth, when the upper part of the body was encased in a cuirass of whalebone, which was united at the waist with the equally stiff fardingale of the same material, descending to the feet in the form of a great drum. We next hear in 1711 of 'that startling novelty the hoop petticoat,' which differed from the fardingale in being gathered at the waist; and by 1744 hoops had grown so extravagant, that a woman occupied the space of six men. An elongated oval form also came into fashion, raised at each side to show the high-heeled shoes. In 1780 we find hoops of cane advertised to 'outwear the best sort of whalebone.' About 1796 hoops had been discarded in private life, but were still the mode at court until, in the time of George IV., they were abolished by royal command.

**Crinum**, a genus of bulbous-rooted amaryllids (sometimes included under *Sternbergia*), chiefly tropical, and frequently cultivated in hothouses—e.g. *C. latifolium* of India, *C. scabrum* of Brazil, &c.

**Cripple Creek**, a city, capital of Teller county, Colorado, 40 miles by rail N. by W. of Florence. It is a gold-mining centre. The population has fallen from 10,000 in 1900 to 2300.

**Cris-cross Row**. See **HORNBOOK**.

**Crispi**, **FRANCESCO** (1819-1901), statesman, was born at Ribera in Sicily, and was called to the bar in Palermo, but joining in the revolutionary movement of 1848, had to flee to France. He organised the successful movement of 1859-60, and re-entered Sicily with Garibaldi. He was conspicuous in the history of Italy as deputy, president of the chamber, minister, and in 1887-90, and again in 1894-96, premier. He represented the Left, was strongly anti-clerical, and maintained the alliance with Germany even at the cost of the alienation of France. Strenuous efforts were made by his enemies to discredit him by connecting him with a series of bank scandals. See *Life* by Stillman (1899), and his *Memoirs*, compiled by Palamenghi-Crispi (trans. 1912-14).

**Crispin**, saint and martyr under Diocletian, fled along with his brother Crispinian, from Rome into Gaul, where they worked as shoemakers in the

town now called Soissons, and where Crispin distinguished himself by his exertions for the spread of Christianity, as well as by his works of charity. In A.D. 287 he and his brother suffered martyrdom by being thrown into a caldron of molten lead. Both are commemorated on the 25th October. Crispin is the universally recognised patron saint of shoemakers.

**Cristofori**, or **CRISTOFALI**, **BARTOLOMEO**, harpsichord-maker, was born at Padua in 1655, and died at Florence in 1731. He is regarded as the inventor of the pianoforte.

**Critchett**, **GEORGE**, ophthalmic surgeon, born in London in 1817, became F.R.C.S. in 1844, and was assistant-surgeon and (1861-63) surgeon to the London Hospital. He early devoted his attention to ophthalmology, and was attached to the hospital at Moorfields from 1846; in 1854 he published a course of lectures on *Diseases of the Eye*, and from 1876 he was ophthalmic surgeon and lecturer at the Middlesex Hospital, where his operations acquired a European fame. He died 1st November 1882.

**Critias**, one of the pupils of Socrates, but unfortunately one who was rather a hearer than a doer of his word. On his return to Athens from banishment, he put himself at the head of the oligarchical party, and was afterwards the most rapacious and cruel among the thirty tyrants set up by the Spartans (404 B.C.). In the same year he fell at Munchia, resisting Thiasylus and the exiles. Critias had a high reputation as an orator, and besides wrote poetry.

**Critical Temperature** is that temperature below which a substance may, and above which it cannot, be liquefied by pressure alone. This temperature for carbonic acid gas, for example, is 30.9° C.—i.e. below that temperature, the liquefaction of the substance may be easily effected if sufficient pressure be applied; but above it the substance cannot be liquefied, no matter how great be the pressure to which it is subjected. The discovery of the critical temperature by Dr Andrews in 1869 first gave the means of distinguishing between a true gas and a true vapour; for the former is a substance above, the latter one below, its critical temperature. When any substance is at this temperature it is in the critical state—i.e. its passage from liquid to gas, or *vice versa*, is one in which the two parts, liquid and gaseous, so merge into one another as to render them optically indistinguishable. The critical temperatures of oxygen, hydrogen, and nitrogen (formerly termed 'permanent' gases) are all extremely low, and hence liquefaction can only be effected (as it has already been) by the application of intense cold as well as considerable pressure. On the other hand, such vaporous bodies as sulphurous anhydride, alcohol vapour, ether vapour, &c. can, provided the pressure be sufficiently great, be liquefied at ordinary air temperatures, since these are much below their critical temperatures. See **GAS**, **VAPOUR**, **MATTER**.

**Criticism**, **BIBLICAL**. See **BIBLICAL CRITICISM**.

**Criticism**, **LITERARY**, is generally held to begin with Aristotle, and by Aristotle's teaching, rightly or wrongly understood, it has been dominated ever since. Earlier instances can, of course, be traced. The work of the sophists and the epideictic orators implies the existence of criticism, and it can be seen, not yet disengaged from other operations of the mind, in the *Frogs* of Aristophanes and the *Republic* of Plato. Even Aristotle's *Rhetoric* is not written from a strictly literary standpoint, for it is a treatise of the art of persuading. In the *Poetics* he founds a masterly theory on the actual practice of poets, mainly, in the surviving fragment, tragic and epic poets, thereby at once showing

successors an example of the true method and throwing an obstacle in their way. For critics of the European nations found it so much easier to see what Aristotle had shown them in Greek tragedy and epic than to look for anything new in their own literatures, that they narrowed their outlook to the scope of Greek literature, and made repressive rules of his observations. The learned men of Alexandria, to whom the active spirit of literature was denied, busied themselves mainly with minutiae of technique. If they did not escape pedantry, they yet did much useful laborious scientific work. Technique again absorbs the attention of Dionysius of Halicarnassus. It is far otherwise in the author (Longinus, it may be) of *On the Sublime*, the greatest, after Aristotle, of Greek critics, who has perhaps never been excelled in generous insight.

The criticism of the Romans is of much smaller value. Apart from casual censures and dicta, Cicero, Horace, Seneca, Tacitus (if he wrote *De Oratoribus*), and Quintilian deserve mention—Horace for the mischievous tyranny long after wielded by the brilliant philistinism of his *Ars Poetica*, Quintilian for his catholicity in appreciation. From Alexandria the line of grammarians and commentators passes to Rome. Writers of miscellaneous second-hand lore, Aulus Gellus, Macrobius, Martianus Capella, hand on the torch to the Dark Ages, which are little enlightened by its glimmerings. Dante alone, before the new learning—unless Boccaccio be counted a second—was a notable critic.

The influence of Aristotle was strong among the Italians of the Renaissance, who expanded his teaching as to unity of action into the doctrine of the three unities, and by insisting on the supremacy of epic, stained modern poetry out of its natural course. Important names are those of Vida, Trissino, Daniello, Robortello, Cinto, Minturno, Scaliger, Castelvetro, Tasso, and Patrizzi.

English criticism before the Renaissance had been confined to a few random utterances, seldom more than perfunctory compliments. But after it is fairly begun by Wilson, Cheke, and Ascham, Italian influence becomes strong. Poetry is defended, its principles examined into, and special problems, such as the legitimacy of rhyme and the possibility of naturalising classical metres, are discussed by such men as Gascoigne, Lodge, Spenser, Gabriel Harvey, Sidney, Webbe, Nash, Puttenham, Campion, Daniel, Jonson, and Bacon. The prestige of English is maintained, and it is distinctly asserted that 'Poesy must not be drawn by the ears; it must be gently led, or rather it must lead; yet one can see in this enlightened and tempered classicism the threat of a criticism that should claim to legislate for poets rather than 'seek to know what they do and how they do,' as Sidney had expressed its function.

Aggressive tyrannical dogma, like political absolutism, spread from France. Earlier schools, those of the *rhétoriciens* and of Marot, had expressed their tendencies in critical as well as productive work; the Pléiade doctrines had been set forth by Du Bellay, Ronsard, and Vauquelin de la Fresnaye. But *enfin Malherbe vint*, and thenceforward the work of 17th-century Frenchmen was to develop the teaching of 16th-century Italian Aristotelians into a closed and rigid system. Even the genius of Corneille submitted itself to the rules of Chapelain, who was backed by Richelieu and the Academy; and the strong prosaic common-sense of Boileau, the destroyer of Chapelain's reputation, only served to make him the Horace of neoclassicism. A stringent code was constructed by D'Aubignac, Rapin, Le Bossu, Bouhours, and other pedants, and in the next century such critics as

Voltaire, Buffon, Marmontel, La Harpe, and Suard were more or less complacently orthodox.

In England the classical theory had to wait for practical application until the weakening of the romantic impulse gave opportunity and its eccentricities excuse. In Ben Jonson the classical drift is already clearly seen. After the Restoration the verse-essays of Mulgrave and Roscommon are types of a large body of criticism written to French dictation. Boileau's yoke sat firmly, though lightly, upon Dryden, who has been called the father of English criticism; and both he and Pope borrowed directly from the French. Ryme was a pedant; the rancorous Dennis perhaps something better; Addison a classicist with a difference; and Johnson a critic whose greatness was confined within the limits that classicism imposed.

A change begins with Lessing in Germany and Diderot in France. With these may be named Schiller, Richter, the Schlegels, and Heider, Mme. de Staël, and Chateaubriand. In England, after premonitory utterances by literary antiquaries like Gray, Hurd, and Thomas Warton, romantic criticism burst forth in Wordsworth's preface to the *Lyrical Ballads*, to be supplemented and far outshone by Coleridge, one of the greatest of critics, indebted partly to German aesthetic thinkers. While the *Edinburgh* under Jeffrey, the *Quarterly* under Gifford and Lockhart, and *Blackwood's* in the hands of Wilson and his colleagues, were either determinedly reactionary or waveringly progressive, romanticism had on its side such critics as Lamb, Leigh Hunt, Shelley, and Hazlitt. To Landor and De Quincey succeeded Matthew Arnold and Walter Pater, Swinburne and Watts-Dunton.

In France, since the revolt of Hugo and the romantics, Sainte-Beuve has kept in mind the psychology of the individual, Taine that of the people in its environment, and Brunetière the evolution of genres. In Italy Croce's criticism is philosophical. The Danish critic Georg Brandes has been notable among those who look at the literature of the world as a whole. Germany has a tendency to be drawn aside from criticism into aesthetics on the one hand, while on the other it has begun to teach America and other countries that self-denying species of criticism which is rather a branch of pure science than anything else.

See the articles on the critics named; also Spingarn, *Literary Criticism in the Renaissance* (1899; new ed. 1908), and *Critical Essays of the Seventeenth Century* (1908-9); Saintsbury, *History of Criticism* (1900-4), and *History of English Criticism* (1911; new ed. 1922); Gregory Smith, *Elizabethan Critical Essays* (1904).

**Croaghpatrick**, a celebrated Irish mountain connected with the story of St Patrick's missionary work. It stands about 4 miles SW. of Westport, in the south of County Mayo, and is 2510 feet high.

**Croatia-Slavonia**, a region of Yugoslavia, lying between the Adriatic Sea on the SW., where Croatia has a seaboard of about 84 miles, and Hungary on the NE. Area, 16,600 sq. m. Pop. (1921) 2,642,648, including Veglia and other islands. The surface of Croatia falls mainly into the wooded mountain district to the north of the Kulpa, with offshoots from the south-east Alps, and a calcareous plateau, belonging to the Karst region, to the south. To the Alpine system belong the Matzel, Ivinica, and Kalnik groups in the north; to the Karst system belong the Liburnian Karst (5007 feet), along the coast from Fiume (q.v.) to Novi, and the Velebit Mountains to the south-east, with the peak of Sveto Brdo (5751 feet) near the Dalmatian boundary. The region belongs mainly to the basin of the Danube, its most important rivers being the Drave and Save, with their affluents; the Gatschka, Likka, and others belong to the Karst, and the Zermanja, in the

south-west, flows into Dalmatia. In Slavonia extensive marshes are found along the main rivers. Warm mineral springs are numerous, and earthquakes, especially about Zagreb or Agram (q.v.), are frequent. The Adriatic coast is poorly supplied with harbours, and exposed to the blasts of the Bora (q.v.). The climate along the coast and in the north is mild, Zagreb having a mean temperature of 52° F.; in the Karst the yearly mean is from 42° to 46° F.

The soil is in general very productive. Corn, maize, pulse, millet, flax, hemp, tobacco, and grapes are cultivated; large quantities of wood are exported, the rich forests being for this industry recklessly despoiled; and horses and cattle are successfully raised, while the oak-forests of Slavonia support great droves of swine. Silk-culture is progressing, and bees are largely kept in the heath districts. Only in ores and minerals is the region poor; iron, silver, copper, lead, zinc, sulphur, and coal are all worked, but in small quantities. Much of the weaving is done at home, and the other manufactures are not important. The trade is chiefly in land products, Slavonia exporting also a brandy made from plums. The bulk of the people are Slavs; both Croats (originally *Chorvats*, 'mountaineers,' from *chora* or *gora*, 'a mountain') and Slovenes are tall and strong, honest, and good-natured, holding much of their land in common, and dwelling for the most part in scattered hamlets. The west is Roman Catholic; the east, Orthodox. Education is very backward; in 1890, 40 per cent. of the male inhabitants could neither read nor write. A number of railways, however, now penetrate the country, and the interest in education and in the national language and literature has increased. There is a university at Zagreb.

Croatia and Slavonia were for the most part included in the Roman province of Pannonia; in the 7th century the territory was taken possession of by the Slavonic races. The Croats shook off the Byzantine yoke about 900, and in the following century extended their rule over Dalmatia, built a strong fleet, which they employed first for piracy, and afterwards for trade, and had their king, Dzirslav, recognised by the Eastern court in 994. His son, Cresimir Peter, one of the greatest national heroes, was acknowledged as king of Dalmatia, as were also his successors until 1091, when the kingdom was taken over by Hungary. Slavonia was made a province of Hungary about the same date, but in the 17th century a great part of the land was held by the Turks, who only in 1699 resigned all territory north of the Unna. Croatia, Slavonia, and Dalmatia were united as the kingdom of Illyria from 1767 to 1777. Afterwards Croatia and Slavonia were regarded as part of the kingdom of Hungary; but among the Croats a feeling of hostility to the Magyars grew up, which asserted itself in 1848-49. In reward for services during the Magyar revolt Croatia-Slavonia was made an Austrian crown-land, and practically so remained until 1868, when the connection with Hungary was restored, Croatia sending deputies to the Hungarian diet. There was a national diet at Zagreb, the official language being Croatian. In 1883 there was a popular movement against Magyar domination. These Serbo-Croat aspirations became more pronounced in the 20th century, and led to repressive measures by the Magyar government; and in 1912 the censorship of the press was drastic, the university of Agram was closed, the new diet was dissolved before it met, and the constitution was suspended, so that the country was under the dictatorship of the ban (appointed by the Magyar government). The constitution was restored in 1913. Nationalists had for a time been content to aim at turning

the dual into a trial monarchy. But on the dissolution of Austria-Hungary the Croatian diet declared the independence of Croatia, Slavonia, and Dalmatia (30th October 1918); and these regions became parts of Yugoslavia or Jugoslavia, or the kingdom of the Serbs, Croats, and Slovenes (see SERBIA). The Military Frontier, established for defence along the Turkish border in the 16th century, was inhabited by military colonists always ready for war, who enjoyed special privileges: it was in 1881 incorporated with Croatia and Slavonia. See BAN; and for language, SERBIA.

**Croce**, BENEDETTO, was born at Pescasseroli, a small township in the province of Aquila in the kingdom of Italy, 25th February 1866. He descended from an ancient family, catholic and conservative, long established in the Abruzzi. His parents moved to Naples in his childhood. In 1883, at the age of seventeen, he lost both his parents and his only sister in the earthquake of Casamicciola in the island of Ischia, and himself lay buried for some hours in the ruined masonry. After his rescue he was taken to live at Rome in the house of his maternal uncle, Silvio Spaventa, who became his tutor. At that time another uncle, a priest, the famous philosopher Bertrando Spaventa, was lecturing to large audiences in the university of Rome on the Hegelian philosophy. Croce tells us that there was a certain estrangement between the brothers, and that he never came under the direct influence of the philosopher uncle. His early studies and his writings before 1900 were mainly historical, and his special researches were devoted to the elucidation of the history of Naples. His first distinctively philosophical writing, the origin of the new philosophy which has made him famous, was a paper read to the Academy of Naples in 1900 and published in the volume of its *Atti*. It was entitled '*Tesi fondamentale di un Estetica come scienza dell'espressione e linguistica generale*.' In the succeeding years this article developed into *The Philosophy of Mind*, which consists of four volumes. All have been translated by Mr Douglas Ainslie. They are (1) *Aesthetic*, (2) *Logic*, (3) *Philosophy of Practice—Economics and Ethics*, and (4) *Theory and History of History*. The philosophical writings, however, form only a part of Croce's literary activity. His complete works to-day (1923) reach the number of twenty-nine volumes. They are arranged in four series: (1) *Philosophy of Mind*, (2) *Philosophical Essays*, (3) *Writings on Literary and Political History*, (4) *Miscellaneous*. These do not include a number of shorter but important occasional publications. Since 1903 he has edited *La Critica*, a bi-monthly review of Literature, History, and Philosophy, largely composed of his own signed articles. Also he has edited a collection of about thirty volumes of '*The Classical Works of Modern Philosophy*,' for the first of which, Hegel's *Encyclopædia of the Philosophical Sciences*, he himself made the translation and wrote the Introduction. Since the Great War he has taken an active part in politics. He is a senator of the kingdom of Italy, and in 1920 he accepted the portfolio of Minister of Public Instruction in the Giolitti government. He resigned with the fall of that government in 1921.

In order to appreciate the distinctive character of Croce's philosophy and his personal eminence as an intellectual leader of contemporary culture, one must dissociate philosophy almost completely from its academical status as a special study. Croce is not and has never been a university professor, and his philosophical writings have nothing whatever of the character of text-books. Philosophy is for him a perpetual human interest, manifesting itself in, and intrinsic to, every mental act. He expresses this by declaring the essential identity of philo-

sophy and history. Philosophy is the interpretation of history, and history is the expression of philosophy. All literary and historical criticism in his view depends on the complete understanding of the essential nature of human activity. Philosophy is therefore the light which irradiates all artistic production and all progress and decay of civilisation.

Croce's method in his philosophical writings is first to present his theory and then to trace the development of the idea by a critical examination of the history of philosophy. The book which probably gives the most direct insight into his principle and method is the essay entitled, 'What is Living and what is Dead in the Philosophy of Hegel.' For Croce, as for Hegel, mind or spirit is reality, and this reality is essentially active. What Croce criticises in the Hegelian system is its transcendentalism. For him the real world is that in which we effectively live. Reality is immanent in the world of ordinary experience, and never transcends it. There is consequently no difficulty in relating thought to being; the difficulty would be to conceive a thought detached from being or a being detached from thought. Hegel conceived a philosophy of history; Croce conceives philosophy as history. This means that history is not anecdotal, a chronicle of definite fixed and unalterable events, about which the only question is the accuracy of past records; on the contrary, it is the interpretation of what is, the actual present unfolding itself in our lives. All history, Croce declares, is present, not past.

Croce's conception of philosophy as the science of mind is an uncompromising idealism, but an entirely new form of idealism. It is not, like Berkeley's idealism or Kant's doctrine of the unknowability of noumena, primarily a theory of knowledge, nor is it the metaphysics of a transcendent reality. It is the science of mind, but a science which is not one of the sciences with its place in a hierarchy; it is science of reality in the ultimate meaning and universal comprehensiveness of the term.

The four volumes of the *Philosophy of Mind* present this science as the grades, or stages, of an unfolding activity. It is systematic in the sense in which all science is necessarily systematic, and yet there is no system in the sense of a logical structure dependent on fixity of categories and rigidity of forms. The fundamental distinction which presents itself when we analyse mind as essentially an activity is not the distinction between thought and thing, but the distinction between knowing and acting. Mind is both a theoretical and a practical activity. It is process. It never *is*; it is always *becoming*. Knowing and acting are grades or stages of this process, and their order is fixed and irreversible. Knowing is the condition of acting; acting is conditioned by knowing, and not *vice versa*. This is the ground on which materialism is rejected. Every form of materialism conceives the theoretical activity or knowing as posterior to and dependent upon the practical activity or acting. For materialism, what a thing does depends on what it is; for idealism, a thing is what it does.

Each of these two activities, the theoretical and the practical, has also its own grades or stages. It is in the distinction of the grades of the theoretical activity that Croce's æsthetic doctrine, his greatest philosophical innovation, is presented. Man has two faculties, a faculty of imagination and a faculty of reason. By the first he gives expression to his intuitions and produces images; by the second he relates those images and produces concepts. Imagination and thought, however, are not independent faculties; they are the two grades

or stages, or, rather, they are the twofold degree of man's activity in knowing. They correspond to the old division between sense and understanding, but instead of sense being conceived as a passive receptivity, it is conceived as æsthetic activity. All men are by nature first poets, then philosophers. Similarly Croce finds a twofold degree in the practical activity. All actions are primarily economic, and on this economic activity the ethical activity is dependent. Philosophy, therefore, is for Croce a methodology, that is, a way of studying reality, and not a science of a metaphysical reality transcending the physical sciences or defining their realm.

A few only of the historical and literary works have been translated. Croce has probably done more than any past or present writer to bring to light the character of the Italian intellectual contribution in the history and development of western culture. He has given new interest to the study of a long-neglected philosopher, Gianbattista Vico (1668-1744), a professor of rhetoric in the university of Naples. It was, he tells us, in the study of the *Nuova Scienza* of Vico that he discovered the original formulation of the æsthetic theory now associated with himself. Another great Italian writer nearer our own time whom Croce has made the subject of special study is the Neapolitan patriot, Francesco de Sanctis, the historian of Italian literature. Croce's studies, however, are not limited to the history and literature of his own country. The essay on 'Historical Materialism' deals with the economics of Karl Marx, and his literary criticisms include original studies of Goethe and of Shakespeare.

Croce's complete works are published by Laterza e Figli of Bari. The principal English translations are: by Douglas Ainslie, *Æsthetic, Logic, Philosophy of Practice, Theory of History, What is Living and what is Dead of the Philosophy of Hegel, Theory and History of Historiography, The Poetry of Dante*; by R. G. Collingwood, *The Philosophy of Vico*; by C. M. Meredith, *Historical Materialism and the Economics of Karl Marx*.

The works in English on the Philosophy of Croce are: *The Philosophy of Benedetto Croce*, by H. Wildon Carr; *Time and History, an Essay in the Proceedings of the British Academy*, by H. Wildon Carr; *Benedetto Croce, an Introduction to his Philosophy*, by Raffaello Piccoli.

**Crochet**, fancy work in worsted, cotton, or silk done by looping with a small hook.

**Crocidolite**, a mineral consisting of silicate of iron and sodium, in asbestos-like fibres, and sometimes called 'blue asbestos.' It may be regarded as a variety of riebeckite, one of the Amphibole (q. v.) group. It occurs in Griqualand, where it is often altered by oxidation and partial replacement by silica (quartz) into a hard, golden-yellow, fibrous mineral, with a silky chatoyant lustre, to which in South Africa the name crocidolite is extended. This quartz mineral is used for making ornaments.

**Crocker Land**, a supposed Arctic island, reported by Peary as sighted W. of Grant Land (1906). Mr Macmillan's expedition (1914) found it to be a mirage.

**Crockets** are ornaments used in Gothic architecture since the 12th century, when they were introduced on capitals of columns in the shape of incurved bunches of leaves springing from stems in place of the classic volutes employed before that date. Similar projecting crockets were soon applied to cornices, gables, spires, &c. In the Early English style they stand up in a detached manner, with the foliage at the point; but in the Decorated and Perpendicular styles the leaves are more developed and cling to the copes or ramps, to which they are applied as ornaments. Animal

forms, specially modified, are sometimes utilised for crockets. See the articles on the various styles.

**Crockett**, SAMUEL RUTHERFORD (1859-1914), novelist, born of farmer stock near New Galloway in Kirkcudbright, and educated at Castle Douglas and Edinburgh University, was in 1886-95 Free Church minister at Penicuik. He wrote a series of sketches, *The Stickit Minister*; a Galloway romance, *The Raiders* (1894); and much else.

**Crocodile** (*Crocodilus*), a large saurian reptile, the name being originally applied to the crocodile of the Nile only. The term is now used for a whole genus of reptiles, as well as for the small order (Crocodylia) to which it belongs. The order includes the largest living reptiles—viz. the crocodiles



Crocodile.

proper, the Alligators (q.v.), and Gavials (q.v.). The most distinctive characters are as follows:

**Externals.**—The body, which is provided with a long, laterally compressed, crested tail, is covered with horny scales and bony 'scutes,' the latter usually confined to the dorsal surface. There are four short, strong limbs, with five fingers and four toes, which are webbed in various degrees of completeness. The three inner digits bear claws. Glands with a musk-like secretion are found on the margin of the lower jaw, at the side of the cloacal aperture, and on the posterior margin of the dorsal shields. The musky odour is strongest during the breeding season. The nostrils lie close together at the point of the snout, and can be closed by valves; the eyes possess third eyelids, and the pupil is a vertical slit; the tympanum of the ear is overhung by a fold of skin which closes during diving; the cloaca has a longitudinal aperture.

**Skeleton.**—Between the skull and the hip-girdle there are always twenty-four vertebrae, and behind the sacrum a large and variable number of caudal pieces: The vertebrae are procelous—that is to say, hollow in front—and bear ribs in the neck as well as in the thoracic region. The ribs are provided with two heads for articulation with the vertebrae, and those in the middle of the thorax give off hook-like, backward-turned (uncinate) processes which also occur in Birds (q.v.). A breast-bone, with which the thoracic vertebrae are connected, is always present, and behind this a number of posterior rib-like processes ('abdominal ribs') form a further support. These arise from ossification of septa between the muscles. In the breast-girdle the clavicle is absent; the hip-girdle is normal. In the large skull the chief peculiarity is the formation of a closed bony palate. By the internal union of premaxillae, maxillae, palatines, and pterygoids, a median tunnel is formed, and the posterior aperture of the nostrils is thus shunted back to the very beginning of the trachea. The development of the skull has been studied by Parker. The mouth-opening is very large, and the jaws bear numerous, usually

conical, hollow teeth, implanted in distinct sockets, with reserve gems, at first on the inner side, and afterwards within the pulp cavities of the old ones.

The *nervous system* calls for no special remark. The peculiarities of nose, eye, and ear have been noted above. The animals have large lachrymal glands. The auditory passages communicate with the three Eustachian tubes (one median and two lateral), which have a single opening at the back of the mouth.

As regards the *alimentary system*, the flat tongue is fixed to the floor of the mouth, the mouth-cavity is bounded behind by two soft transverse membranes. These meet when the crocodile is drowning a victim, and prevent water rushing down the throat. The stomach is in several respects like that of birds. The *circulatory system* is of importance, since in crocodiles for the first time the heart is four-chambered (see CIRCULATION). The partition between the ventricles is here complete, but as two aortic arches remain, mixed blood still goes to the posterior body. The left aortic arch carries only venous blood to the viscera, whereas in other reptiles it carries mixed arterial and venous. The pulmonary arch carries purely venous, the right aortic arch purely arterial blood. The right and left aortic arches communicate at their roots just outside the heart by a small aperture—the *foramen Panizzae*. The *respiratory system* presents no special peculiarity except in the backward shunting of the internal opening of the nostrils. When drowning its prey, and with its half-shut mouth in consequence open to the water, the crocodile keeps the tip of its snout on the surface, the glottis is pushed a little forward to meet the posterior opening of the nostrils, a complete air channel is thus made, and respiration can go on unimpeded. The air is drawn into the lungs when the ribs expand, and an incipient diaphragm is also of use. The lungs are inclosed in pleural sacs. There is no urinary bladder.

**Mode of Life.**—Crocodiles are predominantly aquatic animals, and move rapidly by means of their powerful tail strokes. They are clumsy when ashore, and suffer from being stiff-necked. The body drags somewhat on the ground. They feed on fishes, especially in their youth, and on quadrupeds, which they catch by the river-side, and kill by drowning. If the prey cannot be readily torn, it is often buried till it begins to rot. For their shore work they prefer the darkness, but they also like to bask in the sun. They very often float in the water with their snout and upper back above the surface. The eggs, which are firm, though not thick-shelled, are laid in layers in holes on the banks. They are about the size of goose eggs, and the disproportion between the newly-hatched young and the adults is very striking. The females of some species are said to guard their young. Crocodiles are on the whole sluggish animals, and are very remarkable in the long continuance of the slow growth, which hardly seems to reach a limit as in other animals.

The crocodile has acquired in literature a character for deceitfulness which is largely undeserved. The conceit of 'crocodile's tears' (the animals have large lachrymal glands) was common in Shakespeare's time. Spenser describes (*Faerie Queene*, I. v. 18) the

Cruell craftie crocodile,  
Which, in false greefe hyding his harmefull guile,  
Doth weepe full sore, and sheddeth tender teares.

**Different Forms.**—The order of crocodiles includes twenty-five living species, distributed in three families and a doubtful number of genera. They are all found in tropical and warm regions. The three types may be thus contrasted:

Alligator	Crocodile	Gavial.
Nasal bones form part of nasal aperture.	As in alligator.	Do not.
Head short and broad.	Longer.	Very long.
Teeth very unequal. First and fourth lower teeth bite into upper pits.	Unequal. First into a pit, fourth into a groove.	Almost equal. First and fourth bite into grooves.
Union of lower jaws does not extend beyond fifth tooth.	Not beyond eighth.	At least to fourteenth.
Neck scutes distinct from back.	Sometimes distinct, sometimes united.	Continuous.
South America and south of North America.	Africa, India, North Australia, Cuba, South America	Ganges, Borneo, North Australia.

There are altogether a dozen different forms of Crocodile proper, some of which have been dignified as separate genera. The crocodile of the Nile (*C. vulgaris*) has almost disappeared from Egypt. There are very few below Wadi Halfa. Its range is from Egypt and from Senegal to the Cape. It is abundant in Madagascar. It is said sometimes to attain a length of 30 feet, though half that is considered large. It often fatally attacks man, and feeds very largely on smaller mammals. It grows very slowly and continuously, and, with the exception of man, has few formidable antagonists after it has survived its youth. Some two or three score of eggs, with delicate rough limy shells, about the size of those of geese, are laid in sandy cavities in the bank. The young crocodiles are often happily destroyed by the ichneumon, and by a species of lizard. The adult crocodile lives in amiable partnership with a little bird (*Pluvianus aegyptius*). As Herodotus relates, this watcher warns the crocodile by its cry when danger threatens, and it also cleans its body of small animals which fix themselves there. The crocodile was worshipped and even mummified by the ancient Egyptians, and it occasionally bore a part in the Roman gladiatorial combats. It is now hunted for the perfume of its musk-glands, and also for its skin and fat. Crocodile-hide has lately increased in value as an article of commerce. The eggs are esteemed as dainty morsels. The most widely distributed species is *C. bitorquatus*, or *porosus*. It occurs from the Mascarene to the Fiji Islands, from Farther India to Corea, and also on the north coast of Australia. It lives not only in fresh water, but ventures sometimes into the sea. A very large specimen at South Kensington measures 17½ feet in length. *C. frontatus*, in equatorial West Africa; *C. acutus*, in the north-west of South America, in Central America, and in the West Indies; *C. cataphractus* (often placed in a special genus, *Mecistops*), from the west coast of Africa, are other important species.

**History.**—These giant reptiles, like other large forms, have in recent ages been continuously on the wane. They date from the Triassic period (Belodon, Parasuchus, and Stagonolepis—the last from the Elgin sandstones). In the Jurassic age they are very numerous, forty species having been recorded from British strata alone. In the Chalk, the first Crocodilia with anteriorly concave vertebræ appear in contrast to the Triassic, the Jurassic, and in part the Cretaceous forms, which had biconcave vertebræ. Among these Cretaceous forms are true Crocodiles and Gavials, which are also abundant in Tertiary strata. Huxley worked out the 'almost unbroken' series of gradations from the ancient Triassic forms down to the modern crocodiles, but where this series takes origin among the ancient reptiles is still obscure.

See ALLIGATOR, GAVIAL, REPTILE; G. A. Boulenger, *Catalogue of Reptiles in the British Museum* (1889–1896); E. D. Cope, 'Crocodilians, &c. of North America,' *Report*

*U.S. Nat. Museum for 1898* (1900); Hans Gadow, 'Amphibia and Reptiles,' *Cambridge Natural History*, vol. viii. (1901); A. Strauch, 'Synopsis der lebenden Crocodiliden,' *Mém. Acad. St Petersburg*, x. (1866).

**Crocus**, a very beautiful genus of Iridaceæ, all palæarctic, and particularly abundant in the Mediterranean countries and Asia Minor. Crocuses have long been cultivated in flower-gardens, particularly *C. vernus*, the purple crocus, with its many violet, white, or striped varieties; and *C. luteus*, and other yellow species; all so welcome in early spring. The saffron crocus (*C. sativus*, see SAFFRON) and other species flower in autumn. These must not be confused with the meadow saffron, often called autumn crocus (Colchicum, q.v.), which is a liliaceous plant, from which the true crocuses can at once be distinguished by their inferior ovary, and three instead of six stamens. *Bulbocodium vernum* is a pretty spring flower, also much resembling crocus, but closely akin to colchicum. Two species of crocus occur wild in England, *C. nudiflorus* and *C. vernus*, but the latter at least is merely naturalised. The flowers of one or two species are fragrant. Owing to the shortening and thickening of the stem, the ovary is subterranean, hidden among the leaf-bores, but in ripening it grows out upon a long thin procumbent pedicel, and thus deposits its seed at a sufficient distance from the parent plant. The thickened axis is a Corm (q.v.). Spring Crocus (*Crocus vernus*). It is necessary frequently to take up crocuses and plant them anew, on account of the multiplication of the corms.

**Crocus** of ANTIMONY is the oxysulphide of Antimony (q.v.). Crocus of Mars is the finely divided red oxide of iron. See COLCOTHAR.

**Croesus**, the last king of Lydia, succeeded his father, Alyattes, in 560 B.C. He made the Greeks of Asia Minor his tributaries, and extended his kingdom eastward from the Ægean to the Halys. From his conquests, his mines, and the golden sand of the Pactolus, he accumulated so much treasure that his wealth has become a proverb. He gave himself up in his court at Sardis to a life of pleasure and sumptuous extravagance, deemed himself the happiest man in the world, and was displeased when Solon, on a visit to his court, told him that no man should be called happy till his death. He soon found how uncertain was a happiness such as his; for his beloved son Atys was killed while hunting, and there was left to him only one son, who was dumb; whilst in his war with Cyrus he was totally defeated, and, according to one story (which is highly improbable), himself made prisoner and condemned to be burned (546). At the funeral pyre, his repeated exclamation of 'O Solon!' struck the conqueror, who, when told the reason of it, spared his life and treated him with great kindness. As to his death, nothing is known.

**Croft**, WILLIAM, musician, born in Warwickshire in 1677, was a chorister in the Chapel Royal, of which he became joint-organist in 1704, and sole organist in 1707. In 1708 he succeeded his old teacher, Dr Blow (q.v.), as organist of Westminster



Spring Crocus (*Crocus vernus*).

Abbey and choirmaster of the Chapel Royal; and in 1713 he took the degree of Mus. Doc. at Oxford. From 1704 Croft wrote a number of anthems for state ceremonies and public thanksgivings, thirty of which appeared in two folio volumes in 1724; and it is by these that he is now chiefly remembered. He died in 1727.

**Crofter.** The term 'croft' is commonly used in Scotland to designate a small holding of arable or pasture land, other than garden ground; and the tenant of such a holding, who resides on the holding, is called a crofter.

Lord Napier and Ettrick, who presided over the royal commission appointed in 1883 to inquire into the conditions of the crofters in the Highlands and Islands of Scotland, writing with first-hand knowledge, described in this *Encyclopædia* the conditions obtaining at that date in the Highland counties as follows:—

'Crofters may be broadly divided into two classes: (1) Those who occupy arable land in separate tenancy, and mountain pasture in joint tenancy; (2) those who occupy land in separate tenancy only. The first class may be denominated "township crofters," the second "independent crofters." The township crofters are by far the more numerous class, so much so that the joint tenancy of pasture is a characteristic feature of crofting life. They are scattered over the whole surface of the Western Highlands and Islands, and over the whole of Sutherland. They are found in Caithness, Orkney, Shetland, and in the interior of Ross-shire and Inverness-shire, but less frequently on the eastern seaboard. The township crofters hold directly from the landlord, pay money rents, have had a preponderant share in the construction and maintenance of the buildings on the holding, and have been the authors of the greater part of the simple improvements on the holding and the township. They have preserved some marks of a primitive community in common rights and common obligations, and in the election of township officers who, by the custom of the estate, exert some authority in regulating the relations of the occupiers among themselves, and the relations between the occupiers and the landlord. The crofting township of the Highlands is a partial survival of a system of land tenure once common to the whole of Scotland and prevalent in other countries. It has in all times existed in direct relations with the chief or landlord, yet the greater number of extant township crofters are the descendants of sub-tenants to the tacksman of a former period, and were brought into immediate dependency from the proprietor in the 18th century. The township crofter has always been in the eyes of the law a tenant at will, whether holding under the landlord or the tacksman, except in the case of a specific covenant to the contrary, but it is probable that during the prevalence of the clan system the mutual interests and affections of chief, tacksmen, and people procured for the crofters the actual status of permanent tenure. While the crofters derive a material share of their livelihood and even of their food from the holding, their existence would be impossible without other sources of support. Among these fishing holds the first place, and often affords the chief means of subsistence; but other local employments, domestic crafts, itinerant rural labour in the south, the earnings of a seafaring life, and remittances from relatives at home and abroad, all contribute to the crofters' maintenance.

'The grievances from which the great mass of the township crofters have suffered may be enumerated as follows: The restricted area of holdings, and especially the reduction of common pasture land; high rents in exceptional cases; disturbance without due compensation; the molestation of deer and

other game; the imposition of excessive local rates; the increasing burden of cottar dependents; want of harbours and defective means of transport to the centres of consumption. . . .

'The independent crofters, who may be recognised as a distinct order among the crofting population, are found in all the Highland counties. They appear in considerable numbers in Argyllshire, in Caithness, in Orkney, in Shetland, and in the eastern parts of Inverness-shire and Ross-shire. They are more rare in Sutherland, on the western seaboard, and in the Hebrides. These laborious tenants have been recruited from the working-classes in adjacent districts, and from the members of broken townships dispersed by the formation of sheep farms. Established, for the most part, on waste lands under improving leases or stringent estate regulations, favoured in the eastern districts by a drier climate and soil, surrounded by the examples of a superior husbandry, and encouraged by assistance from the landlord, they have attained a higher condition than the crofting communities, both in regard to dwellings and tillage. The alleged grievances of the independent crofters have reference mainly to high rents, insecurity of tenure, and confiscation of improvements.

'In recording the diversities of crofting tenure it is necessary to mention the exceptional examples of freehold crofts with common pasture in the united parishes of Harray and Birsay in Orkney. These minute estates exhibit a marked superiority over yearly tenancies elsewhere. Belonging to a vigorous race of cultivators whose families prosecuted their fortunes in the colonies and on the sea, the Orkney freeholds have not suffered from excessive subdivision, and illustrate the advantages attached to stability and possession. . . .

'Closely associated with the crofters by origin, vocations, and distresses are the cottars. These people, who are most numerous in the Long Island, are occupiers of dwellings and small patches of ground, holding rarely from the landlord, more frequently from the farmer, the township, or the individual crofter, and are sometimes mere squatters, paying no rent and owing no allegiance. They exist by fishing, by casual employments on the land, and by public charity.'

By a series of statutes, commencing with the Crofters' Holdings Act, 1886, and culminating in the Small Landholders (Scotland) Act, 1911, and the Land Settlement (Scotland) Act, 1919, a new tenure for small holdings has now been established throughout Scotland.

The Crofters' Holdings Acts, 1886-91, applied only to such portions of the counties of Argyll, Inverness, Ross and Cromarty, Sutherland, Caithness, and Orkney and Shetland, as the Crofters Commission—a body of commissioners, three in number, appointed to administer these acts—might determine to be crofting parishes. In the result, all the parishes within the counties named, except two in Inverness, two in Ross and Cromarty, and eight in Argyll, were found to be crofting parishes. The term 'crofter' in the Crofters Acts meant any person who, at the passing of the Act of 1886, was a yearly tenant of a holding, at a rent not exceeding £30, in a crofting parish, who resided on his holding, and the successor of such a person in the holding, being his heir or a 'legatee,' i.e. a member of his family to whom he bequeathed his right to the holding. The crofter could not be removed except on his failure to fulfil certain statutory conditions, or on the landlord obtaining the sanction of the Crofters Commission to 'resume' the holding. The crofter was entitled, upon one year's notice in writing to the landlord, to renounce the tenancy. On renouncing, or being removed from, the holding he was given a right to receive compensation for permanent improvements, suitable to the holding,

executed or paid for by himself or his predecessors of the same family. Either the landlord or the crofter might apply to the commissioners to fix the 'fair rent' to be paid by the crofter, and the commissioners had power to reduce or extinguish any arrears of rent on any holding for which they were called on to fix a fair rent. The commissioners, on the application of five or more crofters resident on neighbouring holdings, were empowered, under certain conditions, to assign available land for the enlargement of the holdings of the crofter applicants. In addition, the commissioners had powers to allocate pasturage among crofters, to determine the boundaries of crofts and grazings, and to make orders with reference to fencing. Certain rights to compensation for permanent improvements were also conferred on 'cottars,' i.e. occupiers of dwelling-houses in a crofting parish, with or without land, who either paid no rent or were yearly tenants at a rent not exceeding £6. The Acts of 1891 and 1908 contained elaborate regulations with regard to the common grazings of townships.

It is scarcely disputed that the results accruing in the Highland counties from the operation of the Crofters Acts have in the main been highly beneficial and satisfactory. The Highlands and Islands Commission, commonly known as the Deer Forests Commission, reporting in 1895, described some of the more important results thus: '(1) The fixing of fair rent has to a large extent removed from the minds of the crofters the sense of hardship arising from the belief that they were made to pay rent on their own improvements, or otherwise made to pay at an excessive rate for soil of a poor quality. (2) The combination of a fair rent with statutory security of tenure has not only taken away or allayed causes of discontent, but has imparted a new spirit to crofters, and imbued them with fresh energy. . . . We found more attention is being paid to cultivation, to rotation of crops, to reclamation of out-runs, to fencing, and to the formation or repair of township roads; but most conspicuous of all the effects perceptible is that upon buildings, including both dwelling-houses and steadings. (3) The enlargement of holdings granted has been . . . of great benefit to the holdings enlarged. (4) The percentage of arrears cancelled has terminated liabilities which could never have been met.'

The anxiety caused by the decline of population in the rural districts of Scotland gave impetus to a movement to encourage the tenants of small holdings throughout Scotland by giving them security of tenure, and enabling them to have the rents of their holdings judicially fixed. The Small Landholders (Scotland) Act, 1911, sought to accomplish this object by in effect extending to the whole of Scotland the system of tenure which had been set up in the Highland counties by the Crofters Acts. Subject to certain special exceptions, all agricultural holdings in Scotland of a rent not exceeding £50, or of an area not exceeding 50 acres (exclusive of any common pasture or grazing), are within the scope of the act.

The act established a Land Court, to which were transferred all the powers and duties of the Crofters Commission. Three members form a quorum, but the court may delegate any of its powers to any one member, or to any two members, with or without the assistance of one or more land valuers, assessors, or other skilled persons. Any order or decision arrived at under such delegation is, however, subject to review by the full court. The court has the ordinary powers of a judicial tribunal to summon witnesses, to examine them on oath, to require the production of documents, to determine questions of law or fact, and to award expenses. An appeal by way of stated case upon a

question of law lies from the Land Court to the Court of Session.

The tenants of small holdings under the act fall into two classes: (1) Landholders and (2) statutory small tenants.

(1) The act transformed into landholders (a) all crofters under the Crofters Acts; and (b) all persons who, at the date of the act, were in possession, either from year to year or under a lease, of holdings within the above-mentioned limit of rent or area, provided that the greater part of the buildings and other permanent improvements had been made or paid for by the tenant or his predecessors in the same family. When such a tenant held under a lease at the date of the act, he becomes a landholder on the expiry of the lease.

The landholder has a permanent right to the occupation of his holding, subject to certain statutory conditions. The more important statutory conditions, on breach of which he can be removed, are that he pays the rent, does not cause dilapidation of the buildings or deterioration of the soil, does not subdivide or sublet the holding, or erect additional dwelling-houses thereon, without the landlord's consent, does not become bankrupt, and does not cease to cultivate the holding by himself or his family with or without hired labour. The rent of the holding, falling agreement, is fixed by the Land Court, and the 'fair rent,' so fixed, is subject to revision every seven years. The Land Court can deal with arrears of rent due by a landholder who has not had a fair rent previously fixed. The landholder may renounce his tenancy on giving one year's notice in writing to the landlord, and he may also be required to surrender it in whole or in part if the landlord obtains the sanction of the Land Court to 'resume' it, or part of it, for purposes specified in the act. On quitting, or being removed from, the holding the landholder is entitled to compensation for permanent improvements, suitable to the holding made by himself or his predecessors of the same family while under no written obligation to make them. In these and other respects, the tenure of the landholder is substantially similar to that of the crofter under the Crofters Acts. The landholder's right, in default of bequest, descends to his heir-at-law. He may bequeath his right; but, to prevent subdivision, the bequest must be to one person, and that person must be a 'member of his family.' By sect. 13 of the Land Settlement Act, 1919, the son-in-law of a landholder is now deemed to be a member of his family. He, unlike the Irish tenant, has no power at his own hand to sell or assign his right *inter vivos* without the landlord's consent; but, if he is unable to work his holding through illness or old age, he may obtain leave from the Land Court to assign his right to a member of his family.

(2) Persons who, at the date of the act, were in possession, either from year to year or under a lease, of holdings within the prescribed limits of rent or area, but who had not provided the greater part of the buildings or other permanent improvements, became, not landholders, but 'statutory small tenants.' Such tenants enjoy fixity of tenure and, in default of agreement, have the rents of their holdings fixed by the Land Court. The rent so fixed is to be 'an equitable rent,' i.e. the rent which a willing lessee would pay to a willing lessor, and it runs for such number of years as the Land Court may determine. On the expiry of that period the statutory small tenant is entitled to a renewal of his tenancy, unless the landlord satisfies the court that there is reasonable objection to such renewal. The Land Court has no power to deal with arrears of rent due by statutory small tenants. Since the passing of the act, it has become clear that most of the tenants in Scotland outside the

northern counties are not in the position of having made or paid for the greater part of the improvements on their holdings, and, therefore, belong to the class of statutory small tenants. Such tenants, however, may become landholders if it is found by the Land Court that the landlord has failed to maintain the buildings and permanent improvements required for the cultivation and reasonable equipment of the holding, in so far as the tenant is not under an obligation to do so.

The Act of 1911 also created a Scottish Board of Agriculture, consisting of three persons, charged with 'the general duty of promoting the interests of agriculture, forestry, and other rural industries in Scotland.' One of the chief duties of the board has relation to the creation and equipment of small holdings and the enlargement of holdings. A member of the board, who is designated the Commissioner for Small Holdings, has the duty of inquiring and reporting what demand exists for small holdings and of negotiating with landlords schemes for the registration by agreement of new holders. The conditions under which, failing agreement, land may be acquired for small holdings are now laid down in sect 9 of the Land Settlement Act, 1919. It is the duty of the board, when satisfied that there is a demand for small holdings and that suitable land is available, to prepare a scheme for the constitution of such holdings, showing the situation and area of the land, the number and areas of the new holdings, the rent of each new holding, the water-supply for each new holding, and the area of any common pasture to be occupied in connection with the new holdings. The prepared scheme is intimated to the landlord, tenant, and occupier of the land, who may make representations concerning the scheme to the board. The board, after giving to all persons interested an opportunity of being heard, may, with the consent of the Secretary for Scotland, make an order confirming the scheme, in whole or in part, and with or without modification, or may abandon the scheme. Compensation is payable to the landlord, tenant, and occupier of the land for any damage or injury done to him in consequence of, and directly attributable to, the constitution of new holdings under the scheme. The compensation, failing agreement, is determined, upon the application of either party, by the Land Court. The compensation does not include any compensation for injury done to or depreciation in the selling value of the land, or of the estate of which the land forms part, except in so far as arising from injury done to or depreciation in the letting value of the land or estate. Nor is compensation payable for injury done to the value of the sporting rights over the land or estate in so far as it exceeds the estimated value of such rights if the land or estate were put to the full reasonable use for which it could be let to ordinary agricultural or pastoral tenants. Any benefit or relief resulting to the landlord or other person from an enhancement of the letting value of the land or estate in consequence of the constitution of new holdings under the scheme is set against damage or injury done to him.

**Croisic**, LE, a fishing-port and watering-place, in the French department of Loire-Inférieure, 20 miles W. of St Nazaire; known from Browning's *Two Poets of Croisic*.

**Croker**, JOHN WILSON, politician and man of letters, was born at Galway, 20th December 1780, the son of the surveyor-general of customs and excise in Ireland. After four years at Trinity College, Dublin, in 1800 he entered Lincoln's Inn, but in 1802 was called to the Irish bar. Two satires on the Irish stage and on Dublin society (1804-5) proved brilliant hits; so did his *Sketch*

*of Ireland Past and Present* (1807), a pamphlet advocating Catholic emancipation. In 1809 he published a poem on the battle of Talavera, which Wellington pronounced 'entertaining,' and during the same year helped to found the *Quarterly*, to which up to 1854 he contributed 260 articles. He had entered parliament for Downpatrick in 1807; and now in 1809 he was rewarded with the lucrative post of Secretary of the Admiralty for his warm defence of the Duke of York, who was charged with conniving at and sharing in the sale of army commissions by his mistress. That post he held till 1830, and then retired with a pension of £1500 a year. On the passing of the Reform Bill (1832), he refused to re-enter parliament, unable 'spontaneously to take an active share in a system which must subvert the church, the peerage, and the throne—in one word, the constitution of England.' He would not even take office under Peel, his old friend (1834); and with Peel he broke utterly on the repeal of the Corn Laws (1846). He died 10th August 1857. Among the seventeen works that he wrote or edited were his *Stories for Children from English History* (1817), which suggested to Scott the *Tales of a Grandfather*; the *Suffolk Papers* (1823); his *Boswell's Johnson* (1831); and *Essays on the Early Period of the French Revolution* (1857). By some Croker is chiefly remembered for his onslaught on Keats, and Macaulay's onslaught on him (Macaulay 'detested him more than cold boiled veal'); or as the originator of the term Conservative (q.v.); a founder of the Athenæum Club, and the 'Rigby' of Disraeli's *Coningsby*—the jackal of 'Lord Monmouth' (the Marquis of Hertford). But in Sir Theodore Martin's nine-page eulogy in the *Dictionary of National Biography* (vol. xiii. 1888), he figures as a 'debater of the first rank,' a master of 'rhetoric that eclipsed Macaulay's,' the 'friend and confidant of many of the best and ablest men of his time,' a pattern of 'sincerity,' 'consistency,' 'devoted loyalty and unselfishness.' See also his *Memoirs, Diaries, and Correspondence*, edited by Louis J. Jennings (3 vols. 1884).

**Croker**, THOMAS CROFTON, Irish folklorist, was born at Cork, 15th January 1798, and in 1814 was apprenticed to a Quaker merchant, but four years later got a clerkship in the Admiralty through John Wilson Croker, a friend, though no relation, of his father's. He retained this post till 1850, and died at Old Brompton, 8th August 1854. As a boy of fourteen he had begun to collect songs and legends of the Irish peasantry; in 1818 he sent Moore nearly forty old Irish melodies; and in 1825 published anonymously his *Fairy Legends and Traditions of the South of Ireland*, a work which charmed Scott, and was translated into German by the brothers Grimm (1826). A second series followed in 1827, and the whole reached a 6th edition in 1882. Of nearly twenty more works of which Croker was either the author or editor, the best were *Researches in the South of Ireland* (1824); *Legends of the Lakes* (1829), illustrated by his friend Maclise, and re-issued as *Killarney Legends* (1876); *The Adventures of Barney Mahoney* (1832); *A Memoir of Joseph Holt, General of the Irish Rebels* (1837); and *Popular Songs of Ireland* (1839; new ed. by Professor H. Morley, 1885). Croker was a zealous antiquary, a member of many learned societies. See the Life by his son, prefixed to the 1839 edition of the *Fairy Legends*.

**Croll**, JAMES, physicist, was born in 1821 near Coupar-Angus, in Perthshire. He received an elementary school-education, but in science was wholly self-trained. Successively millwright, insurance-agent, and janitor of the museum of Anderson's College, Glasgow, in 1867 he joined the staff of the

Geological Survey of Scotland, but retired in 1881. An F.R.S. and LL.D. since 1876, he died 15th December 1890 (see his Life by J. C. Irons, 1896). Besides many papers in the scientific journals, he wrote *The Philosophy of Theism* (1857), *Climate and Time* (1875), *Discussions on Climate and Cosmology* (1886), and *Stellar Evolution* (1889). *Climate and Time*, one of the most important contributions to geological climatology, worked out in detail the view with which Croll's name is identified, that, contrary to the opinion of most physicists, changes of the earth's climate, such as the glacial periods, are due to the secular variations in the eccentricity of the earth's orbit, together with consequences arising out of them, such as the deflection of ocean currents. See CLIMATE, PLEISTOCENE SYSTEM, PRECESSION.

**Croly**, GEORGE, poet, romance-writer, biographer, and preacher, was born at Dublin in 1780, and educated at Trinity College there. He took orders in 1804, and in 1810 came to London, where, after twenty-four years of literary labour, he in 1835 became rector of St Stephen's, Walbrook. He died 24th November 1860. Between 1817 and 1858 Dr Croly published some forty works—the best known being the romance of *Salathiel*.

**Crô-Magnon**. See ANTHROPOLOGY, STONE AGE.

**Cromarty**, formerly the county town of Cromartyshire, on the southern shore of the Cromarty Firth, 2 miles from its entrance, and 19 NNE. of Inverness; since 1912, when the erection of defences was begun, it has been an important naval depot. From the famous Sir Thomas Uquhart (q.v.) the estate came to the second son of that Sir George Mackenzie who in 1685 was created Viscount Tarbat, and in 1703 Earl of Cromarty—a title forfeited by the third earl for his share in the '45, but revived (1861) in favour of his descendant, the Duchess of Sutherland, from whom it passed to her second son (1888) and his daughter (1895). In 1859 a statue was erected of Hugh Miller (q.v.), whose birth-house is now a geological museum. With Wick and four other burghs Cromarty returned one member to parliament until 1918. Pop. 1000.—CROMARTY FIRTH, a land-locked inlet on the north-east coast of Scotland, extends 19½ miles north-eastward and eastward to the Moay Firth, and is enclosed by the county of Ross and Cromarty. It forms a noble harbour, 1 mile to 7½ miles broad, and 5 to 35 fathoms deep; receives at its head the Conon; and narrows at its entrance to 7 furlongs, between the beetling North and South Sutors, 400 and 463 feet high. On its shores are the towns of Dingwall, Invergordon, and Cromarty (each of which has a ferry), and some villages; the Old Red Sandstone near its mouth is classic as Hugh Miller's hunting-ground.—CROMARTYSHIRE, once a Scottish county, 369 sq. m. in area, consisting of ten detached portions scattered up and down Ross-shire (q.v.), with which it was incorporated by the Local Government Act of 1889. It comprised the ancient sheriffdom of Cromarty, and outlying bits annexed thereto towards the close of the 17th century at the instigation of Viscount Tarbat, who wished thus to hold jurisdiction over every part of his estates.—See Sir W. Fraser's *Earls of Cromarty* (2 vols. 1876).

**Cromdale**, a place in Elginshire, on the right bank of the Spey, 5 miles NE. of Grantown. Here, on 1st May 1690, 800 Jacobite Highlanders were surprised and routed by a body of King William's dragoons. This encounter is celebrated in a song called *The Haughs of Cromdale*.

**Crome**, JOHN (known as 'Old Crome'), landscape-painter, the chief member of the 'Norwich School' of artists, was born in that city, the son

of a poor weaver, 22d December 1768. After serving as an errand-boy to a physician, he was apprenticed to a house-painter; but, showing a strong predilection for art, he was befriended by T. Harvey, of Catton, who procured him employment as a drawing-master, and permitted him to study works by Gainsborough and the Dutch masters in his collection. He also received some instruction from Beechey and Opie. He was mainly influential in founding, in 1803, the Norwich Society of Artists, which held exhibitions from 1805, and of which he was president in 1808. He occasionally visited London, where he exhibited in the Academy and the British Institution; and a tour through Belgium and France in 1814 resulted in 'The Fishmarket on the Beach, Boulogne,' and 'The Boulevard des Italiens, Paris.' But his subjects were nearly always derived from the scenery of his native county, which, though founding his practice upon that of the Dutch landscapists, he treated in a singularly direct and individual fashion, painting trees, and especially the oak, with exceptional fidelity and beauty. His works realised only most moderate prices during the artist's life; but he is now recognised as one of the great names among English landscapists, and fine examples of his art fetch very large sums. Several of his oil-paintings, including the great 'Mousehold Heath,' are in the National Gallery; and among his other masterpieces may be mentioned 'Carrow Abbey,' 'Chapel Fields, Norwich,' 'Oak at Porlingland,' and 'The Willow.' His water-colours are rare; his etchings of Norfolk scenery were published in 1834. He died 22d April 1821, and was buried in the church of St George, Colegate. The centenary of his death was commemorated in Norwich by a fine loan exhibition at the Castle Museum. His eldest son, John Berney Crome (1794-1842), painted landscapes after the style of his father.

See Sir F. Wedmore's *Studies in English Art* (1876); L. Binyon's *Crome and Cotman* (1897); T. Cole and J. C. van Dyke's *Old English Masters* (1902); W. F. Dickes's *Norwich School of Painting* (1906); H. S. Theobald's *Crome's Etchings, with some Account of his Paintings* (1906); H. M. Cundall's *Norwich School* (1920); C. H. C. Baker, *Crome* (1921); G. A. Stephen's *Norfolk Artists*, a bibliography (1915).

**Cromer**, a fashionable and delightful watering-place on the coast of Norfolk, 23 miles N. of Norwich. The sea has here made great encroachments on the cliffs since 1350, though the town itself is now protected by a sea-wall, formed in 1877, with an esplanade and a pier. There are capital sands and golf-links (1887), and the church has a noble flint-work tower of 160 feet. Pop. 5400. It gave an earl's title to Sir Evelyn Baring (q.v.).

**Cromer Forest Bed**. See PLEISTOCENE.

**Cromlech** (from the Gaelic *crom*, 'curved,' and *leac*, 'a stone') is a modern term, formerly applied by British archaeologists to a class of megalithic monuments, consisting of one flat stone supported on two or more upright stones, and forming a kind of open chamber with a roof. It is now generally recognised, however, that these are merely the denuded or uncovered chambers of chambered Cairns (q.v.) or Barrows (q.v.), for which another modern term, 'dolmen,' is now generally substituted (see DOLMEN). The French archaeologists retain the use of the word cromlech, but they have always applied it to those groups of standing stones which in Britain and Scandinavia are called Stone Circles (q.v.).

**Crompton**, SAMUEL, whose invention of the spinning-mule entitles him to rank as one of mankind's greatest benefactors, was born, the son, of a small farmer, at Firwood, near Bolton, Lanca-

shire, December 3, 1753. Like his father, Crompton was brought up to the loom and the farm. His mother, a woman of great energy, perseverance, and stern independence, when left a widow struggled hard to give him and her two daughters the best education the district afforded. When he was old enough, he assisted her in the farm, and wove, and earned a little money by playing the violin at Bolton theatre. At the age of twenty-one, he was so much annoyed at the breaking ends of yarn and the difficulties in getting it to weave that he set to work to invent a spinning-machine which should produce better yarn than Hargreaves', one of which his mother possessed. For five years he laboured to realise his idea, sitting up late at night to overcome the successive difficulties, and resuming his labour for daily bread early in the morning. In 1779 he succeeded in framing a machine which produced yarn of such astonishing fineness that the house was beset by persons eager to know the secret. He was rendered miserable. All kinds of devices were tried to gain admission; even ladders were placed against the windows. His machine was such that if a mechanic saw it, he could carry away the leading features of it. He could not leave the house for fear of his discovery being stolen from him. He had spent every farthing he had in the world upon its completion; he had no funds wherewith to obtain a patent, and his shy and unbusiness-like temperament prevented him profiting as he should have done by his invention. A Bolton manufacturer persuaded him to disclose the invention to the trade, under the promise of a liberal subscription, but all that he got was £87, 6s. 6d. Soured by this treatment, in the course of time he saved money enough to begin manufacturing on a small scale at Oldhams, near Bolton, and latterly at Bolton, but not till his rivals had a hopeless start of him in the business. After the use of the mule had told distinctly on British manufacturing prosperity, a sum of between £400 and £500 was raised for him by subscription through John Kennedy, his earliest biographer. Efforts were made to procure for him a national reward. Five thousand pounds was all he obtained in 1812, and he returned to Bolton almost broken-hearted. He began the bleaching trade at Over Darwen, then became a partner in a cotton firm, but was unsuccessful in both. Some friends latterly purchased an annuity of £63 for him. He died June 26, 1827. Crompton's was soon by far the most used of all spinning-machines, and in 1811 the number of spindles on his principle was 4,600,000, while there were only 310,516 of Arkwright's, and 155,880 of Hargreaves'. A monument was placed over his grave, and in 1862 a bronze statue of him erected at Bolton. See Kennedy's *Memoir* in vol. v. of *Memoirs of Literary and Philosophical Society of Manchester*, and French's *Life of Crompton* (1860).

**Cromwell, OLIVER**, Protector of the Commonwealth of England, Scotland, and Ireland, was born at Huntingdon, April 25, 1599. He was the son of Robert Cromwell, younger son of Sir Henry Cromwell, descendant of a nephew of Cromwell, Earl of Essex, and was a younger brother of Sir Henry Cromwell of Hinchinbrook. His mother was Elizabeth, daughter of Thomas Steward of Ely, afterwards knighted by James I., who, when she married Robert Cromwell, was the widow of William Lynne. He was first-cousin to John Hampden. He was educated at Huntingdon grammar-school, the master of which was the Puritan Dr Beard, and at Sydney-Sussex College, Cambridge, and seems to have carried away a modest share of classical and general culture. He went to London to study law, but never

entered an Inn of Court. In June 1617 his father died, leaving him a moderate estate at Huntingdon. In August 1620 he married Elizabeth, daughter of Sir James Bouchier, a London merchant. Of the wildness of his youth there is no proof beyond his own remorseful confession after his conversion that before he knew God he had been the chief of sinners. He was, however, under medical treatment for hypochondria. He embraced Puritanism in its most enthusiastic form, attended and supported the ministry of its proscribed preachers, and became a zealous adherent of the cause, and opponent of its arch-enemy and persecutor Laud.

In 1628 he sat as member for Huntingdon in the stormy third parliament of Charles, and raised his voice against Romanising ecclesiastics. The parliament dissolved, he returned to farming at Huntingdon, whence he removed to St Ives and afterwards to Ely, where property had been left him by his uncle. He appears to have come into collision as a local patriot with the king's commissioners for the drainage of the Fens. He sat for Cambridge in the Short Parliament and in the Long Parliament (1640). In the Long Parliament, though no speaker, he was active and vehement on the Puritan side. Sir Philip Warwick describes him at this period in 'a plain cloth suit, which seemed to have been made by an ill country tailor; his linen was plain, and not very clean; and I remember a speck or two of blood upon his little band, which was not much larger than his collar. His hat was without a hat-band; his stature was of a good size; his sword stuck close to his side; his countenance swollen and reddish; his voice sharp and untunable; and his eloquence full of fervour.' Sir Philip adds: 'It lessened much my reverence unto that great council, for this gentleman was very much hearkened unto.'

When war broke out (1642) he was sent down to organise his district for the parliament, which he did with the greatest vigour and success. He also subscribed £500 to the cause. Becoming captain of a troop of parliamentary horse, he fought at Edgehill. After Edgehill, he warned his friends that the parliament must have soldiers of a better stamp, and that to the spirit of a chivalrous gentry must be opposed that of a God-fearing yeomanry. On this principle he formed his unconquerable Ironsides. With strict morality and organised enthusiasm he combined in the famous corps a rigid discipline, which enabled him always to keep his troopers well in hand, and thus to turn the wavering tide of more than one battle. While the cause of the parliament was depressed elsewhere, his constancy, capacity, and courage upheld it in the eastern counties, which had formed themselves into an association, of which he was the soul. A brilliant action near Gainsborough marked him for high command. In the summer of 1644 he, under Manchester, led the forces of the associated counties to join the Scots and the troops of the Fairfaxes before York, and in the battle of Marston Moor the charges of his cavalry decided the day. He now stood forth as the leader of the Independent and thoroughgoing party against the Presbyterians and moderates. After the second battle of Newbury he impeached the conduct of Manchester in parliament. While the Presbyterian and aristocratic generals were set aside by the Self-denying Ordinance, Cromwell was retained in command. Under Fairfax he led the new model army, of which he no doubt was the chief organiser, to decisive victory at Naseby, June 14, 1645. Fairfax being no politician, Cromwell became the representative of the army in its contest with the Presbyterian parliament, which desired to disband it. The Presbyterians proving intractable,

he resorted as usual to strong measures, marched on London, and coerced the parliament. He was never revolutionary, but he cared not for forms when they stood in the way of what he thought right. It was no doubt under his directions that Joyce carried off the king from Holmby. It seems that Cromwell desired, had it been possible, to make terms with the king; but Charles was incurably possessed with the idea of recovering his power by playing off one party against the other. Whether it was by Cromwell or by the Scotch envoys that Charles was induced to fly from Hampton Court is a question on which authorities differ.

As a prisoner in the Isle of Wight, the king, while he was negotiating with the parliament, was carrying on intrigues with his partisans in England and Scotland, which brought on the second Civil War and the invasion of England by Hamilton. Again Cromwell was called to take the field for his cause, which was once more in extreme peril. After swiftly quelling the insurrection in Wales, he marched northwards, attacked the invading army of Hamilton at Preston and totally destroyed it. The soldiery now clamoured for justice on the king; and Cromwell, probably sharing their wrath and despairing of any arrangement with the faithless Charles, complied with their demand, brought the king to trial, sat in the High Court of Justice, and signed the death-warrant (January 1649). Had ambition been his motive for this deed we should hardly have found him at the same time treating for the marriage of Richard, his heir, with the daughter of Mr Mayor, a private gentleman. The Commonwealth having been established, the first service rendered by Cromwell to it was the suppression of the formidable meeting of the Levellers, which he accomplished by a characteristic union of vigour with mercy. He was next sent to Ireland to end the civil war still raging there. This he did effectually, and on the whole humanely, though it cost some strokes of sanguinary severity, the necessity for which he himself deplored.

On his return from Ireland he (Fairfax having declined) took the command against the Scots, who had declared against the regicide republic and called in Charles II. With his usual daring he assumed the offensive and invaded Scotland. But he was out-generalled by Leslie, and was in extreme peril, when a false move of the Scots, by affording him battle, enabled him once more to display the superiority of the soldiery which he had trained and to win the decisive victory of Dunbar. The image of militant Puritanism was never more vividly presented than by Cromwell's bearing on that scene. With the defeated Covenanters he dealt as with estranged friends. The royalists proper, who still held the field in Scotland, having eluded his strategy and marched into England, he followed, and on September 3, 1651, at Worcester, gained the victory which he called his crowning mercy and which ended the Civil War. Returning to London in triumph, he declared for a constitutional settlement and an amnesty. The parliament, now reduced by revolutionary expulsions to the 'Rump,' was bent on perpetuating its own power. After fruitless negotiations Cromwell turned it out with unwise violence and contumely. Supreme power being now in his hands and those of the other chiefs of the army, he called the convention of Puritan notables, nicknamed the Barebones Parliament, for the settlement of the nation. The Barebones Parliament proving too visionary and revolutionary, was dismissed, and supreme power reverted to Cromwell and his officers.

Cromwell was now declared Protector under the instrument of government, which provided for a government by a single person with one House of

parliament elected on a reformed basis of representation, and a Council of State, in the appointment of which nomination by the Protector was combined with election by the parliament (December 16, 1653). A power of legislating by ordinance till parliament should meet was reserved to the Protector, and was largely used by Cromwell for the purposes of reorganisation and reform. His aim evidently was to restore in substance the ancient constitution of the realm, with a Protestant protectorate or monarchy, and full securities for liberty, especially for the religious liberty which had been in his mind at least the main object of the Civil War. But when parliament met, though elected under his writs, it fell to questioning his authority, and he was compelled to exclude the disaffected by a test. His second parliament, from which the recalcitrants were excluded at the outset, offered him the title of king. Cromwell wavered; but the stubborn resistance of the republican soldiers decided him to decline the offer. The Upper House of parliament was, however, restored, and the Protector was empowered to name his successor. A fixed revenue was also voted to him. He was now installed as Protector with a ceremonial resembling a coronation. When the parliament met again, its two Houses fell into a collision which compelled Cromwell to dissolve it; and his power thenceforth rested upon the army, though it was his constant desire to revert to constitutional government, and he was preparing to call a new parliament when he died.

His protectorate was a perpetual conflict with republican resistance on the one hand and with royalist plots and risings on the other, while his life was constantly threatened by royalist assassins. To keep down the royalists he for a time put the country under major-generals, supplying his treasury at the same time by an impost on the property of the cavaliers. He was, nevertheless, able to inaugurate a great policy, home and foreign. He reorganised the national church on the principle of comprehension, including all but Papists, Prelatists, and Antitrinitarians, while the ministry was weeded by commission, the result being, as Baxter, an opponent of the government, testifies, a ministry very acceptable to the people. Personally tolerant, Cromwell upheld toleration as far as he could, especially in the case of the Sectaries, and curbed the persecuting tendencies of parliament. For law reform he did his best, but professional interests were too strong for him. He united Scotland and Ireland to England, giving them both representation in parliament. Scotland, having free trade with England, enjoyed great prosperity under his rule. Ireland he sought to make a second England in order and industry, and if his measures were high-handed it must be remembered that the native Irish were then in an almost savage state. It was his aim to enlist ability, without distinction of party, and youths of promise from the universities into the service of the state. He saved the universities from the fanatics, put good men at their head, and encouraged letters.

But it is his foreign policy that has brought him most renown. Under him the Commonwealth became the head and protectress of Protestant Europe. He made peace with Holland and tried to form a league of all the Protestant states. He protected the Waldenses of Piedmont against their persecutors, using the pen of Milton in his protest. In the interest at once of religious liberty and commerce he allied himself with France, as the more liberal power, against Spain, the power of persecuting Roman Catholicism and the tyrant of the Western waters. He failed in an attempt on Hispaniola, but took Jamaica, and thus gave British enterprise a foothold in those seas. The

victories gained by his fleet under Blake over the Spaniards brought him at once glory and treasure. His troops, with those of France, won the battle of the Dunes, and he obtained Dunkirk as his share of the spoil. He sedulously fostered British commerce, and by the hand of Blake chastised the pirate-states of Barbary. His boast that he would make the name of Englishman as respected as that of Roman had been, was, so long as he reigned, fulfilled; and his bitterest enemies could not deny the impression which he had made on the world, or the height to which he had raised his country. His court was simple and frugal, yet dignified; and though there was a strain of coarseness in his character (as illustrated in occasional horseplay), his bearing in public upheld the majesty of the state.

Cromwell had always been a most loving husband and father, and the palace of the Protector was a virtuous English home. His speeches are very rough and unmethodical as compositions, but they are marked by sense, force, and intensity of purpose. He was fond of music, and not without regard for art. It seems that his government was striking root, since people of rank were beginning to ally themselves with it, and his heir succeeded without the slightest opposition. But disease and care, together with grief at the death of his favourite daughter, Lady Claypole, cut short his life. He died September 3, 1658, and the fabric of government which his mighty arm had sustained fell speedily to the ground.

The records of Cromwell's life are very imperfect. Of his greatness as a soldier and statesman there can be no question, but it is difficult across two centuries and a half to see into his heart and pronounce how far ambition mingled with higher motives. That the religious enthusiasm which sent him out to expose his life in war at the age of forty-three was sincere cannot be doubted; but religious enthusiasm is often associated with fanaticism and self-deception. One who knew Cromwell well has described him as 'in body compact and strong, about five feet ten in height, with a head which you might see was a vast treasury of natural parts, with a temper exceeding fiery but under strong moral restraint, and compassionate even to an effeminate measure.' 'A larger soul, I think, hath seldom dwelt in a house of clay than his was.' He was laid with great pomp in the tomb of the kings at Westminster, but after the Restoration his body was exposed on the gibbet at Tyburn and afterwards buried under it.

See Noble, *Memoirs of the Protectoral House of Cromwell* (1787); Cromwell, *Life of O. Cromwell and his Sons* (1820); Carlyle, *Cromwell's Letters and Speeches* (1846); Sanford, *Studies of the Great Rebellion* (1853); Goldwin Smith, *Three English Statesmen* (1867); Jas. Waylen, *The House of Cromwell* (1892); books on the Protector by F. Harrison (1888), R. F. D. Palgrave (1890), S. H. Church (1894), Horton (1897), S. R. Gardiner (1897, 1899), Baldock (1899), Paterson (1899), Roosevelt (1900), Firth (1900, &c.), and Morley (1900). Compare also the articles CHARLES I., ENGLAND, PURITANS, LONG PARLIAMENT, WESTMINSTER ASSEMBLY, MILTON, SELDEN, IRTON, LAMBERT, MONK.

**Cromwell, RICHARD**, third son of Oliver, born October 4, 1626, became his father's heir by the death of his elder brothers, Robert and Oliver. An amiable but weak man, he lived at first in comparative privacy, but when the Protector had been empowered to nominate his successor, Richard was brought to the front, and an effort was made to train him to the work of government, but in vain. Scarcely had he entered on his office, when the forces of anarchy, both parliamentary and military, broke loose, and he found himself utterly unable to restrain them. It was probably with little reluctance that he quitted Whitehall and retired into

private life. After the Restoration he lived for a time abroad under a feigned name; but he returned to England about 1680, and passed the remainder of his life at Cheshunt, where he died July 12, 1712, and was buried in the church at Hursley, Hampshire.

**Cromwell, THOMAS** (*malleus monachorum*, 'the hammer of the monks'), was born about 1485, the son of a Putney blacksmith, cloth-shearer, brewer, and innkeeper. His youth was turbulent and adventurous. During eight or nine years passed on the Continent (1504-12), he seems to have served as a common soldier, to have been befriended at Florence by Frescobaldi the banker, to have acted as clerk at Antwerp and to a Venetian merchant, to have visited Rome, and to have traded on his own account at Middelburg. Anyhow, by 1513 he was back in England and married; there, step by step, he rose to wealth and importance as a wool-stapler and a scrivener, half usurer, half lawyer, having originally been bred to the law. Wolsey employed him as early as 1514; through Wolsey, probably, he got into parliament (1523); he was Wolsey's chief agent in the unpopular work of suppressing certain smaller monasteries for the endowment of his colleges at Ipswich and Oxford (1525); and finally he became his factotum and secretary. He stepped to greatness over his fallen master. Cavendish tells how on All-Hallows Day, 1529, he found 'Master Cromwell saying of Our Lady matins—which had been since a very strange sight in him'—and bewailing his own misadventure, but intending to ride from Esher to the court, 'where,' quoth he, 'I will either make or mar.' And Pole tells how, a few months earlier, Cromwell bade him take Machiavelli for his guide. Both stories illustrate the very man.

He was cheaply faithful to the cardinal, aiding him not only by quick-witted advice, and by pleading his cause in parliament, but even with £5 out of his own savings. Withal, he made himself friends of Wolsey's enemies; and his fidelity ingratiated him with Henry VIII. Him Cromwell promised to make the richest king ever in England, and counselled him to cut the knot of the divorce by declaring himself supreme head of the church. Counsel and promise were carried into effect by the Act of Supremacy (1534) and by the dissolution of the monasteries (1536-39). To abolish papal authority, break the power of the church, humble the nobility, and make the king absolute, were Cromwell's aims; in their accomplishment he stuck at nothing. At heart, it would seem, still a Catholic—for so late as 1535 he bequeathed £46 for a priest to sing mass for his soul—he yet did his utmost to Protestantise the English Church, whose 'polity,' in the words of Mr Froude, Cromwell's admirer, 'remains as it was left by its creator.' It is often hard to determine whether he was tool or instigator, to disserve his actions from those of Henry; both must be treated under Henry's reign. But here may be noticed his winning manners and ungraceful person, his venality and profusion, his purposeful ruthlessness and ubiquitous industry, his army of spies and vast correspondence—above all, the fact that that English 'Terror,' in which perished More and Fisher and hundreds of lowlier victims, set in with Cromwell's rise, and ebbed with Cromwell's fall. Among the posts and honours showered on him were those of privy-councillor (1531), chancellor of the exchequer (1533), secretary of state and master of the rolls (1534), vicar-general (1535), lord privy seal and Baron Cromwell of Oakham (1536), knight of the Garter and dean of Wells (1537), lord great chamberlain (1539), and finally, on 17th April 1540, Earl of Essex. 'He had,' says Professor Brewer, 'engrossed in his own hands powers such as no subject and no sovereign in this country had ever

possessed before or will ever possess again.' But the hand that had so exalted could equally abase him. The hatred all men bore him, the Catholic reaction, and Henry's aversion to Anne of Cleves, the coarse Lutheran consort of Cromwell's choosing, combined to effect his ruin: less than eight weeks after his elevation to the earldom he was arrested and lodged in the Tower. His abject entreaties for 'Mercy, mercy!' availed him nothing; as little did his filthy revelations of Henry's discourse with him touching Anne of Cleves. Condemned under a bill of attainder, his own favourite engine of tyranny, he was bunglingly beheaded on Tower Hill, 28th July 1540. See Gairdner's article in the *Dictionary of National Biography* (vol. xiii. 1888); Dean Hook's *Lives of the Archbishops of Canterbury* (vol. vi. chap. 1, 1868), Professor Biewer's article on 'The Royal Supremacy' in *English Studies* (1881); works cited under HENRY VIII.; and his *Life and Letters* by R. B. Merriman (1902).

**Cronje**, PIET, a Transvaal general, born in 1835, who took a leading part in the wars with Britain in 1881 and in 1899-1900. After a skilful and determined resistance to Lord Methuen at Magersfontein, he surrendered with 4000 of his army to Lord Roberts on the Modder River on 27th February 1900. A prisoner at St Helena till the peace, he subsequently visited the United States. He died in 1911.

**Cronstadt**, a Russian fortress and seaport, 20 miles W. of Petrograd, on a narrow island 7 miles long, at the mouth of the Neva. Cronstadt, though ice-bound from December to May, is at once a great naval station and the chief commercial port of Petrograd. It was founded by Peter the Great in 1710, after taking the island from the Swedes (1703). Its fortifications, all built of granite, command every approach to Petrograd. The place was considered impregnable by Sir Charles Napier, who reconnoitred it during the Russian war of 1854-55, but though subsequently strongly refortified, its defences, on the outbreak of the Great War, were altogether antiquated. Cronstadt, which is the seat of the Russian Admiralty, has three harbours: the east, intended for vessels of war; the middle harbour, where vessels are fitted up and repaired, and which is connected with the former by a broad canal; and the west or Merchant's Harbour, for the merchant-shipping. Since 1884 Petrograd is connected with Cronstadt by a ship-canal 200 feet wide and 22 feet deep. Cronstadt contains a cathedral and a statue of Peter the Great. It was seized by mutineers in 1921, but soon fell. Pop. 62,300.

**Cronstadt**, or BRASOV, in Transylvania. See KRONSTADT.

**Cronus**. See SATURN.

**Crook**, GEORGE, American soldier, born in Ohio in 1823, graduated at West Point in 1852, served in California till 1861, and was actively engaged throughout the civil war, in which he rose to the rank of major-general. He served against the Indians in Idaho (1866-72), in Arizona (1872-75), and crushed the great rising in Wyoming and Montana in 1876-77. In 1882 he returned to Arizona, where he controlled the Indians on the southern frontier, putting an end to the truck system. He died 21st March 1890.

**Crooked Island**. See BAHAMAS.

**Crookes**, SIR WILLIAM, K.C.B., O.M. (1832-1919), a great physicist and chemist, born in London, was a pupil and assistant of Hofmann at the Royal College of Chemistry, next superintended the meteorological department of the Radcliffe Observatory, and lectured on chemistry at the Science College,

Chester. In 1859 he founded the *Chemical News*, and in 1864 became also editor of the *Quarterly Journal of Science*. He was elected F.R.S. in 1863, vice-president of the Chemical Society in 1876, member of council of the Royal Society the year after, and in 1880 was awarded by the French *Académie des Sciences* an extraordinary prize of 3000 francs and a gold medal. He was an authority of the first rank on sanitary questions, especially the disposal of the sewage of towns, and his method of producing extreme vacua gave a great impulse to incandescent electric lighting. His original researches in chemistry and physics led to the discovery of the metal thallium in 1861, of the sodium amalgamation process for separating gold and silver from their ores in 1865, and of important discoveries in molecular physics and radiant matter, besides the invention of the Radiometer (q.v.). He wrote *Select Methods of Chemical Analysis* (1871), *The Wheat Problem* (revised 1918), and works on beet-sugar, dyeing, calico-printing, and sewage, and translated books on chemistry and metallurgy. 'Crookes Tubes' are Vacuum Tubes (q.v.); and see RÖNTGEN, GAS. For his spiritualistic views, see SPIRITUALISM. Crookes was president of the British Association in 1898. See *Life* by Fournier d'Albe (1923).

**Crookhaven**, a fishing village of County Cork, 30 miles SW. of Skibbereen, on a fine bay.

**Cropredy Bridge**, near Banbury, gives name to a royalist success (29th June 1644).

**Croquet**, an open-air game, in which two or more players endeavour to drive wooden balls, by means of long-handled mallets, through a series of arches set in the ground according to some pattern. The object of each player is to make the complete circle of six to ten hoops or arches; but during the course of the game he may have the progress of his ball retarded by his opponents, or assisted by his partners; and these friendly aids and hostile attacks constitute the chief interest of croquet. The game seems to be substantially a revival of the old game of Pall Mall, which gave its name to what is now the well-known London street, and to other places in England. Pall Mall, played with ball (Ital. *palla*) and mallet (Ital. *maglia*), came from France into England early in the 17th century, and died out in the 18th. Croquet (Fr. *croquer*, 'to crack') became a popular game about 1850, was the great summer social game during 1860-70, but was after about 1875 superseded by lawn-tennis, to revive about 1897. A *croquet-ground* should be a well-rolled level grass plat or lawn, not less than 30 yards long by 20 yards wide; a full-sized croquet-ground measures 40 yards by 30 yards.

**Crosier**, or CROZIER, a name strictly belonging to the Pastoral Staff (q.v.) or crook of a bishop or abbot, has often been applied, erroneously, by modern writers to an archbishop's cross. The error seems due to an old confusion between cross, derived, apparently through Irish and Norse, from Latin *cruz*, and the obsolete crose or croce, mediæval Latin *crocia*, a crook. The crosier possibly originated in the *lituus* of the Roman augurs.

**Cross**, an instrument of capital punishment among the ancients. Death by the cross was esteemed so dishonourable that only slaves and



Processional Cross.

malefactors of the lowest class were subjected to it by the Romans. Among the Carthaginians, and probably also among the Phœnicians and allied races, it was employed as an instrument of sacrifice to Baal. Thus the Carthaginian general, Mæcus, invested his son, Cartalo, in royal raiment, with a crown on his head, and crucified him to obtain a special favour from Baal. It has been suggested that there may be some allusion to these crucifixions to the sun in Num. xxv. 4; Josh. viii. 29; x. 26. Among the Gauls, as shall be noted later, a cross of equal arms was a solar symbol. It was customary among the Romans to proclaim the name and offence of the person crucified, or to affix a tablet (*album*) to the cross, on which they were inscribed. Malefactors were sometimes fastened on a simple upright stake, and so left to die, or they were impaled upon it, and to this upright stake the Latin name *crux* was originally and more strictly applicable; but very generally a cross-piece (*patibulum*) was added to the stake, to which the arms of the criminal were tied, or to which his hands were nailed. When the cross-piece was fastened at right angles below the summit of the upright stake, the cross was called *crux immissa*; when the cross-piece was fastened at right angles across the top of the upright stake, the cross was *crux commissa*; and when it was formed of two beams crossing one another obliquely, it was *crux decussata*. There was often a projection, on which the body rested, as on a seat. The cross was erected without the gates of towns, but in places of frequent resort. The person crucified often lived for days upon the cross.

The death of Christ by crucifixion led Christians to regard the cross with peculiar feelings of reverence, and to make use of the sign of the cross as a holy and distinguishing sign. The custom of *crossing* one's self in honour and commemoration of Christ, can be traced back to the 3d century. It was customary, probably from apostolic times, for the Christians to pray with extended arms; and Justin Martyr and Origen explain this attitude as representing that of Christ on the cross. In this manner Christians are represented in the early paintings in the catacombs as praying. The Emperor Constantine, after obtaining the victory over Maxentius, through the influence, as he believed, of the sign of the cross, caused crosses to be set up in public places and upon public buildings; but the so-called cross of Constantine, or Labarum, was not really a cross, but a circle containing the XPI, the first three letters of the name of Christ in Greek, and was merely an adaptation of a symbol of a Gaulish solar deity (see Gaidoz, *Le Dieu Gaulois du Soleil*), which consisted of a wheel of six spokes, or sometimes of four. After the *Invention of the Cross*, or finding of the alleged true cross of Christ in Jerusalem, which was supposed to have taken place in a search made on Calvary by the Empress Helena (q.v.) in 326 A.D., a surprising quantity of the relics of the cross were distributed through all parts of Christendom. When a portion of the cross was given to St Radegund by Justin II, emperor of the East, and she desired to have the relic received with honour into the city of Poitiers, the Bishop Maroveus peremptorily refused to allow it. She was obliged to appeal to King Sigebert, and he ordered the Archbishop of Tours to receive the relic. Maroveus left the town rather than countenance what he regarded as a superstitious act. For this occasion Venantius Fortunatus wrote the famous hymn 'Vexilla regis,' and it was first sung on the introduction of the relic processionally into Poitiers, circa 580. Various other protests were made against the extension of the worship of the relics, but in vain. The sign of the cross is made not only by Roman Catholics, but by the members

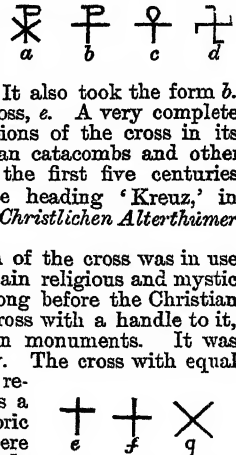
of the Eastern churches also; by the Westerns from left to right, by the Easterns from right to left. It is admitted by the Lutherans as a commemorative sign of the atoning death of Christ, but by many Protestants is rejected as a human invention in worship, and as tending to superstition. It was very generally used during the middle ages, and still is among the less enlightened peasantry in some Roman Catholic countries as a sort of charm, or as affording some security, like an amulet, against all evil, and particularly against evil spirits and witchcraft. The festival of the Invention of the Cross is celebrated on the 3d of May; that of the Elevation of the Cross commemorates the re-erecting of the cross at Jerusalem by the Emperor Heraclius in 628, after it had been carried away by the Persians. See *Legends of the Holy Rood*, edited by Richard Morris for the Early English Text Society (1871); and the *Legendary History of the Cross*, by Ashton and Baring-Gould (1887).

The earliest mention of representations of the crucifixion are by two writers in the 6th century. Gregory of Tours relates that such a picture was in one of the churches of Narbonne, and gave offence because it was nude; and the rhetorician Choricus says that in a church at Gaza was a representation of Christ crucified between two thieves. See CRUCIFIX. As neither of these writers remarks on the novelty of such representations, it may be supposed that they were not infrequent in the 6th century. Early crucifixes were, in contradistinction to that mentioned by Gregory, clothed to the feet. In the treasury of Monza are two such, one given by Gregory the Great in 599 to Adalwald, son of Queen Theodolinda, and another of the 6th century with a Greek inscription. The use of the cross without a figure of Christ is much earlier. As already mentioned, it was employed as a sign made with the hand, or by extension of the arms, at an extremely early Christian epoch; but no crosses are found represented in the catacombs of Rome before the 5th century, excepting the so-called cross of

Constantine, *a*, which is not a cross but a monogram. This symbol is found first in the beginning of the 4th century. It also took the form *b*. Then it became a plain cross, *c*. A very complete list of all the representations of the cross in its various forms in the Roman catacombs and other Christian monuments of the first five centuries will be found under the heading 'Kreuz,' in Kraus, *Realencyclopädie d. Christlichen Alterthümer* (1886).

It appears that the sign of the cross was in use as an emblem, having certain religious and mystic meanings attached to it, long before the Christian era; the *crux ansata*, or cross with a handle to it, *c*, is common on Egyptian monuments. It was the symbol of immortality. The cross with equal arms, and the cross with returned arms or *fylfot*, *d*, is a symbol found on prehistoric relics in Italy and elsewhere (see Mortillet, *Le Signe de la Croix avant le Christianisme*, 1866). The Spanish conquerors were astonished to find it an object of religious veneration among the natives of Central and South America, where it was a symbol of the god of rains. See also PALENQUE and SVASTIKA.

The forms given to crosses in art are endless; but the two leading types are the Latin cross, *e*, or *crux immissa*, supposed to be that on which Christ suffered, and the Greek cross, *f*, both of which are subject to many fantastic variations. The Greek cross forms the well-known cross of St George, which was the national ensign of the English



previous to the union with Scotland. The cross of St Andrew, *g*, differed entirely in form from the Latin or Greek cross. This cross, or *crux decussata*, consisted of two shafts of equal length crossed diagonally at the middle, as in the annexed cut. According to the legend, this was the form of cross on which St Andrew, the national saint of Scotland, suffered martyrdom (see ANDREW). As the Scottish ensign, it is now blended with the cross of St George in the Union Jack. See FLAG.

The Cross of the Resurrection is a floriated cross; and is usually represented as heading a lance, to which is fastened a banner upon which a cross is depicted. The earliest and finest floriated cross is that in the mosaic of San Ponziano, where, however, the flowers spring from the shaft, and on the arms stand two lighted candles. The idea of the floriated cross seems to have been to connect it with Aaron's rod that budded, and so to signify the eternal priesthood of Christ.

In mediæval times a cross, the Rood, stood over the screen between the nave of a church and the chancel. This was always veiled in Lent. The crutched cross, like the letter T, was the symbol of St Anthony the Hermit. *Processional* crosses—double for archbishops—are those carried in processions; *pectoral* crosses, those worn on the breast by ecclesiastics of rank. Many orders have distinctive crosses. See LEGION OF HONOUR.

The *Order of the Cross*, originally a spiritual order of knighthood, sprang up in Palestine in the time of the Crusades, and was then called the *Bethlehemite Order*. Pope Gregory IX. confirmed the order in 1238. Its principal seat was in Bohemia.

*Sanctuary, Boundary, or Monumental Crosses*, as they are called, consist of an upright flat pillar or obelisk, covered with sculptural devices, and set

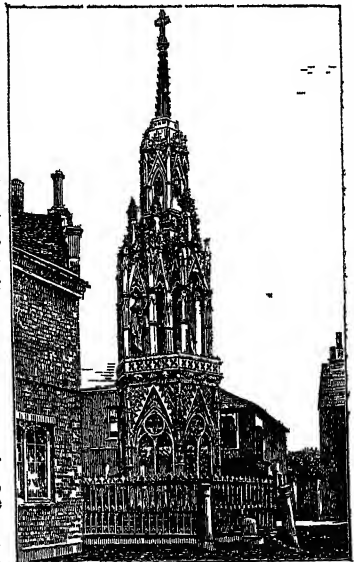
*Celtic Cross*, most frequently found in Ireland and in the north and west of Scotland. Such crosses vary much, from a cross incised on a flat slab to an elaborate cruciform monument. The majority of the latter seem to belong to the period between the 12th and 15th centuries. One of the best known is that at Iona called St Martin's Cross, standing in the grounds of the cathedral. It is a column of compact mica schist, 14 feet high, 18 inches broad, and 6 inches thick, and is fixed in a pedestal formed out of a massive block of red granite, about 3 feet high. In connection with certain ancient religious houses in Ireland, there were very fine Celtic crosses. For Celtic crosses, and for the *Runic* crosses of Anglo-Saxon Britain (as at Ruthwell and Bewcastle), Man, and the Western Isles of Scotland, see the articles SCULPTURED STONES and RUNES.

*Churchyard Crosses* seem to have existed in all churchyards before the Reformation: some still exist, and the remains of others are numerous. In France, in connection with the cemetery cross, in some parts, a perpetual lamp was kept burning, and the contrivance for the lamp remains in some of them.

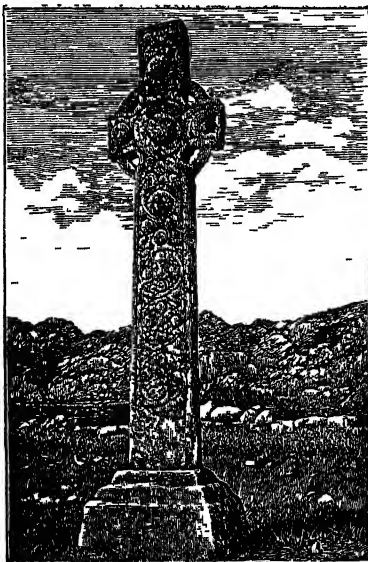
Many very beautiful crosses exist in England, upon the points of gables of churches, or grave-stones, and in other situations, as also in heraldry. Among these, the cross most commonly seen is called the *cross crosslet* (see below).

*Memorial Crosses* are such as are erected in memory of a beloved object, or in commemoration of some event of local importance. In England there are some superb crosses of this kind; they are popularly called *Norman Crosses*. This species of cross resembled a Gothic turret set on the ground, or on a base of a few steps, and was decorated with niches for figures and pinnacles.

The best-known examples are those erected by Edward I. (1290) in memory of his queen, Eleanor; being placed on the spots where the body rested in its funeral progress to Westminster. Of these the original cross at Geddington, near Kettering, still stands, and that at Hardingstone, near Northampton, is one of the finest monuments of mediæval art in Britain; the cross at Wal-



Waltham Cross, restored.



St Martin's Cross, Iona.

in a socket level with the ground. Occasionally, they appear to have marked boundaries, but more frequently were monuments over the graves of heroes, kings, bishops, &c. A vast number of extremely rude and early crosses of granite occur in Cornwall and Devon: some of these have apparently been fashioned out of prehistoric monoliths. In some instances, they probably marked the verge of a sanctuary. A characteristic type of cross is the

tham was repaired in 1890; that at Cheapside no longer stands; that at Charing was removed by parliament in 1647: a reproduction occupies its site.

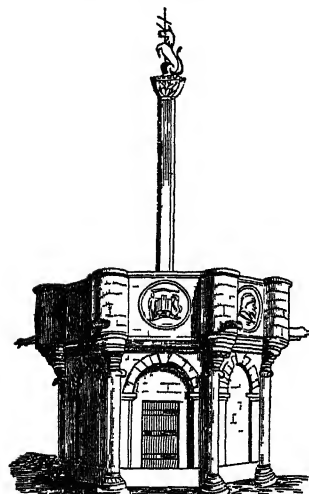
*Village Crosses* stood in the centre of most villages in ancient times. In the west of England a good many remain.

*Town or Market Crosses* were erected as stands to preach from, or in commemoration of events regarding which it was deemed proper to evoke pious

feelings. As these structures were incorporated with or surmounted by a crucifix, the term *cross* was so indelibly associated with them that it survived the religious character of the fabrics. The earliest examples of this kind consisted, probably, of tall crucifixes of wood, such as are still seen by the waysides in some continental countries. Afterwards, stone shafts would be substituted; and according to the increase of market revenues, or progress of taste, these town-crosses assumed that imposing character which they latterly possessed. The crosses at Cheddar in Somersetshire and at Malmesbury in Wiltshire, are open vaulted structures, with a commodious space beneath as a refuge for market-folks during rain, and surmounted with a kind of Gothic turret. At Chichester, Bristol, and Winchester, the market-crosses, while similar in form, are of a higher architectural quality. Adjoining St Paul's in London stood Paul's Cross, a structure which we read of as early as 1259, in the reign of Henry III. At this *preaching cross*, by order of Henry VIII., preachers delivered sermons in favour of the Reformation, and here Queen Elizabeth attended to hear a thanksgiving sermon for the defeat of the Spanish Armada; but in 1643 the cross incurred the displeasure of the Puritans, and was demolished by order of parliament. See books by Alfred Rimmer (1875) and Aymar Vallance (1920).

Scotland offers no specimens of memorial or Norman crosses, unless it be the modern Scott Monument, at Edinburgh, which is essentially a Norman cross of a gigantic order. The simpler kind of Scottish market-cross consisted of a shaft of stone, standing on a flight of circular or octangular steps—the grander market-cross consisted of a tall stone shaft, on an imposing circular, hexagonal, or octagonal substructure, 10 to 16 feet high. The top formed a platform, which was surrounded with an ornamented stone parapet, and was reached by a stair inside. Losing their religious character, the

Scottish market-crosses were employed for royal and civic proclamations, and as places where certain judicial writs were executed. The oldest cross of Edinburgh stood in the centre of the High Street, but was removed in 1617. A new market-cross was then erected farther down the street, on the south side, which consisted of an octangular base, with a stone shaft of about 20 feet in height; its removal in 1756, by the civic authorities, is in-

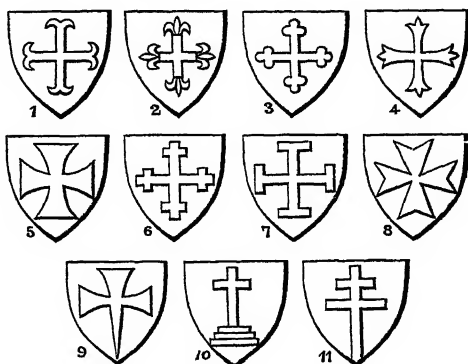
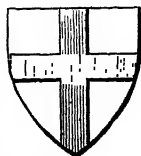


Edinburgh Old Market-cross.

dignantly referred to by Scott in *Marmion*. The shaft, which had been preserved, was re-erected on a similar substructure near the same site in 1885, at the expense of Mr Gladstone. See Small, *Scottish Market Crosses* (1900).

CROSS, in Heraldry, is one of the ordinaries, and is considered to occupy one-fifth of the field if not charged, and one-third if charged. Argent, a cross gules, is the cross of St George. Like

other ordinaries, the cross may be *engrailed*, *invected*, &c. When its central square is removed, it is said to be *quarter-perced*; and when it does not extend to the margin of the shield, it is called *huettee*. But the cross of heraldry is often found varied in other ways, the varieties having each separate names. Thirty-nine varieties are enumerated by Guillim, and 109 by Edmonson. Those most frequently occurring are here mentioned; and it may be remarked that they St George's Cross, have rather the character of common charges than ordinaries not extending to the margin of the shield, and being often borne in numbers as well as singly. The *cross moline* (fig. 1) has the ends turned round both ways; the *cross fleury* (fig. 2) has each end terminating in a



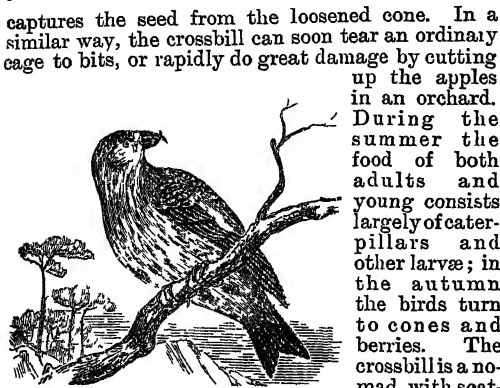
fleur-de-lis; the *cross bottonnée* (fig. 3) has each end terminating in a trefoil; the *cross patee* (fig. 4) has three points to each limb; the *cross pattee* (fig. 5) is small in the centre, but widens towards the ends; the *cross crosslet* (fig. 6) is crossed at each end; and the *cross potent* (fig. 7) is crutch-shaped at each end. The *Maltese cross* (fig. 8), which converges to a point in the centre, and has two points to each limb, though not frequent as a heraldic charge, derives importance from being the badge of the Knights of Malta and other orders. Any of these crosses is said to be *fitchée* when the lower limb terminates in a point, as in fig. 9, representing a *cross pattee fitchée*. Besides these and other crosses with equal limbs, there is the *cross Calvary* (fig. 10), being the cross of crucifixion elevated on three steps, and the patriarchal cross (fig. 11) with two horizontal bars.

**Cross, MARIAN.** See ELIOT, GEORGE.

**Cross, SOUTHERN.** See SOUTHERN CROSS.

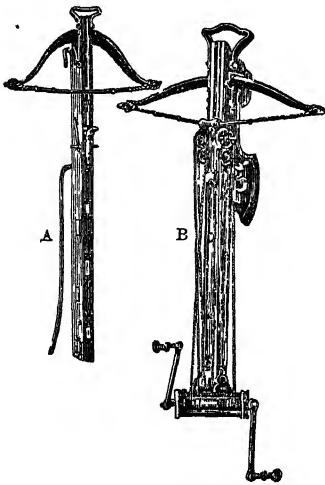
**Cross Bill,** a bill of exchange or promissory note given in consideration of another bill or note.

**Crossbill** (*Loxia*), a Passerine bird in the finch family (Fringillidae), well known for the curious way in which the points of the upper and lower bill-halves cross one another. There seems to be no constancy in the direction of crossing, for in different individuals, even of the same species, the upper and lower portions are found variously directed to right or left. This peculiarity is probably for the most part a directly mechanical adaptation to the food-habit of the bird, which consists in tearing up the cones of firs and pines for the sake of the seeds. Bringing the two points together, the crossbill inserts its beak into the cone, then opens it with a strong lateral movement, and with its scoop-like tongue detaches and

Crossbill (*Loxia curvirostra*).

captures the seed from the loosened cone. In a similar way, the crossbill can soon tear an ordinary cage to bits, or rapidly do great damage by cutting up the apples in an orchard. During the summer the food of both adults and young consists largely of caterpillars and other larvae; in the autumn the birds turn to cones and berries. The crossbill is a nomad, with scattered breeding-places in Britain and throughout Europe. The so-called parrot crossbill (*L. pityopsittacus*) is merely a large-billed variety. The two-banded crossbill (*L. bifasciata*) is a very rare visitor to Britain. Altogether seven species are known, from the northern regions of both hemispheres, and always found gregariously in conifer forests. The crossbill has become associated with a sacred legend, familiar in Longfellow's poem; the bird was fabled to have sought, by pecking at the nails, to free Christ from the cross.

**Crossbow**, or **ARBALEST**, a weapon used in war and sport in medieval times. It consisted of a wooden stock, with a bow made of wood, iron, or steel, crossing it at right angles to the end; the bowstring was pulled down towards the other end of the stock by a lever (which in the simpler kinds was worked by hand or foot), and retained in position sometimes in a notch by a catch or trigger. The bolt or 'quarrel' was then laid in a groove on the top of the stock, and the trigger being pulled, it was shot with a considerable amount of power. The latter, of course, depended on the size of the bow, some of the weapons being comparatively small and easily handled, while others were of large dimensions, and required a machine of the nature of a windlass, called a 'moulinet' or 'gaffie,' to enable the bow to be properly bent. The crossbows of the 14th century were almost all thus equipped. The 'quarrels' employed varied with the size of the bow, but generally they were short stout shafts about 18 inches long, winged with horn or leather, and having a metal point, which was sometimes sharp, but often lozenge-shaped, obtuse, and indented at the sides. Some crossbows had a tube or barrel, with a slit for the bowstring, and dis-



A, Hand Crossbow; B, Rolling-purchase Crossbow.

charged balls of clay, marble, or lead with such force that they were more formidable weapons than the earliest firearms. The larger crossbows were really military engines, which required several men to work them, and threw proportionally heavy missiles (see **BALLISTA**). The crossbow was used in England chiefly during the 13th century; after that it gave place to the longbow, which was found to be the more convenient and easily handled weapon of the two. Its use, however, was general among the continental nations of Europe after the 12th century; though the Lateran Council of 1139 forbade its use as being too murderous a weapon for Christians to employ. See Sir R. Payne-Gallwey, *The Crossbow* (1903).

**Cross-breeding.** See **BREED**.

**Cross-buns**, a small cake specially prepared for Good-Friday, and in many towns of England cried about the streets on the morning of that day as 'hot cross-buns.' *Bun* is, according to Skeat, ultimately of Scandinavian origin. There is an Old Fr. word *bugne*, 'a swelling,' which may be the immediate source of the English word. Good-Friday buns were appropriately marked with the cross, and hence the name. The origin of the practice is obscure. Most probably it is a relic of some heathen observance, to which the early church gave a Christian significance. At Chelsea, there were formerly two celebrated bun-houses, besieged on Good-Friday from morning until night by hundreds of eager purchasers, but they have long since disappeared.

**Crosse**, **ANDREW**, electrician, born at Fyne Court, Somersetshire, 17th June 1784, was educated at Bristol and at Brasenose College, Oxford. His principal researches in science were as to the artificial formation of minerals by processes of electrical deposition and the application of electricity as a means of improving wines, cider, &c. In 1837 he announced that under certain circumstances, organisms (of the genus *Acarus*) appeared in solutions of inorganic substances; a discovery which attracted much attention, but which exposed him to the ridicule of opponents. He died 6th July 1855. See *Memoir* (1857) by his second wife; and her *Red Letter Days of my Life* (1893).

**Cross-examination.** See **EVIDENCE**.

**Crossley**, **SIR FRANCIS**, manufacturer and philanthropist, was born at Halifax, October 26, 1817. His father was the founder of the Dean Clough Carpet Mills. Sir Francis encouraged the inventor George Collier to produce a greatly improved carpet-loom; the mills increased till 6000 hands were employed; while carpets were much cheapened in price, and their use greatly extended at home and abroad. Amongst Sir Francis's benefactions to Halifax were a public park (1857) at a cost of £40,000, almshouses, and orphan homes, besides large donations to the London Missionary Society and to the Congregationalists. A baronetcy was conferred on him in 1863, and from 1852 till his death on 5th Jan. 1872 he represented Halifax and the West Riding as a Liberal.

**Crossopterygii.** See **FISHES**, **POLYPTERUS**.

**Crossraguel** ('*Crux Regalis*'), a ruined abbey in Ayrshire, 2 miles SW. of Maybole. It was a Clugniac foundation, a daughter of the Paisley abbey, and dates from 1244. A notable 'disputation' took place in 1562 between John Knox and the abbot, Quentin Kennedy; and in 1570 the commendator was 'roasted' or severely tortured by fire by the Earl of Cassilis, to force him to resign certain lands.

**Crosswort** (*Galium Cruciata*), a British species of Bedstraw (q.v.), with leaves in whorls of four, and yellow flowers in small axillary cymes.

**Crotal.** See BELL, CASTANETS.

**Crotalaria** (Gr. *krotalon*, 'a rattle'), a tropical genus of papilionaceous Leguminosæ, deriving its name from the inflated pods in which the seeds rattle when ripe. The species are annual, perennial, and shrubby plants, some of which yield valuable fibre, particularly *C. juncea*, the Sunn, or Hemp Sana, or Janupa Hemp of India, an annual species. The perennial *C. peduncularis* (Jubbulpore Hemp) is grown in Southern India, and other species or varieties are in cultivation. Several species are North American.

**Crotalidæ.** See RATTLESNAKE.

**Crotch.** WILLIAM, composer, was born at Norwich in 1775. His musical genius was quite as precocious as that of the great Mozart. When little more than two years old he could play *God save the King* with chords, and in 1779 he was performing in London as a musical prodigy. When only twenty-two he was appointed professor of Music in Oxford University, and in 1822 he obtained the principalship of the Royal Academy of Music. Crotch composed a large number of pieces for the organ and piano, two oratorios, ten anthems, &c.; and he was author of *Elements of Musical Composition* (1812) and *Styles of Music of all Ages* (1807-18). He died at Taunton, December 29, 1847.

**Crotchet.** See MUSIC.

**Croton**, a genus of plants of the natural order Euphorbiaceæ, with numerous species, which are mostly tropical or subtropical trees or shrubs, a few herbaceous. The most important is the Purging Croton (*C. Tiglium*), a small tree, a native



Croton.

of India and the more easterly tropical parts of Asia. The leaves are extremely acid; the wood in a fresh state is a drastic, and in a dried state, a more mild purgative; and the seeds (*Croton Seeds*, or *Tilly Seeds*) are a very powerful drastic purgative, formerly much employed in Europe, but latterly disused on account of violence and uncertainty of action, although still valuable as yielding croton-oil. They are oval or oval-oblong, about the size of field-beans. So great is their acidity, that dangerous effects have ensued from working for some hours with packages of them. The oil is obtained mostly by expression, and partly by treating the cake with alcohol. Other species possess similar properties. Very different are the properties of the species which yield Cascarella (q.v.) and Copalchi (q.v.) barks. Other species are still

more aromatic, and some delightfully fragrant, containing in great abundance a thickish balsamic sap. The sap of *C. gratissimus* is employed as a perfume and cosmetic at the Cape of Good Hope; that of *C. origanifolius* is used in the West Indies as a substitute for Balsam of Copaiva; that of *C. javensis* (or *balsamifer*), also West Indian, furnishes *Eau de Mantes* by distillation; and the balsamic sap of some South American species is dried and used as incense. *C. Draco* and other species yield a blood-red juice, which, when dried, forms the finest kind of dragon's-blood, and has astringent properties.

**CROTON-OIL** is the oil expressed from the seeds of the *C. Tiglium*, and is a sherry-coloured, viscid liquid, with an acrid taste, a somewhat rancid smell, and a fluorescent appearance. It contains a number of oily bodies, none of which have as yet been definitely shown to be the cause of its purgative and vesicating properties. Croton-oil is a violent purgative, in most cases a single drop being sufficient to remove constipation. When rubbed upon the skin it produces rubefaction and pustular eruption, and thereby tends to relieve some affections of the internal organs. It is used either by itself in the unmixed state, or diluted with olive-oil, soap liniment, alcohol, &c. It is not to be employed except under the advice of a doctor.

The name Croton is commonly given by gardeners and others to a plant of another euphorbiaceous genus, *Codiaeum variegatum*, much grown in greenhouses and in the tropics, where it forms hedges. It is a native of the Pacific and Sunda Islands. It is grown for the sake of its variegated leaves, which take many bizarre shapes, being often so narrowed in the middle that one leaf looks like two placed end to end, each with blade and stalk. The blade is often twisted like a propeller.

**Croton.** See CROTONA; and for another often confused with it, CORTONA.

**Crotona**, or CROTON, a city on the east coast of Bruttium in ancient Italy, owed its origin to a colony of Achæans, as far back as 710 B.C. It soon became one of the most prosperous, wealthy, and powerful cities of Magna Græcia. Its walls measured 12 miles in circumference, and the territory over which it extended its sway was considerable. Its inhabitants were celebrated for athletic exercises, and they carried off most of the prizes at the Olympic games. Pythagoras settled here about the middle of the 6th century B.C., and became a very important member of the body politic (see PYTHAGORAS). About 510 B.C. Crotona sent forth an army of above 100,000 men, under Milo, its most renowned athlete, to fight the Sybarites; the latter, though three times as numerous, were utterly defeated, and their city destroyed. The war with Pyrrhus completely ruined the importance of Crotona, and in the 2d century B.C. it had sunk so low that a colony of Romans had to be sent to recruit its well-nigh exhausted population. It never afterwards recovered its prosperity. Some ruins belonging to the old exist in the vicinity of the modern city (called Cotrone, q.v.); and very fine Greek coins have been found. Cortona (q.v.) was also anciently called Crotona.

**Croton Bug.** See BOOKWORM.

**Croton River**, a river of New York State flowing to the Hudson, 30 miles above New York City, has in its basin the lakes and ponds which form the chief water-supply of the city, conveyed through famous aqueducts. See AQUEDUCT.

**Crotophaga** (Gr. 'tick-eater'), a genus of birds in the cuckoo family and order Coccothymophæ. They are also known by the names Ani and Keel-bird, the former referring to the cry, the latter to the blade-like ridge on the compressed arched beak. The best known of the three species (*C. ani*) fre-

quents South America to the east of the Andes, and is often called the Savanna Blackbird. They are distinguished from other cuckoo-like birds by the tail, which has only eight steering feathers. The beak is as long as the head, and the keel is said to be used in unearthing their insect prey; the wings are long and pointed; the tail is long, broad, and rounded. They are social birds, and several females lay their eggs in a common nest. They are fond of keeping about herds of horses and cattle, and destroy insect larvæ on their skin.

**Crotus Rubianus**, otherwise JOHANNES JAGER, German humorist and satirist, is now universally recognised as author, with Ulrich von Hutten, of the *Epistolæ Obscurorum Virorum* (q.v.). His was probably the first conception; and he wrote the forty-one letters of the first series, though probably not without collaboration. He was born about 1480 at Dornheim in Thuringia, whence Rubianus (from *rubus*, a translation of *Dorn*). *Crotus*, a synonym of *Sagittarius*, represents Jager. From goat-herding he passed to Erfurt University in 1498. There he was of the humanist coterie of Mutianus Rufus, and was a friend of Ulrich von Hutten and of Martin Luther. In 1510-15 he was master of the monastic school of Fulda, and from 1517-20 a tutor at Bologna. Later he returned to the Roman Catholic Church; but never quite at home again in it, he suffered the attacks of Lutheran controversialists in silence, and died forgotten about 1540, probably at Halle, where he had received a canonry in 1531. See Walther Brecht, *Die Verfasser der Epist. Obscur. Vir.* (Strassburg, 1904), and F. G. Stokes's edition with English translation (1909).

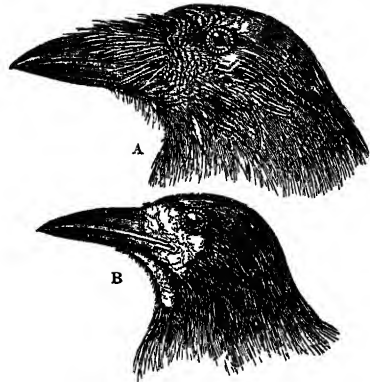
**Croup**, a term used in Scotland from an early period to describe a certain train of laryngeal symptoms, was adopted by Dr Francis Home, in 1765, for an acute inflammatory affection of the Larynx (q.v.), in which there is the formation of a false membrane or fibrinous deposit on the mucous surface of the throat or windpipe. The word has only an historical interest, and its use is not now justified. The investigation by bacteriological methods of the causes of the various types of sore throat has shown that most of the conditions going under the name of croup are in reality cases of Diphtheria (q.v.), though some of the more severe manifestations of simple tonsillitis also fall to be included.

**Crow** (*Corvus*), a genus of Passerine birds, and type of a family Corvidæ, which also includes Magpies (*Pica*), Nutcrackers (*Nucifraga*), Jays (*Garrulus*), Choughs (*Fregilus*), and other genera. The crow family is included in that division of Passeres known as Acromyodi, from peculiarities in the vocal organs, and its members share the following characters: the bill is moderately long, strong and thick; bristles at the base cover the nostrils; the wings are of medium size and rounded; the tail is not prominent; the feet are strong. On the whole they outdo the other Passeres in size and strength, and are represented by towards two hundred species.

Keeping first to the crow genus proper (*Corvus*), we need give little description of the general characters of these familiar birds. The long black bill, the large gape, the tail all but covered by the wings, the black feet, &c. are well-known characteristics. The genus is distributed in most parts of the world except South America and New Zealand. They are essentially tree birds, and almost always build their nests there. In diet they are predominantly vegetarian. It is important to distinguish the four British species of crow. (1) The Raven (*Corvus corax*) is a well-known species in Europe and North Asia. Its black plumage has a

bluish sheen; the upper portion of the bill is bent over the lower; the wings reach the point of the tail. It is a hungry bird, devouring *inter alia* field-mice and small birds; it is not unfrequently tamed, and can be readily taught to ejaculate and play tricks. See RAVEN.

(2) The Rook (*C. frugilegus*) is a commoner smaller species of gregarious habit. There is the same metallic shimmer, the wings again reach the tail, but the upper bill is not elongated over the lower. The face becomes curiously bare during the first winter, and so remains. It is of use in destroying injurious insects, but its omnivorous appetite includes eggs, young birds, fish, walnuts, corn, &c. See ROOK. The accompanying figure



shows the heads of the raven, A, and the rook, B, and illustrates well the prevalent characters of the bill in this genus. It shows also in the raven the bristles which, as in most of the species, surround its base, but which are wanting in the rook. Noteworthy, too, is the greater strength of neck, head, and bill of the more carnivorous as compared with the more frugivorous species.

(3) The Hooded Crow (*C. cornix*) derives its name from the fact that while the general colour is ashen gray, the head is black. The under throat, the wings, and the tail are also, however, black. Like the next species, the hooded crow is fond of carrion, and both are often shot by gamekeepers on account of the damage they do to young game-birds, &c.

(4) The Carrion Crow (*C. corone*, or *Corone hiemalis*), which is of the same size as the rook, has black plumage, with a steel-blue shimmer on back and head, and wings which do not reach the tip of the tail. The bases of the feathers are gray in the rook, white in the carrion crow. It is useful in destroying mice and insects. It is said to interbreed with the preceding species. The name is given in America to a Vulture (q.v.). In some parts of Scotland the carrion crow is called the *Hoody*. There is considerable dispute as to the specific dignity of some of the crows. A few other forms in addition to the above four may be noticed. The crow of North America (*C. americanus*) is very similar to the carrion crow, but rather smaller, and, after the breeding season is over, congregates into great flocks; it is also partially migratory, great numbers from the more northerly parts moving to the south on the approach of winter. Its habits are otherwise intermediate between those of the carrion crow and the rook.—The Fish Crow (*C. ossifragus*) frequents the coasts and southern rivers of the United States, feeding chiefly on fish, which it catches with great dexterity. It also sometimes assails gulls, and compels them to disgorge their prey.—The Jabbering Crow (*C. jamaicensis*) of the Blue Mountains of Jamaica

is remarkable for the resemblance of its voice to human speech. Sir J. E. Tennent gives an interesting account of the small glossy gray-necked crow of Ceylon (*C. splendens*), which frequents the towns, feeding on offal, and boldly enters rooms through open windows, to snatch some morsel from the dinner-table. See also CHOUGH, JACKDAW, LAY, MAGPIE.

**Crowberry**, or **CRAKEBERRY** (*Empetrum nigrum*), a small procumbent shrub, with characteristically inrolled leaf-margins, of the order Empetraceæ, a native of the colder northern parts of the world, and the Andes, abundant in the moors of Scotland and the north of England, and common throughout Canada, Alaska, and Siberia. The order consists of a few heath-like shrubs, which, however, are usually associated with Euphorbiaceæ, with small trimerous, usually unisexual flowers, the



Crowberry (*Empetrum nigrum*):  
a, flowering branch; b, flowers enlarged; c, fruit.

fruit a small berry seated in the persistent calyx. The berries of the crowberry are nearly black, surround the branches in crowded clusters, and contain six to nine bony seeds and a watery acidulous juice. A fermented liquor is prepared from them in some northern countries. They are a favourite food of game. The variety *E. rubrum*, of Cape Horn, differs little, except in having red berries. The berries of the Camarinheira (*Corema alba*) are employed in Portugal for the preparation of an acidulous drink in fevers. The plants of this order, especially *E. nigrum*, have taken considerable part in the formation of peat.

**Crowe**, MRS CATHERINE (née Stevens), authoress, was born at Borough Green, in Kent, in 1800. In 1822 she married Lieutenant-colonel Crowe, and spent great part of her after-life in Edinburgh. She died in 1876. Her mind was morbid and despondent, ever hovering on the border-line of insanity, which it crossed once in one violent but brief attack. Her translation of Kerner's *Seeress of Prevorst* (1845) prepared the way for her well-known *Night Side of Nature* (1848), a great collection of supernatural stories, told, indeed, with vigour and verisimilitude, but hopelessly credulous and uncritical. She wrote also tragedies, juvenile books, and novels; of the last, the best, *Susan Hopley* (1841) and *Lilly Dawson* (1847). Her *Spiritualism and the Age we live in* (1859) has no value, save as autobiography.

**Crowe**, SIR JOSEPH ARCHER, art-writer, born in London in 1825, studied and travelled widely on the Continent, where in 1847 he met Cavalcaselle; their joint works will be found in the article CAVALCASELLE. Crowe was a special correspondent in the Crimean war, the Indian mutiny, and the Franco-Austrian war; and in 1857-59 was director of the School of Art at Bombay. In 1860 he was appointed British consul-general at Leipzig, and afterwards at Dusseldorf; in 1882 he was named commercial attaché at Paris. Made a C.B. in 1885, he was raised to the dignity of K.C.M.G. in 1890. He contributed the article RAPHAEL to this work. He died 6th September 1896. See his *Reminiscences* (1895), mainly of his career as journalist.

**Crowfoot**. See RANUNCULUS.

**Crow Indians**, some 4000 in number, of the Dakota stock, live on reservations in Montana.

**Crowland**, or **CROYLAND**, an ancient market-town in the south of Lincolnshire, on the Welland, in the Fens, 10 miles NNE. of Peterborough. Here in 716 King Ethelwald founded a monastery in honour of the hermit St Guthlac, which, burned by the Danes in 870, and again destroyed by fire in 1091, was restored in 1113, and thereafter became a mitred Benedictine abbey of singular magnificence. The north aisle of its church now serves as the parish church, and part of the west front and the famous bell-tower (1427) still remain. Ingulph (q.v.) was abbot of Croyland. See G. Perry's *Croyland Abbey* (1867). The 'Triangular' or 'Three-way Bridge' is described at BRIDGE.

**Crown** (Lat. *corona*). The crown of classical times was a circular ornament of metal, leaves, or flowers, worn on festive and solemn occasions, and as a reward of worth, talent, or military or naval prowess. Among the Greeks the crown (*stephanos*) was sometimes used as an emblem of office, as in the case of the archons; sometimes as an ornament for the heads of the victors in the public games; and sometimes as a mark of distinction for citizens who had merited well of their country. The Romans made great use of crowns as rewards for valour. The most highly prized was the *corona obsidionalis*, which was bestowed by a beleaguered garrison or army on the general who rescued them. It was made of grass or wild-flowers, gathered from the place which had been beset by the enemy. Next in order was the *corona civica*, a garland of oak leaves and acorns, which was given as a reward to any soldier who had saved the life of a Roman citizen in battle; the *corona navalis*, a gold circle decorated with beaks of ships, was the reward for naval services; the *corona muralis*, a similar circle surrounded with battlements, was bestowed on him who first scaled the walls of a besieged city; and the *corona vallaris*, a circle ornamented with palisades, on the first soldier who forced his way into the enemy's camp. There was also the *corona triumphalis*, bestowed upon a general when he obtained a triumph.

Other crowns were emblematic, such as the sacerdotal, funeral, convivial (of roses, violets, myrtle, ivy, and even parsley), and nuptial crowns. The custom of wearing bridal wreaths or even bridal crowns of metal is not unknown in modern Europe as in Germany and Norway and medieval England; and the bridal wreaths of young brides are still suspended in some Derbyshire churches. (1) *Corona sacerdotalis*, worn by the priests and bystanders when engaged in sacrifice. (2) *Corona funebris* or *sepulchralis*, with which the dead was crowned, a custom which prevailed both among the Greeks and Romans. In Greece, these crowns were commonly of parsley. (3) *Corona convivialis*, worn by guests on festive occasions.

As the emblem of sovereignty in modern Europe, the crown was borrowed less from the crowns of antiquity than from the diadem, a fillet of silk, linen, or woollen. This decoration was originally oriental. Alexander the Great adopted it from the kings of Persia; and Antony assumed it during his luxurious intercourse with Cleopatra. In modern states, crowns have been of various forms, and undergone various changes. The royal crown of England in the 12th and 13th centuries was a jewelled circlet of gold, heightened with strawberry-leaves or trefoils, sometimes alternately large and small. In the very costly and magnificent crown of Henry IV., the strawberry-leaves, eight in number, alternated with as many fleurs-de-lis, the whole alternating with sixteen small groups of pearls. The same crown was worn by Henry V. in the beginning of his reign, but on undertaking his French campaign he ordered it to be broken up, and the fragments distributed as security for the loan required by him to carry on the war. The crown that succeeded it was probably an arched one; for although no arched crown appears on the Great Seal of any monarch before Edward IV., the arched as well as the unarched form of crown is found occasionally in sculptures and illuminations of the reigns of Henry V. and Henry VI. The crown of Edward IV. (which was probably also worn by Henry V. and Henry VI.) differs from previous crowns in being arched over with jewelled bands of gold, closing under a mound ensigned by a cross patée, while crosses patée are substituted for the strawberry-leaves, and roses or fleurs-de-lis for the clusters of pearls. During succeeding reigns down to that of Charles II., the crown underwent various minor changes of form.



Fig. 1.

usually known in this country as the imperial crown, and represented in fig. 1. It has four crosses patée and four fleurs-de-lis set alternately

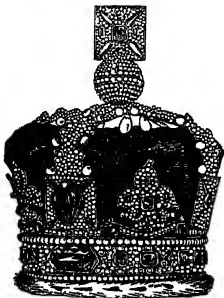


Fig. 2.

on the circlet, while two complete pearl-studded arches rising from within the crosses patée carry at their intersection the mound and cross. A new state crown was made for the coronation of Queen Victoria, differing somewhat from the imperial crown. Its arches rise almost perpendicularly, are elevated rather than depressed at their intersection, and assume the form of wreaths of rose, thistle, and shamrock, formed of brilliants; and the crown itself is covered with diamonds and studded with costly gems (fig. 2). In official representations of the royal arms, they are ensigned by the imperial crown, but a graceful modification of that crown is sometimes made use of instead of it with His Majesty's sanction (fig. 3). For the coronets of the members of the royal family and of the nobility generally, see CORONET.

The crown of Scotland, long lost sight of, was in 1818 discovered, along with the other Regalia (q.v.), in a chest in Edinburgh Castle. Its gold circle, richly jewelled and enamelled, is heightened with ten fleurs-de-lis, alternating with as many crosses fleury, each adorned in the centre with a great diamond between four large pearls put crossways. Four gold arches, added in the reign of James IV., close under a mound, on which rests a large cross patée, with four pearls at the extremities, and as many in the angles. Excepting the arches, the crown is probably of the date of Robert Bruce.

In the crown of the kings of France the circle was heightened with fleurs-de-lis; and from the time of Francis I. it was closed with eight arches,



Fig. 3.

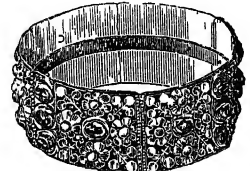


Fig. 4.

from whose intersection rose a fleur-de-lis. The crown of the old German emperors, later the Austrian emperors, is cleft in the centre, so as to present an appearance suggestive of a mitre. The adoption of this crown by Charles V. seems to have resulted from the kings of France having, in emulation of the emperors, assumed a close crown. The iron crown of the ancient Lombardic kings (fig. 4)—restored to the king of Italy by the emperor

of Austria in 1866—is alleged to have been bestowed by Pope Gregory the Great on Queen Theodolinda, and with it Henry of Luxemburg and succeeding emperors were crowned. It is a gold circle with enamelled flowers and jewels, within which is a thin fillet of iron, which has been asserted to have been hammered from a nail of the true cross. The crown (afterwards altered) of the Hohenzollern German empire is shown in fig. 5. The crown of Rumania is of bronze from cannon captured at Plevna.

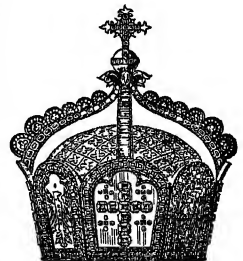


Fig. 5.

The crowns of British kings-of-arms are of silver gilt, with sixteen oak-leaves, each alternate leaf higher than the others, with the motto MISERERE MEI DEUS SECUNDUM TUAM MISERICORDIAM in Roman letters on the circlet.

Crowns occasionally occur as heraldic bearings; among these may be mentioned three of the classical crowns (see above)—viz the crowns mural, a (fig. 6), naval, b,



b



a



c



d

Fig. 6.

also the eastern or antique crown, d, a circle with high points rising from it, and the celestial crown, differing from the last in having a star on each point. The imperial crown is chiefly used.

**THE CROWN** is a term employed in England to signify the sovereign authority in the state. In English law the supreme executive power is vested in the crown, and all officers of the state, administrative, military, and naval, from the highest ministers of state downwards, are servants of the crown. The law-making power lies with the crown in parliament. The crown is the fountain of justice. All jurisdiction exercised within the British dominions is derived from the crown, and the judges, who interpret and apply the law, represent the crown. The crown, too, is the fountain of honour, and enjoys the exclusive right of granting pardons. The crown also represents the state in its relations with foreign states. The maxim of law is that 'the King never dies.' The decease of the reigning monarch involves what is termed 'the demise of the crown.' Formerly such demise had the effect of dissolving parliament and vacating offices held under the crown. The crown is immune from civil or criminal liability. Nevertheless, when it is alleged that the crown or any officer of the crown is in breach of contract or is wrongfully detaining property belonging to a subject, a proceeding known as a 'petition of right' is allowed in practice, the effect being that the question at issue is tried by the courts and the property or compensation for the breach of contract may be recovered from the crown. Again, although an action of damages does not lie against the crown in respect of a wrongful act committed by one of its servants, servants of the crown must answer for any wrongful act committed by them; nor can they plead that they acted in obedience to the command of a superior.

**CROWN COLONIES.** See COLONY.

The **CROWN OFFICE**, in England, is the office of the clerk of the crown in Chancery. It is in this office that the Great Seal is, for most purposes, affixed, and the name of the clerk of the crown, appended to a sealed document, is proof that the sealing has taken place on due warrant. From this office are issued the writs for election of members of the House of Commons, and, under the Crown Office Act, 1877, provision is made for the keeping of a record of justices of the peace appointed by royal commission. The **LAW OFFICERS** of the crown are the Attorney-general (q.v.) and the Solicitor-general (q.v.). Criminal informations—i.e. written complaints made on behalf of the crown—may be filed by the Attorney-general, and also by the Master of the Crown Office, provided, in the latter case, permission has been obtained from the King's Bench Division. In legal proceedings, the term crown is used generally as meaning the government department concerned. The **CROWN-SOLICITOR** is the solicitor to the Treasury. Prior to 1908 the solicitor to the Treasury for the time being also held the office of Director of Public Prosecutions, but, by a statute of that year, this office has been separated from that of the Treasury-solicitor and made an independent appointment. The **CROWN OFFICE RULES** are rules and orders of great importance, framed by the Lord Chancellor and other judges for the regulation of criminal procedure. In Scotland the Lord Advocate (q.v.) is the principal law officer of the crown. The **CROWN-AGENT** is the solicitor to the Lord Advocate's department, and is in charge of the **CROWN OFFICE** in Edinburgh. It is through the crown-agent and the Crown Office that communications are carried on between the Lord Advocate and his deputies on the one hand and the procurators-fiscal on the other hand with regard to criminal prosecutions. All serious offences and accidents are reported to the crown-agent, who lays the report before crown counsel. The appointment of the crown-agent lies with the Lord Advocate.

**CROWN DEBTS.** See DEBT, EXTENT, EXCHEQUER. **CROWN-LANDS** are the hereditary landed property of the sovereign in right of his kingship. It is now usual for the sovereign on his accession to surrender his interest in the crown-lands for his life, in return for a civil list of a fixed amount settled on him. The crown-lands are called annexed property in Scotland, and demesne lands in England, and are of course also distinct from the private estate of the person who happens to be sovereign. They are now contracted within narrow limits, having been almost entirely granted away to subjects. The superintendence of such property as still belongs to the crown is now vested in the Commissioners of Woods, Forests, and Land Revenues (see WOODS AND FORESTS). In some British colonies unallotted ground is still referred to and legislated for as crown-land.

**CROWN CASES RESERVED** gave name to a court established in 1848 to decide points of law arising in criminal cases, and 'reserved' by the judge at the trial. This court was superseded by the Criminal Appeal Act, 1907, which created a Court of Criminal Appeal that can review any question whether of law or of fact. See APPEAL.

**Crown**, in Architecture, a species of spire or lantern, formed by converging flying-buttresses—e.g. the crowns of St Giles', Edinburgh, and King's College, Aberdeen; in England the only old crown is that of St Nicholas's Cathedral, Newcastle.

**Crown Imperial.** See FRITILLARY.

**Crown Pieces**, of the value of five shillings, were introduced into the English coinage by Henry VIII.; originally of gold, they were first struck in silver by Edward VI.; none were coined from 1861 till 1887. Austria, Denmark, Norway, and Sweden have also crowns; and the French *ecu* is so translated.

**Crown Point**, a post-village of New York, on Lake Champlain, near the site of a British fort of the same name taken by Ethan Allen in 1775.

**Crown-work**, in Fortification, is an outwork consisting of two Bastion (q.v.) fronts connected with the main work by long flanks, so that its plan resembles somewhat the outline of a crown.

**Crow's-feet.** See CALTROP.

**Crow-stone**, the top stone of the gable-end of a building. See CORBIE STEPS.

**Crowther**, SAMUEL ADJAI (1812-91), negro bishop, whose native name was Adjai, was born in Ochugu, Dahomey. He was carried off as a slave in 1819, and after having been bartered and sold more than once, was taken by a British man-of-war and landed at Sierra-Leone in 1822. Under the influence of missionary training he embraced Christianity in 1825, assuming the name of a London vicar, and was later placed in charge of a mission school. He was with the first and second Niger expeditions (1841, 1854), and visited London in 1842, when, after further training, he was ordained by the Bishop of London. Entering with enthusiasm upon his missionary labours, he was consecrated Bishop of the Niger territory in 1864. A D.D. of Oxford, he translated the Bible into the Yoruba language. See his *Life* (1888), and J. Page, *The Black Bishop* (1908).

**Croydon**, a town in Surrey, 10½ miles S. of London Bridge, yet practically a suburb of London. It lies on the edge of the chalk and plastic clay, near the Banstead Downs, at the source of the Wandle, hence its name *Croindene* (Fr., 'chalkhill') in Domesday. The archbishops of Canterbury had a palace here from the Conquest till 1757. Its Perpendicular hall (1452) and chapel (1633-63) were purchased by the Duke of Newcastle in 1887 and presented to the Sisters of the Church Extension

Association. Addington Park,  $3\frac{1}{2}$  miles ESE., was in 1807–1902 summer seat of the archbishops of Canterbury. Addiscombe House, home of the first Earl of Liverpool, was converted in 1812 into the East India Military College, but was pulled down in 1863. The fine old Perpendicular parish church was destroyed by fire in January 1867, with the exception of the tower, but was rebuilt by Sir Gilbert Scott, and retains the monument of Archbishop Sheldon, with fragments of that of Archbishop Grindal. That of Archbishop Whitgift was restored in 1888 at a cost of £600. Whitgift's Hospital (1596) is a red brick pile, restored in 1860; his grammar-school now occupies buildings of 1871, and under the same endowment is a large Whitgift middle school. A new town hall, with law-courts and free library, was opened in 1896. Croydon was one of the first towns to grapple effectually with the economical disposal of town-sewage. A system of disposing of sewage by irrigation was inaugurated in 1858. In 1868 new water-works were completed, the water, which is of great purity, being obtained from an artesian well; and a further supply has since been added. There is a suffragan bishop under Canterbury. Till the 18th century Croydon was famous for its 'colliers' or charcoal-burners; now its chief specialty is the manufacture of church clocks and carillons. There is an aerodrome for commercial and passenger traffic. The town is, however, mainly residential in character. It was made a municipal borough in 1883, a parliamentary borough in 1885 (with two members since 1918), and a county borough in 1888. Pop. (1851) 10,260; (1871) 55,652; (1921) 190,877.

**Croyland.** See CROWLAND.

**Crozet Islands,** a group in the Indian Ocean, between the Cape of Good Hope and Kerguelen, in lat.  $46^{\circ}$  S., and long.  $52^{\circ}$  E.; the largest are Possession, East, Apostle, and Hog; apart from these they are mere rocks. All are uninhabited, though shipwrecked sailors have lived for a time on them. They were visited by the *Challenger* expedition in 1873–74, but have never been adequately explored. They were annexed by France in 1913.

**Crozier.** See CROSIER, PASTORAL STAFF.

**Crucian** (*Carassius vulgaris*), a fresh-water fish, nearly related to the carp, from which it differs in the absence of barbules, in the single-rowed arrangement of the pharyngeal teeth, and in a few other minor points. It is found in numerous varieties in rivers, ponds, and lakes in Europe and Asia; and is sometimes, though rarely, caught in the Thames. The food chiefly consists of dead vegetable and animal matter. The flesh is less esteemed than that of carp. The fish spawn in May or June, and then assemble in great numbers. See CARP.

**Crucibles** (Low Lat. *crucibulum*; from the root of Old Fr. *cruche*, 'a pot') are vessels made of materials capable of being exposed to high temperatures without alteration, and used for fusing substances together, such as the materials for glass-making, or metallic ores, with various fluxes to obtain the several metals they yield. Crucibles should resist the corrosive action of the substances brought into contact with them, and are generally made of fireclay, porcelain, graphite, iron, platinum, and, for some special operations, of silver. See ASSAYING.

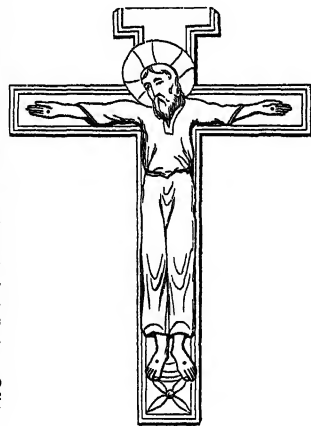


Crucible.

**Cruciferae** (Lat., 'cross-bearing,' from the X-wise position of the four petals), an important order of archichlamydeous dicotyledons, including about 1200 known species, mostly paleoarctic, and specially abundant in Europe. No order is indeed more

familiar or more widely represented; the Mustard, Shepherd's Purse, &c., are among the commonest weeds of cultivation, while the Turnip and Cabbage, the Radish and Cress, &c., are no less familiar and widespread in usefulness. As wild flowers, they are mostly inconspicuous, but the pretty Cuckoo-flower or Lady's Smock (*Cardamine pratensis*), and not a few others, might be mentioned as contributing some characteristic feature to marsh or cliff or copse; while a large number of genera are of the greatest value to the florist, for whom the exuberant masses of Iberis, Alyssum, Arabis, and Aubrietia are among the most admired resources of the rock-garden. Besides the Stocks and Wallflowers, &c., the old-fashioned Honesty and Gillyflower are among the most familiar inmates of every cottage-garden. The general character of the order is antiscorbatic and stimulating, with more or less acidity; the familiar flavour being due to the presence of a characteristic ethereal oil. Striking examples of these properties are given by the Scurvy-grass of our shores, so important to mariners in the days of long voyages and salt provisions; or more familiarly by the Common Water-cress; while a wide range of variation of flavour is presented by the flesh, rind, and leaves of the Common Turnip, especially in different varieties, soils, and seasons. A fixed oil is largely present in the seeds (see RAPE, COLZA), and the Woad Plant (*Isatis*, see WOAD) has been used from the earliest times as a source of indigo. The order was conveniently subdivided by Linnæus by the nature of its fruit as long and short podded (*Siliculosæ* and *Siliculosæ*), while later systematists have derived important characters from the mode of folding of the cotyledons within the seed. See Engler's *Pflanzenfamilien*, or other systematic work, and separate articles—e.g. CABBAGE.

**Crucifix** (Lat. *crux*, 'the cross,' and *figo*, 'I fix'), a cross with the effigy of Christ fixed to it. The principal crucifix in Catholic churches stands in the centre of the high-altar. It overtops the tapers, and is only removed to make place for the host in the service of Benediction. In well-appointed churches, the altar crucifix is generally either of gold or silver. Crucifixes are used in Lutheran churches, and in Prussia they are often made of Berlin iron. The crucifix first began to take the place of the plain cross in the time of Constantine, but it was never publicly acknowledged by the Greek Church, and did not come into general use in the East till towards the end of the 8th century. It was not till the Carlovingian age that it became general in the Latin Church. On the earlier crucifixes, Christ is represented as alive, with open eyes, and generally clad, and fastened with four nails. On later ones he is represented as dead, naked, except for a cloth round the loins, and fastened with three nails—i.e. the two feet pierced by a single nail. See CROSS.



**Cruden,** ALEXANDER, born at Aberdeen, 31st May 1701, from the grammar-school passed to

Marischal College, where he took his M.A., but, having shown symptoms of insanity, was for a short time placed in confinement. On his release he left Aberdeen, and, after spending ten years as a tutor, in 1732 established himself as a bookseller in London. In 1737 appeared his *Complete Concordance of the Holy Scriptures*, a really admirable work. It was dedicated to Queen Caroline, who graciously promised to 'remember him,' but unfortunately died a few days later. Cruden now relapsed into insanity, and for ten weeks was kept in a mad-house, as again for a fortnight in 1753. Earning meanwhile his livelihood as a press-reader, he assumed the title of 'Alexander the Corrector,' and in 1755 began to go through the country, reproving by voice and pen the nation's sins of Sabbath-breaking and profanity. But many a good and kindly action was interwoven with his crack-brained courtships, his dreams of knighthood and a seat in parliament. He was just back from a visit to his native city, when he died at his prayers in his Islington lodgings, 1st November 1770. See the *Life* by A. Chalmers, prefixed since 1824 to many of the numerous editions of the *Concordance*. See CONCORDANCE.

**Cruelty.** See ANIMALS (CRUELTY TO), CHILDREN.

**Cruikshank, GEORGE**, one of the most gifted of English pictorial satirists, was born in London, September 27, 1792, the son of Isaac Cruikshank, who, as well as his eldest son, Isaac Robert Cruikshank, was also known as a caricaturist. Cruikshank at first thought of the sea as a profession; but some of his sketches having come under the notice of a publisher, he was induced to engage in the illustration of children's books and songs. A publication, *The Scourge* (1811-16), afforded scope for the display of his satiric genius, and from that time forth he continued to pursue with remarkable success this his true vein. His illustrations for Hone's political squibs and pamphlets, and especially those dealing with the Queen Caroline trial, attracted much attention, and sent some of them through no less than fifty editions. But in the exquisite series of coloured etchings contributed to the *Humorist* (1819-21), and in the etchings to the *Points of Humour* (1823-24), did his true artistic power begin to be visible. This second, and in many ways finest, period of his art, represented by these works, culminated in the etchings to *Peter Schlemihl* (1823), and to Grimm's *German Popular Stories* (1824-26), which in the simple directness and effectiveness of their execution, and in their fertile and uncumbered fancy, rank as the artist's masterpieces. The latter series, now extremely scarce, was reproduced in 1868, with a laudatory preface from the pen of Mr Ruskin. Similar in artistic aims and method are the spirited little woodcuts contributed to the *Italian Tales* (1824), *Mornings at Bow Street* (1824-27), and Clark's *Three Courses and a Dessert* (1830); and the plates to Scott's *Demonology and Witchcraft* (1830) may be regarded as the last examples of his earlier and simpler method as an etcher. His numerous plates in *Bentley's Miscellany* mark a third period of his art, in which he aimed at greater elaboration and completeness, introducing more complex effects of chiar-oscuro, and frequently attaining great power of tragic design. The finest of these are the great series to Dickens's *Oliver Twist*, and to Ainsworth's *Jack Sheppard* in *Bentley's Miscellany*, and *The Tower of London*, and in the same class are to be ranked the plates to *Windsor Castle*, and *The Miser's Daughter*, of which, as of *Oliver Twist*, he thirty years afterwards claimed the chief authorship. Among the best productions of his later years are the large

and elaborate etchings to Brough's *Life of Sir John Falstaff*, published in 1858. His last illustration was the frontispiece to Mrs Blewitt's *The Rose and the Lily* (1877), 'Designed and etched by George Cruikshank, aged eighty-three, 1875.' As a water-colourist he left work marked by considerable skill and delicacy. In his late years he devoted himself to oil-painting, and in this province showed perhaps more humour, fervour, and inventive ability than artistic power. His most important picture was 'Worship of Bacchus' (1862), which has been engraved partly by his own hand, a vigorous and earnest protest against the evils of drunkenness; and to the cause of temperance he also devoted many of his designs, especially the tragic and powerful series of *The Bottle* (1847), which, reproduced by glyptography, attained an immense circulation. He died 1st February 1878. There are excellent collections of his works in the print-room, British Museum, and the South Kensington Museum. The last named, presented in 1884 by the artist's widow, numbers 3481 items. See G. W. Reid's *Catalogue* (3 vols. 1871), and Lives by Bates (2d ed. 1879), Jerrold (2d ed. 1883), and Stephens (1891); and Marchmont's *The Three Cruikshanks* (1897).

**Cruiser**, formerly an armed ship employed to protect commerce or capture enemies' ships. See PRIVATEER, FRIGATE; also NAVY.

**Crummock Water**, adjoins Buttermere (q.v.).

**Crusades** is the name given to the religious wars carried on during the middle ages between the Christian nations of the West and the Mohammedans. In time, however, the name came to be applied to any military expedition against heretics or enemies of the pope. The first of the regular crusades was undertaken simply to vindicate the right of Christian pilgrims to visit the Holy Sepulchre. On the conquest of Palestine, however, the object of the crusades changed, or at least enlarged, and the efforts of the subsequent crusaders were directed to the recovery of the whole land from the Saracens, who had repossessed themselves of it. From an early period in the history of the church, it was considered a pious act to make a pilgrimage to the Holy Sepulchre, and to visit the various spots which the Saviour had consecrated by his presence. When Palestine was conquered by the Arabs in the 7th century, that fierce but generous people respected the religious spirit of the pilgrims, and allowed them to build a church and a hospital in Jerusalem. Under the Fatimides of Egypt, who conquered Syria about 980 A.D., the position both of the native Christian residents and of the pilgrims became less favourable; but the subjugation of the country in 1065 by brutal hordes of Seljuk Turks from the Caucasus rendered it intolerable. These barbarians, but recently converted to Mohammedanism, were nearly as ignorant of the Koran as of the Scriptures. They hardly knew their fellow-religionists, and are said to have wreaked their vengeance on the Mussulmans of Syria as well as on the Christians. The news of their atrocities produced a deep sensation over the whole of Christendom. The first to take alarm were, naturally enough, the Byzantine monarchs. In 1073 the Greek emperor, Michael VII., sent to supplicate the assistance of the great Pope Gregory VII. against the Turks, accompanying his petition with many expressions of profound respect for His Holiness and the Latin Church. Gregory—who beheld in the supplication of Michael a grand opportunity for realising the Catholic unity of Christendom—cordially responded; but circumstances prevented him from ever carrying the vast designs which he entertained into execution, and the idea of a crusade died gradually away. It was, however,

revived by his successor Urban II., an able and humane man, to whom Alexius Comnenus appealed, as had Michael to Gregory. But Urban thought more of Jerusalem than of the reconquest of Asia Minor. Two councils were held in 1095. At the second, held at Clermont, in France, a crusade was definitely resolved on. The pope himself delivered a stirring address to a vast multitude of clergy and laymen, and as he proceeded the pent-up emotions of the crowd burst forth, and cries of *Deus vult* ('God wills it') rose simultaneously from the whole audience. 'This tumultuous cry,' says Hallam, 'which broke from the heart and lips of the assembly at Clermont, affords at once the most obvious and most certain explanation of the leading principle of the crusades.' These words, *Deus vult*, were made by Urban the war-cry of the enterprise, and every one that embarked in it wore, as a badge, the sign of the cross; hence the name *Crusade* (Lat. *cruaz*, 'a cross'). Peter the Hermit, who used to be thought the originator of the movement, was only one of the most notable of many preachers who spread the enthusiasm throughout Christendom. They traversed Europe, preaching everywhere to crowds in the open air, and producing the most extraordinary fervour by their impassioned descriptions of how pilgrims were murdered, robbed, or beaten; how shrines and holy places were desecrated; and how nothing but greed restrained the ruffian Turks (who made the Christians pay heavy taxes for their visits to Jerusalem) from destroying the Holy Sepulchre, and extirpating every vestige of Christianity in the land.

*First Crusade.*—From all parts of Europe thousands upon thousands hurried at the summons of the pope to engage in the holy war. 'The most distant islands and savage countries,' says William of Malmesbury, 'were inspired with this ardent passion. The Welshman left his hunting, the Scotchman his fellowship with vermin, the Dane his drinking-party, the Norwegian his raw fish.' It is said that in the spring of 1096 not less than 6,000,000 souls were in motion towards Palestine. This, however, must be a huge exaggeration. What we do know positively is, that previous to the setting out of the great hosts of European chivalry, four or five armies—if disorderly multitudes deserve that name—amounting in all to 275,000 persons, had departed for Palestine. The first consisted of 20,000 foot, and was commanded by a Burgundian gentleman, Walter the Penniless. It marched through Hungary, but was cut to pieces by the natives of Bulgaria, only a few, among whom was Walter himself, escaping to Constantinople. The second, consisting of 40,000 men, women, and children, was led by Peter the Hermit. It followed the same route as its predecessor, and reached Constantinople greatly reduced in numbers. Here the two united, crossed the Bosphorus, and were utterly defeated by the Turks at Nicæa, the capital of Bithynia. A third expedition of a similar kind, composed of 15,000 Germans, led by a priest named Gottschalk, was dispersed with terrible slaughter in Hungary; which also proved the grave of the fourth, a horde consisting of about 200,000 wretches from France, England, Flanders, and Lorraine, who had swept along through Germany, committing horrible ravages, especially against the Jews, whom they murdered without mercy. Now, however, the real crusaders made their appearance: the gentry, the yeomanry, and the serfs of feudal Europe, under chiefs of the first rank and renown. In this, the most successful of the crusades, neither the emperor nor any of the kings of the West participated; and to this circumstance was doubtless due its more fortunate termination. Six armies appeared in the field, marching separately, and at considerable

intervals of time. Their respective leaders were Godfrey of Bouillon, Duke of Lorraine; Hugh the Great, Count of Vermandois, and brother of Philippe, king of France; Robert Curthose, Duke of Normandy, the son of William the Conqueror; Count Robert of Flanders; Bohemond, Prince of Tarentum, son of the famous Guiscard, under whom was Tancred, the favourite hero of all the historians of the crusade; and Count Raymond of Toulouse. The place of rendezvous was Constantinople. The Greek emperor, Alexius, afraid that so magnificent a host—there were said to be 600,000 men, exclusive of women and priests—might be induced to conquer lands for *themselves*, cajoled all the leaders, excepting Tancred and Count Raymond, into solemnly acknowledging themselves his liegemen as long as they remained in his territory. After some time spent in feasting, the crusaders crossed into Asia Minor, accompanied by the unfortunate Peter the Hermit. Here their first step was the siege and capture of Nicæa, the capital of Sultan Soliman, in June 1097. This monarch was also defeated by Bohemond, Tancred, and Godfrey, at Dorylæum. Baldwin, brother of Godfrey, now crossed into Mesopotamia, where he obtained the principality of Edessa. After some time, the crusaders reached Syria, and laid siege to Antioch. For seven months the city held out, and the ranks of the besiegers were fearfully thinned by famine and disease. Many even brave warriors lost heart, and began to desert. Melancholy to relate, among the deserters was the poor enthusiast who had inspired the enterprise. Peter was actually several miles on his way home when he was overtaken by the soldiers of Tancred, and brought back to undergo a public reprimand. At length, on the 3d of June 1098, Antioch was taken, and the inhabitants were massacred by the infuriated crusaders, who were in their turn besieged by an army of 200,000 Mohammedans sent by the Persian sultan. Once more famine and pestilence did their deadly work. Multitudes also deserted, and escaping over the walls, carried the news of the sad condition of the Christians back to Europe. But again victory crowned the efforts of the besieged. On the 28th June 1098 the Mohammedans were utterly routed, and the way to Jerusalem opened. It was on a bright summer morning (1099) that 20,000 to 40,000 crusaders, the miserable remnant of that vast array which two years before had laid siege to Nicæa, obtained their first glimpse of Jerusalem. On the 15th of July, after a siege of rather more than five weeks, the grand object of the expedition was realised. Jerusalem was delivered from the hands of the infidel. As on the occasion of all the triumphs of these first crusaders, a horrible massacre ensued. Religious enthusiasm, evoking the intensest and most strangely mingled passions, naturally led to these excesses on the part of men reared in the fiercest times of feudalism. Godfrey of Bouillon was unanimously elected king of Jerusalem. Unlike his successors, he refused the title royal. His kingdom, at first comprising little more than the mere city of Jerusalem, was gradually extended by conquest until it included the whole of Palestine. A language resembling Norman French was established, a code of feudal laws drawn up—Jerusalem was erected into a patriarchate, and Bethlehem into a bishopric. The best part of Asia Minor was restored to the Greek empire, while Bohemond became Prince of Antioch. For nearly fifty years, the three Latin principalities or kingdoms of the East—Edessa, Antioch, and Jerusalem—not only maintained themselves against the attacks of the Mohammedans of Egypt and Syria, but greatly increased in size, power, and wealth. At Jeru-

salem were founded the two famous orders of the Knights Hospitallers of St John and the Knights Templars.

*Second Crusade.*—In 1144 the principality of Edessa was conquered by the Emir of Mosul, and the Christians slaughtered. His son, Nureddin, advanced to destroy the Latin kingdoms of Syria and Palestine. Europe once more trembled with excitement. A second crusade was preached by the famous St Bernard, abbot of Clairvaux, in Champagne; and early in 1147 two enormous armies, under the command of Louis VII., king of France, and Conrad III., emperor of Germany, marched for the Holy Land. Their united numbers were estimated at 1,200,000 fighting-men. The expedition, nevertheless, proved a total failure. The Greek emperor, Manuel Comnenus, was hostile; and through the treachery of his emissaries, the army of Conrad was all but destroyed by the Turks near Iconium, while that of Louis was wrecked in the defiles of the Pisidian Mountains. After a vain attempt to reduce Damascus, the relics of this mighty host returned to Europe.

*Third Crusade.*—The death-blow, however, to the kingdom of Jerusalem, and the power of the crusaders, was given, not by Nureddin, but by Salah-Eddin, commonly called Saladin, a young Kurdish chief, who had made himself sultan of Egypt, and who aspired to the suzerainty of the Mohammedan world. He invaded Palestine, took town after town, and finally, in October 1187, compelled Jerusalem itself to capitulate, after a siege of fourteen days. The news of this led to a third crusade, the chiefs of which were Frederick I. (Barbarossa), emperor of Germany; Philippe Auguste, king of France, and Richard Cœur-de-Lion, king of England. Barbarossa took the field first in the spring of 1189, but was thrown from his horse and drowned in crossing the Salef. His army, much reduced, joined the forces of the other two monarchs before Acre, which important city was immediately besieged. In vain did Saladin attempt to relieve the defenders; and after a beleaguering of twenty-three months, the place surrendered. But the crusaders were not united among themselves. Philippe soon after returned to France; and Richard, after accomplishing prodigies of valour, which excited the admiration of the Saracens, concluded a treaty with Saladin, by which 'the people of the West were to be at liberty to make pilgrimages to Jerusalem, exempt from the taxes which the Saracen princes had in former times imposed.' This, as has been previously noticed, was all that had been claimed by the first crusaders. On the 25th of October 1192, Richard set sail for Europe.

*Fourth Crusade.*—Crusading unfortunately now became a constituent of the papal policy; and in 1203 a fourth expedition was determined upon by Pope Innocent III., although the condition of the Christians was by no means such as to call for it. It assembled at Venice; but how entirely secular crusading had become, will be seen from the fact that the army never went to Palestine at all, but preferred to take possession of the Byzantine empire. The leader of this host of *pseudo-crusaders*, Baldwin, Count of Flanders, was seated on the throne of the East in 1204, and thus founded the Latin empire of Constantinople. Nothing was achieved for the recovery of Jerusalem, but Innocent had his reward in the temporary supremacy of the papal see over the Eastern Church. See BYZANTINE EMPIRE, VENICE.

*Fifth Crusade.*—This was commanded by Frederick II., emperor of Germany. It began in 1228, and terminated in a treaty between that monarch and the sultan of Egypt, by which Jerusalem (with

the exception of the Mosque of Omar), Jaffa, Beth-lehem, and Nazareth were ceded to Frederick, who, after being crowned king of Jerusalem, returned to Europe, leaving his new possessions in a state of tranquillity. Frederick, however, who had been excommunicated by Gregory IX. for his tardiness in embarking in this crusade, was denounced in the most violent language by the same pope for having thus made terms with the infidel.

*Sixth Crusade.*—In 1244 the Khorasmians, driven from Tartary by Genghis Khan, burst into Syria, and made themselves masters of Jerusalem. This was made, by Pope Innocent IV., the occasion for another crusade; and in 1249 Louis IX. (St Louis) of France headed an expedition against Egypt, which was now regarded as the key of the Holy Land. The expedition was an utter failure. Louis was defeated and taken prisoner by the sultan, and obtained his liberty only on the payment of a heavy ransom.

*Seventh Crusade.*—This also was primarily undertaken by St Louis, but he having died at Tunis (where he had gone in the hope of baptising its king) in 1270, on his way to Palestine, Prince Edward of England, afterwards Edward I., who had originally intended to place himself under the command of St Louis, marched direct for Palestine, where his rank and reputation in arms gathered round him all who were willing to fight for the cross. Nothing of consequence, however, was accomplished; and Edward soon returned to England, the last of the crusaders. Acre and Tripoli still continued in the possession of the Christians, and were defended for some time by the Templars and other military knights; but in 1289 Tripoli capitulated, and two years later Acre, and the knights were glad to quit the country and disperse themselves over Europe, leaving Palestine in the undisturbed possession of the Saracens.

Though conventionally the crusades are numbered, their distinctness cannot be maintained. The Latin kingdom and the Latin principalities, with their resident Latin population, small though it was, gave them continuity; and small bodies of crusaders were constantly coming and going. Of pseudo-crusades, three deserve notice as productive of important results. Firstly, in 1209, there was that against the Albigenses (q.v.). Secondly, on the principle that it was binding on the servants of the church to do battle with all outside its pale, in 1230 the Teutonic knights were called on by Gregory IX. to undertake a crusade against the heathen Prussians on the shores of the Baltic. The result was the complete subjugation of the Prussians, and the establishment in their country of the Teutonic military order till its extinction at the battle of Tannenberg in 1410. Thirdly, in 1262 Urban IV., jealous of the growing power of Manfred, king of Sicily, son of the Emperor Frederick II., offered Manfred's crown to Charles of Anjou, brother of St Louis of France, and gave to this dispossession the name of a crusade. A protracted war ensued, which resulted in the House of Anjou gaining the kingdom of Naples, and the House of Aragon the kingdom of Sicily. The terrible wars of the 16th century between France and Spain for supremacy in Italy were the direct consequence of this pseudo-crusade.

*Effects of the Crusades.*—While we cannot help deploring the enormous expenditure of human life which the crusades occasioned, it is impossible to overlook the fact that they indirectly exercised a most beneficial influence on modern society. They secured for humanity certain advantages which it is difficult to see could have been otherwise obtained. Guizot, in his *Lectures on European Civilisation*, endeavoured to show their design and function in the destinies of Christendom. 'To the

first chroniclers,' he says, 'and consequently to the first crusaders, of whom they are but the expression, Mohammedans are objects only of hatred: it is evident that those who speak of them do not know them. The historians of the later crusades speak quite differently: it is clear that they look upon them no longer as monsters; that they have to a certain extent entered into their ideas; that they have lived with them; and that relations, and even a sort of sympathy, have been established between them.' Thus the minds of both, but particularly of the crusaders, were partly delivered from those prejudices which are the offspring of ignorance. 'A step was taken towards the enfranchisement of the human mind.' Secondly, the crusaders were brought into contact with two civilisations richer and more advanced than their own—the Greek and the Saracenic; and it is beyond all question that they were mightily struck with the wealth and comparative refinement of the East. Thirdly, the close relationship between the chief laymen of the West and the church, occasioned by the crusades, enabled the former 'to inspect more narrowly the policy and motives of the papal court.' The result was very disastrous to that spirit of veneration and belief on which the church lives, and in many cases an extraordinary freedom of judgment and hardihood of opinion were induced—such as Europe had never before dreamed of. The immediate results of the crusades, however, went altogether to strengthen the power of the church. Through their means the popes found an easy method of ridding themselves of refractory monarchs; and by the exorbitant taxes levied in the name of the cross they practically rendered all the kingdoms of the West their tributaries. Fourthly, great social changes were brought about. A commerce between the East and West sprang up, and towns—the early homes of liberty in Europe—began to grow great and powerful. The crusades, indeed, 'gave maritime commerce the strongest impulse it had ever received.'

See Gibbon's *History of the Decline and Fall of the Roman Empire*; Milman's *Latin Christianity*; Hallam's *History of the Middle Ages*; Mill's *History of the Crusades*; Cox's *History of the Crusades*; Heeren's *Essay on the Influence of the Crusades*, the great *Recueil des Historiens des Croisades*, issued by the Académie des Inscriptions; Archer and Kingsford, *The Crusades* (1894); Barker, *The Crusades* (1923); Stevenson's *Crusaders in the East* (1907); and the articles BALDWIN, GODFREY, JERUSALEM, RICHARD I., SALADIN, WILLIAM OF TYRE, &c.

**Crusca**, ACCADEMIA DELLA. See ACADEMY, DELLA CRUSCAN SCHOOL.

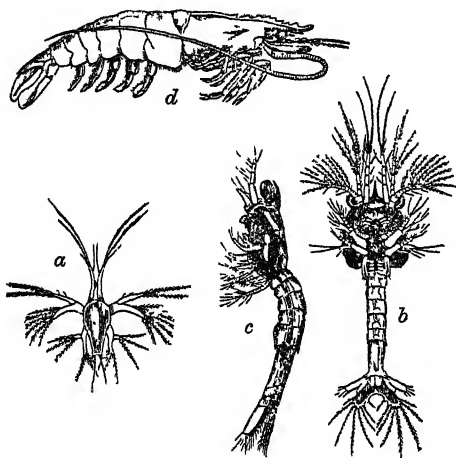
**Crusenstolpe**, MAGNUS JAKOB, Swedish political writer, was born at Jönköping, 11th March 1795. He wrote novels, elaborate historical works, pamphlets, and contributed to the newspapers. His *Ställningar och Förhållanden*, carried on from 1838 till 1865, applied vigorous and unsparing criticism to the questions and persons of the day. His bitter opposition to government cost him three years' imprisonment (1838–41). He died 18th January 1865.

**Crustacea**, a large and important class of Arthropod animals, including crabs, lobsters, shrimps, sand-hoppers, wood-lice, water-fleas, barnacles, acorn-shells, &c. The class contains such variety of structure that general characters are hard to find. They are almost all aquatic, but a few (e.g. wood-lice and land-crabs) are terrestrial. The majority are marine, but great numbers inhabit fresh water. The form of the body is very variable, as may be seen by contrasting crab and barnacle. A head with five pairs of appendages, a limb-bearing thorax more or less united to the former, and a segmented abdomen with or without

limbs, are very generally distinguishable. The segmentation is never developed in the Ostracod water-fleas, and is often lost in degenerate forms. By the development of shields (Apus), bivalve shells (water-fleas), and mantles (Cirripedes), the real form is often obscured. As to appendages, the head usually bears two pairs of antennæ, a pair of mandibles, and two pairs of maxillæ; the thorax is always limb-bearing except in utter degeneracy; and the abdomen of the majority also carries appendages. The typical form of limb, on which so many changes are rung, consists of a basal piece and two more or less jointed forks. The cuticle varies greatly in degree of firmness, but is always chitinous (see CHITIN) and often much calcified. Glands open on various parts of the surface, and may be of use for preliminary digestion, for egg attachment, for mooring the animal, &c. The colouring of the body is often very brilliant and beautiful (see PIGMENT). It is sometimes like that of the surroundings, and is occasionally associated with sexuality. The power of colour-change is also not uncommon. Sapphirina is said to rival the humming-bird in its splendour. While the nervous system in general retains the Arthropod characteristics, the ventral ganglia are often concentrated (as in crabs). The majority possess compound eyes, which in one large division are stalked. Eyes are absent in some subterranean forms, and are lost during the development of Cirripedia (q.v.) and many parasites. In the Euphausiidae there are very numerous eye-like structures or luminous organs over the body. Smelling hairs usually occur on the first antennæ, and auditory hairs have been frequently observed, usually more or less inclosed in sacs. The alimentary system, which consists of fore, mid, and hind gut, is usually simple, except as regards the hard masticating parts often developed on the cuticle of the anterior portion. In some parasitic forms the entire system degenerates. The body-cavity is usually a good deal filled up by the muscles and viscera; it contains the blood-fluid, which is occasionally faintly coloured with hæmoglobin, tetronerythrin, and other pigments, and includes amoeboid elements. A heart is usually present in the thoracic region, and is often inclosed in a special part of the body-cavity—the pericardium. In higher forms the blood passes by distinct arteries to the bodies, is gathered up in venous spaces and sinuses, is purified in the gills, and returns to the pericardial sac and heart. The respiratory system is typically represented by distinct gills variously attached; in many cases water flows in and out at the anus, and probably effects an anal respiration; in many lower forms the blood is simply purified by being exposed under the skin. The excretory system is never very marked. The green glands of higher forms, the shell-glands of Phyllopods and Copepods, and certain other structures, are excretory. The reproductive system presents many variations. The sexes are usually separate, but most Cirripedes are hermaphrodite. 'In the Cymothoidæ (Isopoda) the sexual organ of the young animal is male—of the old, female—in function.' The glands are usually thoracic, and the ducts double. Some of the appendages are often modified for copulation or egg-retaining. The spermatozoa are peculiar in being usually non-motile. The eggs are in most cases carried about by the female, but are occasionally laid on water-plants, &c., or in the water. According to Bates, *Podocerus capillatus* builds a nest of interlaced seaweed. Parthenogenesis (q.v.) has been observed in some of the lower forms. 'Complemental' males occur among the hermaphrodite Barnacles and Acorn-shells (q.v.).

*Life-history*.—The development of Crustaceans is usually indirect—that is to say, the newly-

hatched young is unlike, often very unlike, its parent. Even when there is no metamorphosis after hatching, traces of transformation, as opposed to continuous development, are sometimes to be detected in the earlier history while the embryo is still within the egg-case. (a) The crayfish (*Astacus*) has a very much abbreviated life-history, for the newly-hatched form is almost quite like the adult. (b) The newly-hatched lobster (*Homarus*), however, begins life a little further back, in what is known as the *Mysis* stage, in which the thorax bears two-branched swimming appendages. (c) Most other higher Crustaceans (e.g. crabs) begin at a still lower level, in what is called the *Zoea* stage, with a short unjointed thorax and a segmented abdomen without limbs. (d) The



Development of a Prawn (*Penaeus*):  
a, Nauplius; b, Zoea; c, Mysis; d, adult.

Decapod *Penaeus*, a shrimp-like creature, has its life-history still more drawn out. It quits the egg as a *Nauplius*, an unsegmented larva with three pairs of appendages, the first unforked, the other two pairs double-branched. These correspond to the first three appendages of the adult. The median eye is also a distinctive feature in the Nauplius larva. The *Penaeus* Nauplius has with successive moults first to become a *Zoea*, and then a *Mysis*, and then an adult. It is as a Nauplius that the majority of lower Crustaceans leave the egg, but then they do not climb so high. To understand the circuitous life-history of a form like *Penaeus*, we have to note that it begins in the Nauplius stage, at the level of the lowest Crustaceans, and gradually climbs through a series of higher and higher stages, each of which is represented permanently by some division of Crustaceans which have not risen higher. If the various grades from Nauplius up to Decapod adult represent successive historic levels, now exemplified in the classification of Crustaceans by those which were left behind at each lift, what the *Penaeus* does is to recapitulate in its individual life-history the historic evolution of the class. This idea has been beautifully applied to Crustaceans in Fritz Müller's *Facts for Darwin*. The various grades of Nauplius, *Zoea*, *Mysis*, and adult *Penaeus* (overlooking intermediate ones) may be compared to stations which mark the gradual extension of the Crustacean line of advance. *Penaeus* has to travel along the rails laid down by the ancestral history, and has to stop for variable periods at the successive stations between the starting-point and the terminus. Crabs skip over the Nauplius station, and like most other Decapods

start at the *Zoea* point; lobsters abbreviate still further, and begin as *Mysis* forms; the crayfish has found the shortest cut of all. Some of the lower Crustaceans never get far past the Nauplius stage, while others remain practically on the *Zoea* grade. The life-histories of Crustaceans vividly illustrate how the individual life-history is a rehearsal of the historic evolution of the kind, or more technically, how ontogeny recapitulates phylogeny.

*Habit of Life*.—The acorn-shells fastened to the rocks, wafting in their food by their curled feet; the barnacles moored to floating logs and ship-bottoms; such extremes of parasitism as are illustrated by *Sacculina* on hermit-crabs; the hermit-crabs themselves, stealing the shells of *Gasteropods*, or entering into partnership with sea-anemones; the thousand minute and active water-fleas; the wood-lice, quite terrestrial; the brine-shrimps in the salt-pools; the fresh-water crayfish; the giant marine lobsters; the land-crabs, habituated to inland life, sufficiently suggest how varied are the habits of Crustaceans. Some Crustaceans form masking shelters for themselves out of Tunicates, or get covered over by a concealing growth of seaweed, sponge, hydroids, &c. A few forms are known to make a stridulating noise. The general intelligence of the class is probably considerable (see CRAB). On the whole the members of this class are active animals, but on each side of the medium activity of the majority there are extremes. Thus, not a few active marine forms are phosphorescent, while parasitism (to the extent of some 700 species) occurs in most of the subdivisions. Many of the parasites are very striking in the contrast between the free-swimming young and the *ne plus ultra* of degeneracy in the adults (see DEGENERATION, PARASITISM). Some of the interesting cases of Commensalism (q.v.) have been referred to under that title; while some of the external parasites show in the castration, &c. which they effect on their hosts, how real in such cases is the direct influence of the animate Environment (q.v.). The diet of Crustaceans is very varied; the majority are carnivorous and aggressive; many feed on dead creatures and organic debris in the water; others depend largely upon plants. They often lose limbs in fighting or otherwise, and have the power of replacing what they have lost.

*Classification*.—There are two sub-classes—Entomostraca and Malacostraca. The Entomostraca are usually small, with very diverse number of segments and appendages, with the larva generally hatched as a nauplius, with an excretory organ associated with the second maxillæ, and with no gastric mill. They include Phyllopods, e.g. Brine-shrimps, *Apus*, *Daphnia*; Ostracods, e.g. *Cypris* (fresh-water) and *Cypridina* (marine); Copepods (common water-fleas and fish-lice); and Cirripedes (Barnacles and Acorn-shells). The Malacostraca are usually larger and more complex, with nineteen segments and pairs of appendages (except in *Nebalia* and its relatives), with the larva usually higher than a nauplius, with the excretory organ usually associated with the antennæ, and often with a gastric mill. They include some primitive types, *Nebalia* and *Anaspidæ*, and a number of orders, e.g. Schizopods, Amphipods, Isopods, Decapods.

*Distribution in Space and Time*.—(a) Deep-sea forms are very abundant, and often remarkable 'for their colossal size, their bizarre forms, and brilliant red colouring.' Blind species are known to occur in the depths, and others are brilliantly phosphorescent. (b) Pelagic surface Crustaceans (especially Schizopods and Entomostraca) are very abundant, and often form a large part of the food of fishes. They are often beautifully transparent, and hardly to be seen in the water. Less

frequently they are brilliantly coloured (as in Sapphirina) or phosphorescent. Some of them are remarkable for their large eyes. One Amphipod Crustacean presents a curious mimicry of a Medusoid form. Decapods are most abundant in the warmer waters. (c) Crustaceans form an important part of the relatively sparse and uniform fauna of lakes. They occur both on the surface and at the bottom, the latter being generally more sluggish. The surface forms, at any rate, are usually perfectly transparent with the exception of the eye. (d) The catalogue of terrestrial Crustaceans, which includes species of Amphipods, Isopods, and Decapods, is relatively a very short one.

The Crustacea date back to Cambrian times, but the highest forms (Decapods) were not firmly established till the Tertiary period. Some 800 fossil species, as against over 5000 living forms, are known. Some of the genera—e.g. *Estheria*—from the Devonian, are marvellously persistent, and survive from ancient epochs as still very successful and widely distributed forms. The most primitive Crustaceans are the Phyllopods—e.g. *Apus*—and it is probable that *Nebalia* and *Anaspides* give us trustworthy hints as to the ancestors of the higher Malacostraca.

**Economic Importance.**—Crabs, lobsters, crayfish, shrimps, prawns, &c. form part of our food-supply. Others are indirectly useful as important parts of the food of herrings and other fishes. Many are doubtless useful in purifying the water from organic débris, while others are the hosts of important parasites—e.g. the Cyclops species, which contains the young stages of the Guinea-worm (q.v.).

See ACORN-SHELLS, BARNACLE, BRINE-SHRIMP, CIRRI-PEDIA, COPEPODA, CRAB, CRAYFISH, CYPRIS, CYCLOPS, LOBSTER, PRAWN, SHRIMP, WATER-FLEA, &c.; also COMMENSALISM, PARASITISM, PARTHENOGENESIS, &c., and references under above articles. For further details, consult Smith and Weldon in the *Cambridge Natural History*, Calman, *Life of Crustacea* (1911), and *Crustacea* in Lankester's *Treatise of Zoology*: Sedgwick, *Student's Text-book of Zoology*, vol. iii.; also Baird, *British Entomostraca* (Ray Soc. 1850); Balfour's *Embryology*, Bell, *British Stalk-eyed Crustacea* (Lond. 1856); Challenger Reports (several); Claus, *Genealogy of Crustacea* (1876); Dana, *Crustacea of U.S. Exploring Expedition* (Phila 1852); Gerstaecker in Bronn's *Thierreich*; Huxley's *Crayfish* (1881); Milne-Edwards, *Histoire Naturelle des Crustacés* (Paris, 1834-40); the Monographs of the Naples Station (several); F. Müller, *Facts for Darwin* (1869); Sars, *Fresh-water Crustacea of Norway* (Christiania, 1867); Spence Bate and Westwood, *British Sessile-eyed Crustacea* (1863-68); Stebbing, *A History of Crustacea* (1893).

**Crutched Friars** (M.E. *crouchen*, 'to cross'), or CROISIERS (Fr. *croix*, 'cross'), an order of friars, carrying in the hand a staff surmounted by a cross. They came to England in the 13th century, and had monasteries in London (still giving name to a street), Oxford, and Reigate.

**Crutwell**, CHARLES THOMAS, literary historian, was born in London, 30th July 1847. He was educated at Merchant Taylors' School and at St John's College, Oxford. He held various benefices in the Church of England, and died at Ewelme, near Wallingford, 4th April 1911. His works include *A History of Roman Literature* (1877) and *The Saxon Church and the Norman Conquest* (1909).

**Cruvellhier**, JEAN (1791-1874), physician, born at Limoges, became professor of Pathology at Montpellier in 1824, and of Pathological Anatomy in Paris in 1836. Besides his great work, *Anatomie Pathologique du Corps Humain* (2 vols. 1828-42), he published other works on anatomy, which were for long the most valuable French contributions to their subject, and also a *Life of Dupuytren* (1840).

**Cruvell**, SOPHIE, German soprano singer, originally named Crüwell, was born in Westphalia,

12th March 1826. She studied in Paris, made her début in Venice (1847), and retired from the operatic stage on her marriage with Comte Vigier in 1856.

**Cruz**, JUAN DE LA, was the name assumed on entering the Carmelite Order (1563) by the Spanish poet and mystic, Juan de Yepis y Álvarez, born at Fontiveros in 1542. He associated himself with Santa Teresa's movement for the reformation of the order, and in consequence suffered persecution and imprisonment till his death at Ubeda in 1591. He was canonised in 1726. His works, printed in 1580, have been repeatedly reprinted and translated.

**Crwth** (pronounce the *w* as French *u*), an old Welsh stringed instrument. Four of its six strings were played with a bow, the other two being twitched by the thumb.

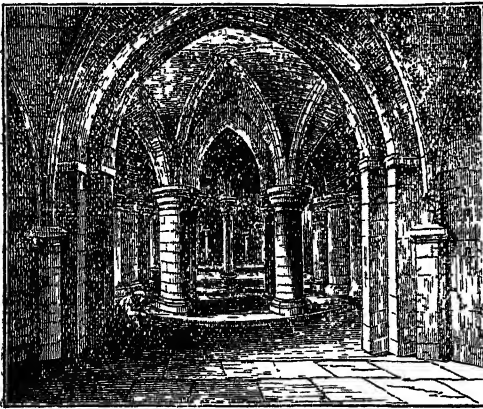
**Cryolite**, a mineral which exists in great abundance on the coast of Greenland. It consists mainly of a fluoride of aluminium in combination with Fluoride of Sodium,  $6\text{NaF} \cdot \text{Al}_2\text{F}_6$ . The metal Aluminium (q.v.) was formerly largely obtained from it, but it is now most important as a source of alum and of soda bicarbonate; much of it, also, is melted and made into a kind of glass.

**Cryophorus** (Gr. *kryōs*, 'cold,' and *pherō*, 'I carry') is an instrument consisting of a glass tube with a bulb at both ends, used for showing the diminution of temperature in water by evaporation. In constructing it the whole of the air is extracted, leaving practically a vacuum inside. A little water is present in one of the bulbs, and when the second bulb, containing only water-vapour, is placed in a freezing mixture, the vapour condenses, which causes more vapour to rise from the water in the first bulb. The result of this vaporation from the first bulb is the abstraction of much heat, and ultimately the remaining water passes into a frozen state.

**Crypt** (Gr. *kryptō*, 'I hide'). In the early days of persecution the Christians were accustomed for security to worship in the catacombs or crypts where they buried their dead (see CATACOMBS). When persecution ceased, this custom led to the erection of churches over the graves of martyrs and saints; but at a later date the bodies of the saints were transferred to chambers, constructed to resemble the catacombs, under the sanctuary or altar of the new churches, in order to add to their sanctity. These crypts and their sacred shrines were visited by numerous pilgrims, and were frequently constructed for the accommodation of the devotees, of sufficient size to admit a number at a time, who descended by one stair, and ascended by another. In other cases the crypts were so placed that the shrine of the saint could be seen from the aisles of the choir, the floor of which was necessarily raised considerably above the level of the nave. Crypts of these kinds were usual in the early centuries, and many examples of them have been preserved in Italy and France, even where the churches over them have been rebuilt. The crypt of the Circular church of St Bénigne at Dijon was one of the largest. There a great circular aperture in the centre of the floor of the upper church enabled a very large congregation of pilgrims, including those in the crypt, to see the shrine of the saint, and witness any ceremony taking place there.

After the 13th century crypts were not so much in use. The great cathedrals were regarded as much in the light of civil as of ecclesiastical edifices, and the floor of the choir was brought down to the level of the rest of the building. It sometimes happened that owing to the slope of the site considerable underbuilding was required under the choir, in which case an under church was constructed, which was called by the old name of the

crypt, and was generally used for sepulchral purposes. The crypt of Canterbury is one of the finest of this kind. The crypt of Glasgow Cathedral is



Crypt, Canterbury Cathedral.

also a very beautiful example, the vaulting over the shrine of St Mungo being pointed out by Sir Gilbert Scott in his lectures as one of the best specimens of its class.

**Cryptogamia.** This term was introduced by Linnaeus as the twenty-fourth and last class of his system of classification, and broadly with its present contents. The name, however (Gr. *kryptos*, 'concealed,' and *gamos*, 'marriage'), in opposition to flowering plants (Phanerogamia, q.v.), records its donor's well-founded expectation that sexual reproduction would one day be discovered. Jussieu proposed to distinguish them as *Acotyledones* from monocotyledons and dicotyledons; but the term has necessarily lapsed for many reasons. De Candolle distinguished them into two great groups, *Cellulares* and *Vasculares*; while Endlicher's separation of the vegetable kingdom into Thallophytes and Cormophytes still further recognised their vast morphological range. Armed with the microscope more recent investigators have determined the life-history and mode of reproduction of all the leading types, so not only amply confirming the hypothesis of Linnaeus, or even still further increasing their morphological importance as compared with Phanerogams, but entirely revolutionising our interpretation of the flowering plants themselves, since leading us to view them as more profoundly cryptogamic than the cryptogams. The separate groups of cryptogamic plants are outlined in the articles ALGÆ, SEAWEEDS, BACTERIA, FUNGI, LICHENS, MOSSES, LIVERWORTS, FERNS, WATER-FERNS, HORSE-TAILS, LYCOPODIACEÆ, SELAGINELLA; while their relation to higher plants is explained under PHANEROGAMIA, FLOWER, GYMNOSPERMS.

**Cryptography**, the art of secret writing, also called *Writing in Cipher*, *Hieroglyphic Writing*, *Secret Writing*, *Steganography*, *Polygraphy*, has been in use from an early date in correspondence between diplomatists and others engaged in important affairs requiring secrecy. Every government used to employ its staff of decipherers, who availed themselves of extraordinary means for interpreting despatches which (fairly or unfairly) came into their possession. The cipherers and the decipherers waged a constant struggle to outwit each other; the one by constructing new difficulties; the other by conquering the difficulties as soon as constructed. How often we hear of a courier being murdered and his despatches carried off! And without the

key to decipher letters so written, to what purpose would they be intercepted by such a deed? In these modern times, however, there has been so great an improvement in the morals of governments that the custom of killing foreign-office messengers for the sake of their despatch-bags is entirely obsolete in diplomacy, and statesmen have ceased to pillage post-offices or rifle portmanteaus for cryptographic messages.

Most of the odd knacks, contrivances, decoys, blinds, now employed by cryptographers were to some extent known to and employed by the ancients. Substituting points for vowels; arranging threads, knots, or ink-spots at determinate distances; substituting one letter for another; inventing new arbitrary characters for whole words or even sentences—now made use of extensively in telegraph codes; abbreviating words in their prefixes and affixes; writing a long sentence of nonsense, with a clue to find the words which gave the proper sense—all were brought into requisition. Perhaps the most amusing of all cryptographs was the one mentioned by Herodotus. Histæus, a Greek at the Persian court, being desirous of sending a secret message to Aristagoras at Miletus, selected a slave who was afflicted with bad eyes, and shaved his head, pretending that it was necessary for his recovery. In performing this, Histæus imprinted his secret intention in legible characters on the man's head, and kept him in close confinement till his hair grew again, when he sent him to Aristagoras for a perfect cure. Aristagoras repeated the shaving, read the writing underneath, and thus obtained the desired information by means of the unconscious messenger.

One of the simplest methods of cryptography is to use instead of each letter of the alphabet a certain other letter at a regular interval in advance. Such was a mode of secret writing adopted by Julius Cæsar. As a variety of this plan, the alphabet is used invertedly, *z* for *a*, *y* for *b*, *x* for *c*, and so on; or, while the first seven letters are represented by the second seven, the next six may be represented by the last six. And many other variations may be adopted. But the decipherment of such messages is naturally not difficult, and with a little consideration of the peculiarities of the English language, all the ups and downs of many an interesting love story related in cipher in the columns of the *Times* can be followed from start to finish with comparative ease. It is known that *e* is the most frequent letter; that *the* is the commonest word; that *ea* and *ou* are the two-vowel groups which most frequently occur; that the consonants most common at the ends of words are *r*, *s*, and *t*, &c. We also know that a word of a single letter must be either the pronoun *I*, or the vowel *a* or *O*; that *an*, *at*, *on*, *to*, *of*, and *in* are the most common words of two letters; that *the* and *and* are the most frequent words in three letters; that the most usual doubled letters are *ee*, *oo*, *ll*, *ss*, *ff*; that double vowels are mostly followed by *l*, *m*, *n*, *r*; that the letter *a* begins three two-letter words in very extensive use—*an*, *as*, *at*; that the letter *o* begins or ends eight two-letter words in very common use—*do*, *go*, *no*, *so*, *to*, *of*, *on*, *or*; that more words in a sentence of average English begin with *t* than with any other letter; that in about three-fourths of all the words in a sentence, either the first or the second letter is a vowel; that among consonants, *d* and *h* are most largely used, after which come *n*, *s*, *r*, *t*; that the letter *q* is always followed by *u*; that no English word of two letters or more ends with *i*. All these considerations will guide us to the solution of any simple cipher, enabling a skilful decipherer to read almost any ordinary piece of cryptographic writing in a very short time.

In British history, cryptography has at no time been in greater requisition than during the Civil War. Charles I.'s celebrated letter to the Earl of Glamorgan (afterwards Marquis of Worcester), in which he made some compromising concessions to the Catholics of Ireland, was composed in an alphabet (sometimes supposed to be Charles's own, but more probably Worcester's invention) of twenty-four short strokes variously situated upon a line. Other letters from the hand of the same monarch are to appearance a mere series of numbers of two or three figures divided by semicolons. In such cases it was necessary that the two parties engaging in the correspondence should have previously concerted what words each number was to represent.

In the reign of William III. the Jacobites invented many curious ciphers to enable them to communicate with their exiled king. All the Jacobite clubs had distinct methods of their own—their great aim being to write in such a manner that the very ciphers themselves should pass through their enemies' hands without suspicion. This they accomplished by means of sympathetic inks. A favourite Jacobite cipher was the use of parables, conveying, by means of ordinary language, a double meaning, which only the person acquainted with the writer's views would think of. The use of cryptography for purposes of state in England ended, it may be said, with the Peace of 1815. During the Peninsular war the government attached a cryptographer to the office of the Minister for Foreign Affairs to read and write the ciphers received and despatched. It is said that on more than one occasion the minister was unable to comprehend his own cipher.

The earliest elaborate treatise on writing in cipher is the *Steganographia* (Frankf. 1606) of the abbot John Trithemius, a MS. copy of which was bought for a thousand crowns at Antwerp by Dr Dee in 1563. Lord Bacon, who esteemed cryptography one of the most useful arts of his time, framed what he believed a not easily penetrable cipher—in which he employed only *a* and *b*, arranging each of these letters in groups of five, in such collocations as to represent all the twenty-four letters. Thus *aabab, ababa, babba* conveyed the word *fly*. In his *De Augmentis* he styled this an *omnia per omnia* cipher, believing that in this case preconcertment would be necessary; but in reality any clever modern decipherer could have read any letter composed in such a manner if it were of any length.

Mr Donnelly, in his work *The Great Cryptogram*, endeavoured in 1887 to prove that Bacon inserted a cipher in the Shakespearian plays—which he claimed was the work of the great philosopher—but the cipher was of so elaborate a kind that nobody but Mr Donnelly was able to follow its intricacies. The unfortunate Earl of Argyll used a mode of secret writing which consisted in setting down the words at certain intervals, which he afterwards filled up with other words, making of the whole something intelligible, but of no use to any one else reading the message. The Marquis of Worcester invented a cipher composed of dots and lines variously ordered within a geometrical figure; while Dr Blair made one of three dots, placed over, under, or on the line, by which he could represent no fewer than eighty-one letters, figures, or words. The Doctor, in his able article in *Rees's Cyclopædia*, declares this cipher to be as nearly as possible undecipherable by strangers; but two years afterwards, Mr Gage, of Norwich, published a pamphlet on purpose to solve Dr Blair's riddle. As he devoted fourteen closely printed octavo pages to the explanation, any description of the cipher is beyond the limits of this article. Mr Thicknesse, a well-known expert of the 18th century, also devised a plan of conveying information in the

disguise of music, the notes, rests, expression-marks, &c., standing for letters.

All the methods, however, of cryptography may thus be summarised: (1) By invisible ink; (2) by superfluous words; (3) by misplaced words; (4) by vertical and diagonal reading; (5) by artificial word-grouping; (6) by stencil-plates cut out so as to show certain words beneath; (7) by using two letters (Lord Bacon's cipher); (8) by transposing the letters; (9) by substitution of letters; (10) by counterpart tabulations; (11) by mixed symbols; (12) by a printed key and code-book, used chiefly in telegrams; (13) by the employment of numerals.

See books by Porta (1563), Blaise de Vigenere (1587), Thicknesse (1772), Klüber (1809), Romani (1875), Fleissner (1881), Katscher (1889), André Langie (trans. 1922). Telegraphic codes are a kind of cipher.

**Cryptomeria**, or JAPANESE CEDAR. This lofty and beautiful hardy coniferous tree (*C. japonica*) is widely distributed in mountain districts of Japan and China, as well as cultivated in many varieties. It was introduced by Robert Fortune in 1842, and has since passed into cultivation. Although originally confused with the cypresses, it is nearly allied to *Sequoia* and *Taxodium*. See CONIFERÆ.

**Cryptoprocta**, a fierce carnivorous animal of Madagascar, forming a genus and species by itself. Semi-plantigrade, and with beautiful fur, it resembles a large polecat, three feet long, and attacks the largest animals with great ferocity.

**Crystalline Rocks**, a name given to all rocks having a crystalline structure. The crystalline texture may either be original or superinduced. Thus some crystalline rocks, such as certain calcareous masses, owe their origin to chemical precipitation from water, while others again, such as lavas, have consolidated from a state of igneous fusion. There is another large class of crystalline rocks, the crystalline granules of which present a remarkable foliated character—that is, they are arranged in more or less parallel layers (see SCHISTS). This peculiar schistose structure appears to have been superinduced—the original rocks having been either fragmental or crystalline or both—and the result of great heat and pressure. Such highly altered rocks occur in the neighbourhood of masses of granite, and cover wide regions, where there is abundant evidence to show that the strata have been subjected to enormous compression, crushing, and crumpling—having been folded and fractured and pushed violently over each other for distances of sometimes 15 miles and more. It is therefore believed that pressure and the heat engendered by great earth-movements, and the intrusion of plutonic igneous matter, are among the most potent agencies in the production of schistose structure.

**Crystallites**, minute non-polarising bodies (the result of incipient crystallisation) occurring in the vitreous portions of Igneous Rocks (q.v.).

**Crystal-gazing**. See CRYSTALLOMANCY

**Crystallography** (from the Greek *krustallos*, 'ice,' an idea among the ancients being that rock-crystal, which may be taken as a type of crystalline minerals, resulted from the subjection of water to intense cold). Minerals, salts, and chemical substances generally (examples, rock-crystal, fluor-spar, alum, and sugar) exist in the crystalline state; and from an examination of all crystals, whether occurring naturally or obtained artificially, certain laws have been discovered, and phenomena observed, and these laws and phenomena constitute the science of crystallography. The following are the more important laws and principles of the science:

(1) *Law of Constancy of Angles*.—Crystals of the

same substance may differ much in general appearance, but when the angles between their faces are measured these angles are found constant. Thus the crystals A and B (fig. 1), when cut through in

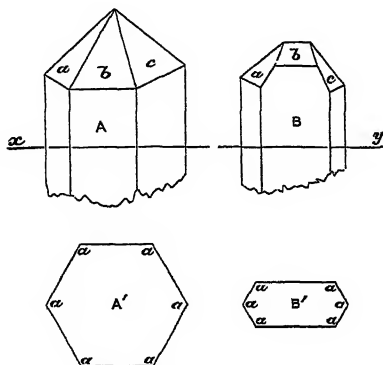


Fig. 1.

Drawings of two crystals differing much in appearance, but with angles at  $\alpha$  shown to be constant when similar sections are made.

the direction  $xy$  at right angles to the prism, give the sections shown at A', B'; and in each section the angles  $\alpha$  will be found the same—viz.  $120^\circ$ ; or again, if the angles between the faces  $ab$ ,  $bc$ , or  $ac$ , be measured, they will be found identical in both crystals.

(2) *Law of Symmetry*.—Suppose we cut a crystal in two, and then place the two parts with their cut surfaces on a mirror. The mirror will reflect each part, and may or may not produce the appearance of the original crystal. If the mirror will produce the appearance of the original crystal, we have severed the crystal in a plane of symmetry. Thus with a cube, if we cut it in either of the planes

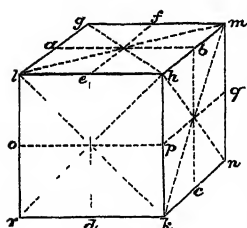


Fig. 2.

Each of the planes represented by dotted lines is a plane of symmetry.

while with other forms varying numbers of planes of symmetry may be found, until with a sphere there are an infinite number of planes of symmetry, for it is obvious that if a sphere be cut anywhere by a plane passing through its centre, and the half thus obtained be laid upon a mirror, the appearance of a complete sphere will be produced. Now on examining all (holohedral) crystals, it is found that they fall into the following six categories or systems: (1) *Anorthic System*.—No plane of symmetry—examples, copper sulphate and anorthite. (2) *Oblique System*.—One plane of symmetry—gypsum and washing-soda. (3) *Prismatic System*.—Three planes of symmetry at right angles to each other—barytes, saltpetre, and native sulphur. (4) *Rhombohedral System*.—Three planes of symmetry at  $120^\circ$  to each other—calcite, quartz, and ice. (5) *Pyramidal System*.—Five planes of symmetry—cassiterite, zircon, and idocrase. (6)

*Cubic System*.—Nine planes of symmetry—fluor-spar, galena, and alum.

(3) *Law of Rationality of Indices*.—The various planes of crystals, as explained below, are indicated in the Millerian system by three numbers, which together form the symbol of the plane. Thus we have planes represented by 1 2 3, by 1 1 1, by 1 1 0, &c. Now the law of rationality asserts that the symbol of a plane must be represented by numbers which are rational—i.e. numbers which can be expressed exactly, not those like  $\sqrt{2}$ ,  $\sqrt{4}$ , &c., which can only be obtained approximately. Thus by the law of rationality, no plane of a crystal can have such a symbol as  $1\sqrt{3}5$ ,  $1\sqrt{2}0$ , &c.

*Crystallographic Notation*.—Several methods of representing planes of crystals by symbols are in use. Two of these only need be mentioned—viz. Miller's notation and Naumann's notation. In both systems the planes are referred to three axes corresponding in direction to three edges of the crystal.

Let  $abc$  (fig. 3) represent parts or parameters cut off from three axes  $xyz$ , then in Miller's

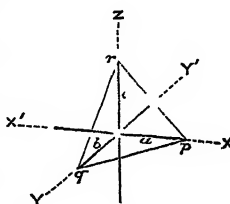


Fig. 3.

The plane 1 1 1 in Miller's notation.

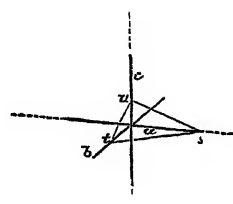


Fig. 4.

The plane 1 2 3 in Miller's notation.

system the plane 1 1 1 represents a plane which cuts the  $x$  axis at one-oneth of  $a$ , the  $y$  axis at one-oneth of  $b$ , and the  $z$  axis at one-oneth of  $c$ . Such a plane is indicated by  $pqr$ . The plane 1 2 3 means a plane which cuts the  $x$  axis at one-oneth of  $a$ , the  $y$  axis at one-half of  $b$ , and the  $z$  axis at one-third of  $c$ . Such a plane is represented by  $stu$ , fig. 4. The plane 1 1 0 means a plane which cuts the  $x$  axis at one-oneth of  $a$ , the  $y$  axis at one-oneth of  $b$ , and the  $z$  axis at one-nought of  $c$ —i.e. does not cut  $c$  at all, or is parallel to it. Such a plane is represented by  $uvwx$  in fig. 5.

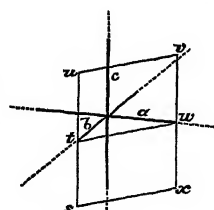


Fig. 5.

The plane 1 1 0 in Miller's notation.

In Naumann's system some form is selected as the fundamental pyramid of the crystal, and this pyramid, which corresponds to Miller's form, 1 1 1, is represented by the letter P in all systems but the cubic (in this system it is called O) and the rhombohedral (in this system it is called R). Thus the planes marked P (fig. 6) form the fundamental pyramid, the planes  $\frac{1}{2}P$  are those of a pyramid one-half the height, while the basal plane is represented by  $oP$  or a pyramid

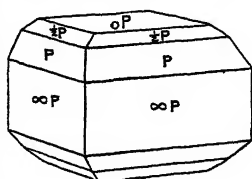


Fig. 6.

A crystal with the faces marked in Naumann's notation.

of no height, while the planes  $\infty P$  represent a pyramid of infinite height.

**Drawing and Mapping of Crystals.**—Various modes of representing crystals have been adopted. Perspective drawings are made by projecting the axes according to the rules of Projection (q.v.), then the various planes are indicated, and from these their intersections are known, and these intersections form the drawing of the crystal. Fig. 7 represents one octant of the form 2 1 1

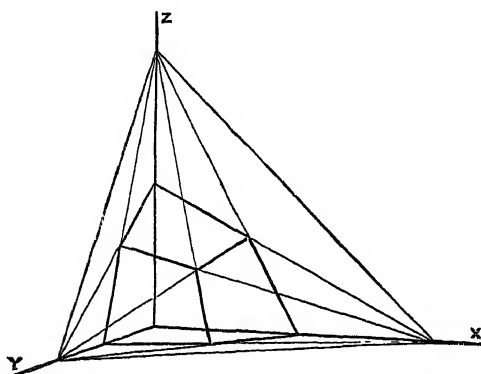


Fig. 7.  
Mode of drawing a crystal from projection of axes.

drawn by this method. Some writers represent crystal forms by orthographic projections—that is, represent them in plan and front elevation. Of all methods, however, of representing crystals from measurements made with the goniometer, the most elegant and convenient is that of spherical projections. Two kinds of spherical projection are in use—viz. the *gnomic* and the *stereographic*. Imagine a glass sphere placed within a crystal, as in fig. 8, and suppose the faces of the

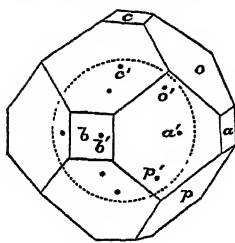


Fig. 8.  
Sphere within a crystal.  
When planes are moved they touch the sphere where dots are marked.

crystal to move parallel to their original positions until they touch the sphere, and where the faces touch let dots be marked on the sphere. Thus the face  $a$  will produce the dot  $a'$ , the face  $o$  the dot  $o'$ , and so on. When the sphere is thus marked with dots corresponding to the several faces, the next thing is to make a map of the dots in their proper position. If the map is to be made on the gnomonic projection, the sphere is supposed to be placed on the paper on which the map is to be made, and the eye is then placed at the centre of the sphere. The various dots when projected on to the paper as seen by the eye placed at the centre of the sphere produce the map. If the map is to be made on the stereographic projection, suppose a piece of glass to pass through the centre of the sphere as in fig. 9, and let the eye be placed touching the sphere at  $E$ , then the dots as they appear on the glass to the eye at  $E$  form the map. Such a map of the crystal of fig. 8 is given in fig. 10. In the stereographic projection all great circles on a sphere are represented on the map by either straight lines or arcs of circles, whereas in the gnomonic projection they are represented by straight lines. The map (fig. 10) shows not only the position of the dots or poles, but also great circles passing through

the sphere. These great circles correspond to the planes of symmetry of the cube (fig. 2) and other forms of the cubic system. These stereographic maps, as will be seen by reference to treatises on

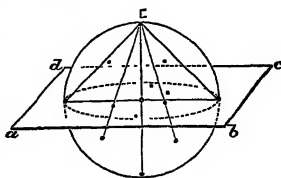


Fig. 9.  
The eye placed at  $E$  sees the dots on lower part of sphere projected on the plane  $a b c d$ .

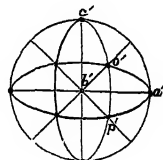


Fig. 10.  
Stereographic map of the crystal of fig. 8 as obtained by method in fig. 9

the subject, convey a good deal of information respecting the crystals they portray.

Planes of crystals form a *zone* when the intersections of the planes (i.e. the edges) are parallel to each other. Thus, in fig. 6 the faces  $oP$ ,  $\frac{1}{2}P$ ,  $P$ , and  $\infty P$  form a zone. Now in Miller's notation these forms have the indices 0 0 1, 1 1 2, 1 1 1, 1 1 0, and it will be noticed that all these symbols have a common ratio—thus, the first and second index are equal to each other. It may be shown that this is universally true; hence, knowing the indices of a plane, we can say whether it is on a particular zone, or knowing that a plane lies in two zones, we can determine its indices. Thus, the planes 1 2 3, 1 2 4, 1 2 5, &c., are all in one zone, as the symbols have the common ratio 1 : 2, and the plane 3 4 5 cannot be on this zone, because its symbol does not contain the ratio 1 : 2.

**Holohedrism and Hemihedrism.**—Crystals which have all faces present as required by the law of symmetry are termed holohedral. Where, as is often the case, only one-half of these faces are present, the crystal is said to be hemihedral; while if only one-fourth of the full number of faces are present, the crystal is said to be tetartohedral.

**Physical Crystallography.**—The physical properties of crystals have some interesting relations to the symmetry and form of the crystal, and these properties are included generally with crystallography. Thus, if in the regular system a face is striated or has any peculiarity, this striation or peculiarity will be found on each face which is present by the law of symmetry. Again, most crystals cleave (i.e. break easily) in certain directions, and the cleavage planes follow the law of symmetry. Again, when examined by polarised light, other properties of crystals in relation to symmetry are brought out. Thus, crystals of the regular system (except in a few certain cases) do not doubly refract light, no matter in what direction the light is incident. With crystals of the rhombohedral system and the pyramidal system light is not doubly refracted when it falls parallel to the vertical axis, but in other directions it is doubly refracted; while in the remaining systems two directions can be found in which the crystals of these systems do not doubly refract light, though they do so in all other directions. Again, heat is conducted differently in different systems of crystals. Suppose crystals turned in a lathe into spheres, and that the centre is made suddenly hot, then in the regular system the heat spreads equally, and after a time the surface of the sphere is uniformly raised in temperature; with other systems the effect is different; with the pyramidal and rhombohedral systems a similar experiment would result in the surface of the sphere being heated uniformly over belts corresponding to an equator and parallels of latitude, but the tempera-

ture of the different belts would be different, thus showing that heat is propagated in two directions at right angles to each other with different velocities. With other systems more complex results would be obtained owing to heat being propagated in three directions with different velocities.

When soluble crystals are placed in a solvent the faces are eaten out differently, producing figures termed by German writers 'aetzfiguren'. These figures will often indicate the symmetry of the crystal, and have been useful in such determination. As physical properties generally are related to elasticity, Groth states that the best way to define a crystal is that it is a solid body, the elasticity of which is the same in all parallel directions, but on the contrary is different in different directions.

The discovery by Laue in 1912 that crystals can act as diffraction space-gratings for X-rays has greatly extended the methods of examining crystal structure. In the original experiment a fine pencil of X-rays passes through a crystal, and subsequently falls upon a photographic plate. The impression which it makes upon the plate is surrounded by a large number of spots arranged symmetrically. These are actually a diffraction pattern; and the success of the experiment shows that it must be possible to determine the arrangement of the atoms within a crystal by the study of the pattern. W. L. Bragg (*Proc. Cam. Phil. Soc.* xvii. Pt. I. p. 43) showed how this was to be done; and his rendering of the Laue theory opened the way to a series of researches which is forming a new crystallography. It is now possible to determine the exact arrangement of the atoms within the crystal; the outward form of the crystal is no longer the chief guide to crystalline structure.

The fundamental proposition of the new analysis is concerned with the reflection of a homogeneous wave-train by a set of parallel and regularly spaced planes, each of which by itself reflects only a very small fraction of the incident train. In Fig. 11 the

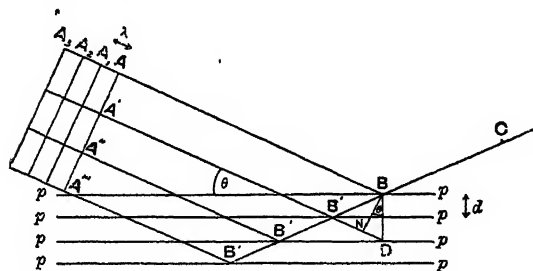


Fig. 11.

train  $A_1A_2A_3A_4\dots$  meets the planes  $p, p, p\dots$  at an angle  $\theta$ . The planes are parallel to each other and are spaced regularly at a distance  $d$ . A number of small reflections occurring at  $B, B', B'', \dots$  group themselves together into a single compound reflection along  $BC$ . All these will be in the same phase if  $n\lambda = 2d\sin\theta$ , where  $\lambda$  is the wave-length of the train and  $n$  is any whole number. (For  $A'B' + B'B - AB = A'B' + B'D - A'N = DN = 2d\sin\theta$ .) If this relation is satisfied there is a reflection; if not there is none, because the various small reflections mutually destroy each other. Rayleigh gave the theory of this peculiar effect in an explanation of the colours of crystals of chlorate of potash. These crystals contain numbers of twinning planes, parallel to each other and regularly spaced. White light incident at any angle is not reflected in its entirety; a portion which has the proper wave-length is selected, and the rest passes on.

The parallel effect in the case of a crystal occurs in the following way. The atoms of a crystal may be supposed to be arranged in sets of parallel planes; there are an infinite number of such possible arrangements. Any set can constitute a reflecting set of planes. When X-rays of wave-length  $\lambda$  meet a set at an angle  $\theta$ , reflection occurs when and only when the above condition is satisfied. In practice the number of sets of planes which can reflect X-rays of ordinary quality is limited; a small number only are sufficiently widely spaced.

If the same set of homogeneous X-rays is always used for the purpose of the experiment, and the angles of reflection in different sets of planes are found, we have a means of comparing the spacings of the various sets. In this way we may arrive at the disposition of the separate atoms. Further help is given by examination of the relative intensities of the different orders of reflection, that is, for the several cases where the whole number in the formula may be 1, 2, 3, &c. Examples will be given presently.

The instrument employed may be called an X-ray spectrometer. A fine pencil of X-rays issues from a vertical slit in a box containing the X-ray bulb, and falls upon the vertical face of a crystal mounted on a revolving table. If the angle of incidence is such that there is a reflection, the reflected pencil passes into a tube containing a heavy gas, such as sulphur dioxide or methyl bromide, which it ionises. The ionisation current is driven by the usual methods into an electroscope, and its intensity is measured. If, as is usually the case, the rays from the bulb contain a certain amount of X-radiation of a general character, on which strong homogeneous rays characteristic of the metal emitting the X-rays are superimposed, the fact is revealed by examining the reflection at all angles; and the result may be described as a line spectrum overlying a general or continuous spectrum.

An X-ray tube in which the anticathode is made of rhodium gives a spectrum containing four lines, 0.534, 0.545, 0.614, and 0.619 Ångström Units ( $10^{-8}$  cm.). When greater wave-lengths are required the anticathode is commonly made of some substance of smaller atomic weight, such as copper.

Crystals in the form of minutely divided powder are examined by an alternative method devised independently by Debye and by Hullah.

We may now take one or two examples of crystal measurement. The (100) planes of a copper crystal reflect a certain palladium ray at  $9^\circ 25'$ ; the (110) planes at  $13^\circ 20'$ , and the (111) planes at  $8^\circ 0'$ . The sines of these angles are respectively 0.1636, 0.2306, and 0.1392,

which are in the ratio  $1:1.41:0.85$ , or  $1:\sqrt{2}:\sqrt{3}/2$  nearly. From the formula given above, the spacings of the three sets of planes must also be in this proportion. But this is characteristic of an arrangement of reflecting centres in a face-centred lattice, as may be seen on examination. There are very convincing reasons for supposing that the reflecting centres are the copper atoms; and we learn that the atoms are arranged on a lattice of this form and are indeed close packed.

In similar ways it is found that the atoms of sodium in rock-salt are placed at the corners of a cube and at the centres of its faces; the chlorine atoms, at the middle points of the edges and at the cube centre, or *vice versa*. Each kind of atom is, therefore, arranged on a face-centred lattice, and one lattice can be derived from the other by a shift parallel to a cube edge. The distance from any atom to its nearest neighbours is 2.81 Ångström Units. It is interesting to observe that in such a

construction it is not possible to distinguish separate molecules within the crystal.

The structure of diamond is revealed mainly by the fact that the cleavage (100) faces give a spectrum in which the second order is absent. That is to say, reflection occurs when the whole number in the formula is 1, 3, 4, or 5, but not when it is 2. This is characteristic of a certain special spacing of the planes, in which each plane is three times as far from its neighbour on one side as on the other. It is readily inferred that the carbon atoms of a

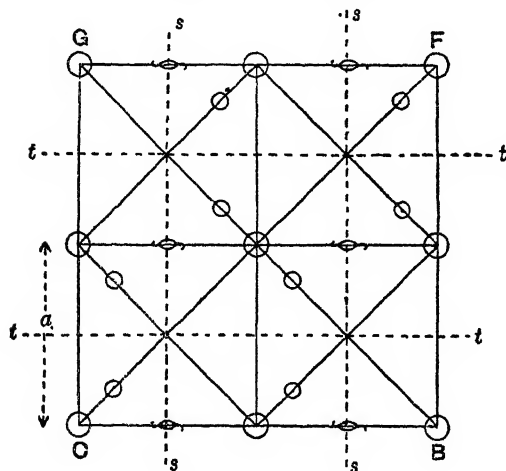


Fig. 12.

diamond are so placed that each lies at the centre of a regular tetrahedron, at the points of which lie its four nearest neighbours. The distance from any atom to any of its four neighbours is 1.51 Ångström Units.

In the case of iron pyrites, iron atoms lie at the corners and the face centres of a cube. Sulphur atoms are found in four of the eight small cubes into which the larger cube may be divided. Each sulphur atom lies on a small cube diagonal, nearly four times as far from the iron atom at one end as from the empty corner at the other. The arrangement projected upon a (100) plane is shown in fig. 12; it suggests a cause for the peculiar striations of iron pyrites, which run parallel to the pairs of sulphur atoms in each small square of the figure. The diagonals upon which sulphur atoms lie are axes of rotation symmetry; no two axes intersect.

A number of other crystals have been examined by these methods. A summary is given in *X-rays and Crystal Structure*, W. H. and W. L. Bragg (1915; rev. and enl. 1924).

**Crystalloid** is a name given by Graham to a class of substances which when in solution pass easily through membranes; as opposed to *colloids*. Metallic salts, sugar, oxalic acid, are crystalloids. See DIFFUSION, OSMOSE, PHYSICAL CHEMISTRY.

**Crystallomancy**, a mode of Divination (q.v.) which has been practised among almost all peoples. A precious stone, crystal globe, mirror, drop of ink, or other object has been employed, a Beryl (q.v.) being by some deemed most effective. In using it, the operator in some cases first muttered over it certain formulas of prayer, and then gave it into the hands of a youth or virgin—none others were pure enough to discern its revelations—who beheld in it the information required. Sometimes the wished-for knowledge was conveyed by means of

written characters on the crystal; sometimes the spirits invoked appeared in the crystal to answer the questions asked. Dr Dee (q.v.) was a great adept at crystallomancy, and two of his magic mirrors—cannel coal and smoky quartz, polished—are now in the British Museum. Lady Blessington's 'magic crystal' illuminated London 'society' in the 19th century. Crystal-gazing is still practised in the 20th century by professional charlatans who prey upon the superstitious. But experiments have also been made by scientific workers, and it seems to be established that 'scrying' (without incantations) may bring to the surface and objectify forgotten facts or other hidden contents of the mind. Some would add that certain proved experiences of crystal-gazers can only be explained by telepathy or clairvoyance. See books by J. Melville (1903), N. W. Thomas (1905), T. Besterman (1924).

**Crystal Palace.** See SYDENHAM.

**Csaba**, or BÉKÉSCSABA, a town of Hungary, 7 miles S. of Bakes, has a trade in grain, flour, wine, hemp, and cattle; pop. 47,000.

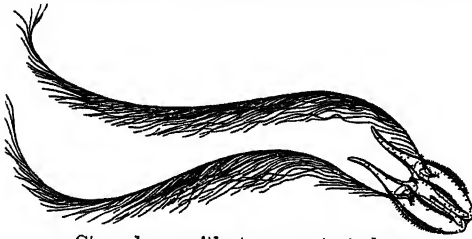
**Csárdás.** See CZARDASCH.

**Csoma de Kőrös**, ALEXANDER, a Hungarian traveller and philologist, born 4th April 1784 in the Transylvanian village of Kőrös, was educated first at the college of Nagy-Enyed, and subsequently at Göttingen, where Eichhorn the Orientalist inspired him with a passion for philology. In 1819 he studied Slavonic in Croatia with his customary ardour, and next year started on his pilgrimage to central Asia, finding his way in Asiatic dress with the most indomitable perseverance by Bagdad and Teheran to Bokhara, thence by Kabul and Lahore to Kashmir and Tibet. He soon began to devote himself to a study of the Tibetan language under the patronage of the English government. Early in 1827 he started on his third journey thither, and remained in the country for three years, completely absorbed in study, and indifferent to the extreme cold of winter and to privation of every kind. Early in 1831 he arrived at Calcutta, where he completed his Tibetan grammar and dictionary. He was appointed librarian to the Asiatic Society, but no comforts could wean him from his love for travel. In January 1836 he started on another journey to Tibet, but died of fever six days after arriving at Darjiling, 30th March 1836, a veritable martyr to science. His life was written by Dr Theodore Duka (1885), who disposed of the assertion so often made that the traveller's zeal, at least after the years of mere boyhood, was due to a devout imagination that somewhere in the heart of Asia it was possible still to discover the original home of the Magyar race.

**Csongrád**, a town of Hungary, at the confluence of the Theiss and the Kőrös, 75 miles SE. of Budapest. The inhabitants, 25,000 in number, are chiefly engaged in the rearing of cattle, fishing, making of wine and soap.

**Ctenophora** (literally, 'comb-bearers'), a subclass of Coelenterates (q.v.), representing the climax of activity in that series of animals. The Common Beroe and Pleurobrachia are good types. Venus' Girdle (*Cestum veneris*) is a well-known aberrant form, which has been elongated sideways to a yard or more in length. They are beautifully delicate, free-swimming marine organisms, generally globular in form, moving by means of comb-like plates. These are composed of numerous agglutinated cilia, and disposed along eight meridional rows. The mouth is at one pole of the sphere; two excretory or anal apertures lie at the other, which also exhibits a sense organ and a probable steering mechanism usually known as the 'otolith.' There are numerous alimentary vessels regularly disposed

in relation to the main central cavity. In most cases there are two retractile tentacles; the stinging-cells so characteristic of Cœlenterates are usually modified into 'adhesive cells.' The Ctenophores are hermaphrodite, carnivorous in diet, extremely active in habit, and often phosphorescent.



Ctenophore, with streaming tentacles.

The Ctenophora are very divergent from other Cœlenterates, e.g. in the almost complete absence of stinging-cells, in the early establishment of a mesodermic germinal layer, in usually showing two tentacles (except in Beroidæ), and in having the peculiar ciliated combs. There is a good deal of evidence in support of the view that they point the way to the Turbellarian Flat Worms (as is suggested by *Ctenoplana* and *Cœloplana*). See BEROE, CœLENTERATA.

**Ctesias**, a Greek historian of Persia, was private physician of Artaxerxes Mnemon, and accompanied him in the expedition to crush the revolt of his brother Cyrus, 401 B.C. His *Persika* was a history of Persia in twenty-three books, written in the Ionic dialect, but unhappily only a meagre fragment can be recovered in an abridgment in Photius, and in some portions preserved by Diodorus and other writers. Ctesias compiled his history from oriental sources, and it is not wonderful that his statements often contradict those of Herodotus. Of his *Indika* also only an abridgment by Photius is extant.

**Ctesibius**, a Greek who flourished under Ptolemy Philadelphus and Euergetes, at Alexandria, about 250 B.C., and was famous for his inventions in mechanics. We owe to him and his pupil Hero Alexandrinus the pump, the bent siphon, and also the discovery of the elastic force of air, and its application as a motive-power.

**Ctesiphon**, a city of Babylonia, on the eastern bank of the Tigris and opposite Seleucia, the common winter residence of the Parthian kings, and finally the capital of the Parthian kingdom. It was conquered by the Romans in 115 A.D., and destroyed by the Arabs under Omar in 637. The British defeated the Turks there 22d November 1915. Its ruins still attest its former magnificence.

**Cuba**, the most westerly and largest island of the West Indies, till 1898 the principal colony left to Spain, stretches in the form of a long narrow crescent, convex on the north side, at the entrance of the Gulf of Mexico, which it divides into two channels—the north-west, 124 miles wide, and the south-west, 97½ miles at its narrowest part. Cuba is 759 miles long from Cape Maisi on the east to Cape Antonio on the west, with a breadth varying from 27 miles to 90 miles, and an area of about 45,000 sq. m. Only about one-third of the coast-line is accessible to vessels, the remainder being beset by reefs and banks. The shores, low and flat, are liable to inundations, but there are numerous excellent havens. In the south-east are the Sierra de Maestra shooting up in the Pico de Turquino to 8400 feet, and the Sierra del Cobre (copper). The mountains, composed of granite overlaid with calcareous rocks, and containing

minerals, especially copper and iron, are clothed in almost perennial verdure, wooded to the summits. Carboniferous strata appear in the west, schistose rocks on the north coast. The limestone rocks abound in caverns, with magnificent stalactites. Mineral waters are plentiful. The climate, more temperate than in the other West Indian Islands, is salubrious in the elevated interior. No month of the year is free from rain, the greatest rainfall being in May, June, and July. Earthquakes are frequent in the east. Hurricanes, less frequent than in Jamaica, sometimes cause widespread desolation.

Among the animals are a species of tailless rat peculiar to Cuba, great abundance of birds, including the mocking-bird, a species of vulture (valuable as a scavenger), woodpecker, partridge, flamingo, albatross. Of noxious animals there are the crocodile, scorpion, and mosquitoes. The rivers and seas are well stocked with fish; and turtle abound in the shallows and sandy places of the beach.

Sugar, for which soil and climate are peculiarly favourable, has long been the chief product, and the island is now responsible for about one-quarter of the world's supply. Tobacco, though far behind, is next in importance. Other important crops are sweet potatoes, bananas, maize, rice, and many fruits; cocoa and coffee are also grown. The rearing of live-stock is extensively carried on, and bee-keeping is a thriving industry. Iron, manganese, and copper are worked; and oil and asphalt are got. The principal exports are sugar, tobacco, copper, iron ore, fruits, wood, cigars, cattle hides, honey and beeswax, molasses, cocoa, manganese, asphalt, &c.; these are mostly to the United States, with whom since 1903 a reciprocal commercial treaty has existed.

In 1887 the population was 1,631,687; in 1899 it was 1,572,797, the decrease being due to war; in 1919 2,889,004, three-fourths whites. The principal towns are Havana (q.v.), the capital, pop. 363,500; Camagüey, 98,000; Cienfuegos, 96,000; Santiago de Cuba, 70,000; Guantánamo, 69,000; Santa Clara, 63,000; Matanzas, 63,000; Sancti Spiritus, 59,000; Manzanillo, 57,000; Pinar del Río, 48,000; Trinidad, 41,000; Cárdenas, 33,000. The educational system is good, and there is a university at Havana dating from 1721. There are about 3200 miles of railway connecting the principal towns and seaports, and the road system is being greatly extended.

Cuba, spoken of as the 'Queen of the Antilles,' was discovered by Columbus in 1492, the discoverer calling it 'the most beautiful land that eyes ever beheld.' It was first settled by Spaniards at Baracoa in 1511. Havana, first settled in 1519, was reduced to ashes by the French in 1538, and again in 1554. For about a century and a half Cuba was in constant danger from French, English, Dutch, and West Indian filibusters. In 1762 the English under Lord Albemarle (q.v.) took Havana, which, however, was by the Treaty of Paris next year restored to Spain. Hitherto the whole Spanish trade with the colonies had been in the hands of a single privileged company. During the ten months' English occupation, Havana, open to free trade, showed in its port, instead of ten to twelve ships yearly as formerly, more than one thousand, and agriculture made rapid progress. In 1818 Cuba was opened to the world's trade, and soon reached unexampled prosperity. The civil war in the United States ruined its sugar industry and so benefited Cuba; but the suppression of slavery by the Spanish government (1880-86) without compensation created discontent not abated by the constitution of 1884. A serious insurrection took shape in 1895. Absolute freedom from Spanish rule was demanded, a Cuban republic was proclaimed, and soon a bloody guerilla

war was in progress. In their efforts to crush the rebellion the Spanish government sent to Cuba upwards of 200,000 soldiers, of whom a very large proportion died in hospital. The savage and destructive character of the war, and the cruelties believed to have been shown by the Spaniards even towards non-combatants, provoked very pronounced sympathy with the insurgents on the part of the United States, and American intervention was repeatedly threatened. The destruction of an American warship by an explosion in Havana harbour embittered American feeling, and in April 1898, the United States and Spain were at war. The harbour of Havana was blockaded, but the centre of military operations was Santiago; and a brief war was ended by the total destruction of the Spanish fleet in August. On the conclusion of peace in 1899 Cuba became practically a dependency of the United States—in the first instance a military protectorate—and as such was occupied for three years. The administration was reorganised; roads, railways, docks, and harbours were made or improved, and sanitary regulations enforced. Taxes, customs, and education were put on an improved basis, and many other reforms made. A constitution being drafted and adopted, on 20th May 1902 the United States officials withdrew from the island, their government having previously propounded a series of conditions to which the agreement of the Cubans was obtained, and the republic of Cuba was formally established, Tomás Estrada Palma being the first president. An insurrection in 1906 led to a renewed occupation by United States troops until 1909, and a negro rising in 1912 compelled the despatch of an American squadron. During the Great War, Cuba entered on the side of the Allies, 7th April 1917.

See books on Cuba by Gallenga (1873), Hazard (1871) and Ballou (1885), Larrinaga, Piron (Paris), Davies (1897), Davey (1898), Porter (1899), Wright (1917); and works cited at WEST INDIES.

**Cubango.** See NGAMI.

**Cube**, a solid bounded by six equal square faces, opposite pairs of which are parallel; the three edges meeting at any point being at right angles to one another. This form frequently occurs in nature, especially among crystals (see CRYSTALLOGRAPHY). In arithmetic, the cube of a number is the product of its multiplication twice by itself; if the edge of a cube be a line of 4 inches, its solid content is 64 cubic inches. The cube root of a number is that number which, multiplied twice by itself, produces the first number. See INVOLUTION, ROOT, DOUBLING THE CUBE.

**Cubebs**, or CUBEBS PEPPER, the dried berries of *Piper Cubeba*, a climbing shrub, a native of Sumatra, Java, and southern Borneo. The fruits of other species of *Piper* are sometimes substituted for the true cubeb. Known to the Arabs in the middle ages, cubebs fell gradually into disuse, till at the beginning of the 19th century all reference to it was omitted in medical books, and its importation ceased. It has come again into use. As a stomachic and carminative it has some value; in piles and in sore throats it is beneficial; and in gonorrhoea its application is important. It is often contained in asthma-cigarettes. In the East it is used as a condiment.

Cubebs contains a volatile oil, a crystalline substance called *cubebin*, and resinous bodies, one of which is *cubebic acid*. The cubebin is inactive, while the volatile oil is not believed to have the full virtue of the cubebs. It enters, however, into the composition of a well-known voice lozenge, to which it imparts highly stimulating properties. The diuretic properties are held by some to be entirely due to the resinous bodies, but on this

point there is a difference of opinion. The dose of powdered cubebs is from one to three drachms, that of the volatile oil ten drops, and of the oleo-resin five to thirty drops.

**Cubic Equations.** A cubic equation in a given quantity is an equation in which the highest exponent of that quantity in any term is 3. Every such equation can be reduced to the form  $x^3 + px + q = 0$ , where  $x$  is the variable and  $p$  and  $q$  are constants. Every equation of this form has three roots, all of which may be real, or one may be real and two imaginary. An equation containing any number of variables in which the greatest sum of the exponents of the variables in any term is 3 is called a cubic equation. Thus  $x^2y + 5y^3 + 6 = 0$  and  $xyz + z^2 = 0$  are cubic equations in  $x$ ,  $y$ , and  $z$ ,  $y$ , and  $z$  respectively. See EQUATIONS.

**Cubism.** See PAINTING.

**Cubit** (Lat. *cubitus*, 'forearm'), a Roman measure of length, supposed to equal the length of the forearm from the elbow to the tip of the middle finger. It was  $1\frac{1}{2}$  Roman feet ( $17\frac{1}{2}$  English inches). The English cubit is  $1\frac{1}{2}$  feet. The cubit of the Bible is generally estimated at 22 inches, though that of Egypt, Babylon, and Asia Minor was slightly over  $20\frac{1}{2}$  inches.

**Cubitt**, SIR WILLIAM (1785–1861), engineer, born at Dillham, in Norfolk, was a miller, cabinet-maker, and millwright until 1812, when he became chief engineer and later a partner with Messrs Ransome at Ipswich. In 1823 he joined the Institution of Civil Engineers, and was afterwards engaged in many public undertakings. The improvement of the Severn and of Boulogne port, the Bute docks at Cardiff, the Berlin water-works, and South-eastern Railway are among his works. He also invented the treadmill; and for his services in connection with the erection of the Great Exhibition buildings he was knighted in 1851.

**Cucking-stool.** See DUCKING-STOOL.

**Cuckoo** (*Cuculus*), a well-known genus of birds in the order Cuculiformes, or, according to others, Picariæ, and type of a large family (Cuculidæ). The common cuckoo (*Cuculus canorus*) is a widely distributed bird, breeding in summer in the northern parts of Europe and Asia, and migrating in winter to Africa, as far as the Cape, or to India.



Cuckoo.

It is best known for the 'coo-coo' cry with which the male announces its arrival in spring, and for its habit of utilising for its own family the nests and the brooding of other birds. The cuckoo is slightly over a foot in length; the bill is as long as the head, slender and slightly curved; the wings are long and pointed; the tail is also long and rounded; the upper part of the shank is feathered.

The upper surface is ashen gray, the belly and legs are whitish with undulating transverse brown lines, the tail is spotted with white above, and the root of the bill and the feet are yellow. The young birds are brownish above with a white spot on the nape. A reddish variety occasionally occurs. The bird arrives in north Europe in April or May, and leaves again in August or September. Its cheerful call ceases to be heard about the middle of June. Predominantly an arboreal bird, it is rare in treeless districts. Each cuckoo seems jealously to 'preserve' a certain territory for itself. Like the other species of *Cuculus*, it is a shy, restless, unsocial bird. It is extremely valuable on account of its insatiable appetite for caterpillars. The hairy forms are especially delighted in, and the indigestible hairs form a felt-like coating in the stomach. The female places her eggs singly (sometimes to the number of eight), each in the nest of some suitable bird, choosing such as feed their own young on insects—in order of preference, hedge-sparrow, water-wagtail, titlark, yellow-hammer, green linnet, and whin-chat. The young cuckoo, unconsciously reared by its foster-parents, manages to secure the bulk of the food-supply, and in the struggle for existence completely monopolises the nest, ousting the rightful brood. Stories of the young bird devouring its foster-parent are mythical. In some cases the adult cuckoo destroys the foster-parent's eggs. The males greatly outnumber the females. The latter has a low 'water-bubbling' or whistling cry. The males are said to be very passionate in their love-making, but there is no regular pairing or continued attachment. The musical interval between the cuckoo's two notes is not uniform, and varies from a minor to a major third (the latter being that adopted in Beethoven's reproduction). See *Nature*, vol. xxxvi. p. 344.

There are over forty genera in the cuckoo family—e.g. *Coccytes*, *Eudynamis*, *Seythrops*, and *Coccyzus*. The Great Spotted Cuckoo, *Coccytes glandarius*, which puts its eggs in the nests of magpies and crows, has occurred a few times in Britain. The Indian Koël (*Eudynamis honorata*), supposed to foretell rain, also utilises the nests of crows. The Black-billed Cuckoo of America (*Coccyzus erythrophthalmus*) builds a slight nest, and is somewhat irregular in its laying and in its parental care. The Coucals (*Centropus*), the Road-runners or Ground Cuckoos (*Geococcyx* and *Carpococcyx*), the Anis (*Crotophaga*), are other members of the family. The so-called parasitic habit of the cuckoo is in many respects puzzling. (1) It is by no means restricted to the European cuckoo, but it is not exhibited by all the members of the family. Thus it does not occur in the American cuckoo. On the other hand, it is exhibited in diverse degrees by species of the far-separated genus *Molobrus* or cowbirds, allied to the weaver-birds. It is also of interest to notice that there are scattered instances of many different species of birds laying their eggs in the nests of unrelated types. (2) The usual procedure seems to be that the mother-cuckoo lays her egg on the ground, then takes it in her bill, and puts it as quickly as possible in a suitable nest. According to Baldamus, Chance, and some others, she may lay her egg in an open nest. Each hen is believed to produce eight or more eggs, and the laying occurs at intervals of two or three days, or even more. The egg is small in proportion to the size of the bird, and is very variable in its colouring. There is considerable evidence that the eggs of any individual cuckoo are all of the same coloration. Very remarkable is the frequently close resemblance between the coloration of the cuckoo's egg and that of the foster-parent, but it has not been proved that this is of actual advantage; and it must be noticed that the dis-

similarity is as conspicuous in many cases as the resemblance in others. It is possible that the cuckoo does to some extent, when she is not hurried, select a nest with eggs like the type which she lays. For fresh observations on the cuckoo's habits, especially as regards laying an egg in a nest, reference should be made to Mr Edgar Chance's admirable book, *The Cuckoo's Secret* (1922). (3) The relatively small egg of the cuckoo, incubated by the foster-parent, hatches in eleven or twelve days. As the incubation-periods of the foster-parents are usually about thirteen to sixteen days, the egg of the cuckoo hatches before or about the same time as the others, if deposited early in their incubation. This is an advantage, for the newly-hatched cuckoo has only to deal with eggs and very small nestlings. These it ejects from the nest by clambering backwards up the side, pushing before it an egg or nestling which rests in the hollow of its broad back. This depression disappears in about ten to fourteen days, when the ejecting instinct also dies away. It is noteworthy that the young bird will throw itself backwards with some force when it is touched unexpectedly. The attempts at eviction may begin when the young cuckoo is only thirty hours old, and quite blind and naked. The normal result is that the young bird is successful in making room for itself. It has been known to deal with a weaker or younger member of its own kin (if two cuckoo-eggs happen to have been placed in the nest) as it deals with the eggs or young of its foster-parent. In peculiar cases the ejecting reaction seems to be ineffective, and it may be that the foster-parents then remove their suffocated young ones. For about three weeks the young cuckoo remains in the nest, and is faithfully fed by the foster-parents, though it has meant the destruction of their own brood. Eventually the young cuckoo may be three times the size of its nurses. (4) Darwin suggested that the peculiar habit of the cuckoo may have arisen as an adaptation to the fact that the bird lays its eggs not daily, as is usual, but interruptedly. Jenner pointed out that the device enabled the cuckoo to have a numerous progeny during the short period of their stay in northern Europe. The parasitic habit, in other words, makes it possible for the cuckoos to leave early on their autumnal migration, and it is important to note that the adults leave a month or so before the young birds. It is not difficult to see advantages in the habit; it is the problem of its origin that is so perplexing. (5) In the American cuckoo (*Coccyzus erythrophthalmus*) there is a clue. It exhibits a tendency to lay at irregular intervals, so that there are eggs and young in the nest for a longer time than usual. The disadvantage of this is lessened by the fact that the young ones leave the nest very early (on the seventh day after birth) and show an interesting climbing stage for a couple of weeks. When disturbed in its nest-activities, the American cuckoo has been known to transfer its eggs to another nest of its own making, and it has been known to lay in other birds' nests. (6) Professor F. H. Herrick has advanced our understanding of the problem very notably by pointing out that the loss of the nesting instinct in various cuckoos and cowbirds is due to an irregularity in the rhythm of the reproductive cycle. In most birds the cyclical instincts connected with reproduction follow one another in a definite harmonious series, but, abnormally, one term in the series may be weakened or dropped out, another exaggerated or prolonged, and so on. There are many cases of individual disturbance in the chain; thus a bird may build a superfluous nest, or drop its eggs on the ground, or migrate too soon. A lack of attunement between egg-laying and nest-building is casual in many birds, it has become established.

in some cuckoos and cowbirds, and adjustments have been made to meet it. (7) Finally, perhaps, it should be noted that the non-brooding is not to be held apart from the other peculiarities of the cuckoo, such as the great preponderance of males, the polyandry, the gluttonous appetite, the solitary individualism, and the behaviour of the nestling. A peculiar habit should always be considered in its setting, along with the whole constitution and character of the organism.

The folklore of the cuckoo is almost inexhaustible in every country of Europe. It has the gift of prophecy as the herald of spring and of long life, the prelude of storms, of prosperity, and of speedy marriage to maidens. Countless superstitions, and those of the most varied character, are connected with its origin, the cause of its cry, its winter transformation into a hawk, as well as with the first hearing of its call, the hearer's occupation at the moment, and the direction from which it comes; while as many proverbs play upon the monotony of its note, its supposed stupidity, and its obvious connection with cuckoldom, from its habit of depositing its offspring with alien parents. It has only been by a strange transference of meaning that the name *cocu* or *cuckold* has been transferred from the paramour to the unsuspecting husband, unless *cuckold* means, as explained by Littré, one who has been *cuckoo-ed* or treated after the manner of the cuckoo. An early English song (13th century) is an expression of the joyousness of the cuckoo-call.

For details of Cuckoo folklore, see Mannhardt in the *Zeitschrift für Deutsche Mythologie*, vol. iii. pp. 209-298; James Hardy's 'Popular History of the Cuckoo,' in Part II. (1879) of *The Folklore Record*; and Swainson's *Folklore of British Birds* (1886).

**Cuckoo-flower.** See CRESS.

**Cuckoo-pint.** See ARUM.

**Cuckoo Spit.** See FROTH-FLY.

**Cucumber** (*Cucumis*), a genus of Cucurbitaceæ. The Common Cucumber (*C. sativus*), distinguished by heart-shaped, acuminate pentangular leaves, which are rough with hairs



Common Cucumber (*Cucumis sativus*):  
a, fruit.

approaching to bristles, and oblong fruit, is a native of the middle and south of Asia, and has been cultivated from the earliest times. Its fruit forms an important article of food in its native regions, the south of Europe, &c., and an esteemed delicacy in colder countries, where it is produced by the aid of artificial heat. Many varieties are

in cultivation, with fruit from 4 inches to 2 feet long, rough, smooth, &c. Young cucumbers are much used for pickling, and are called *gherkins*; a small fruiting variety is selected for this purpose. The cucumber is cultivated in fields even in the south of England, for the supply of the London market; but in all parts of Britain the plants required for the purpose of growing either in the open or under glass must be reared in a hotbed in spring. In the northern parts it can only be successfully cultivated in frames during summer. A large trade is now done in winter crops of cucumbers, which are grown in well-heated, specially constructed glass-houses. In many parts of the United States it will, if planted late enough to escape the frosts, grow well with almost no care. But it requires rich soil, much moisture, and heat. To this genus belong other species valued for their edible or ornamental fruit, but all that are popularly named cucumber are not properly *Cucumis*, but merely species or varieties belonging to allied genera. *Dudaim* (*C. Dudaim*) is a highly fragrant, handsome fruit, with insipid flavour and flaccid flesh, often grown in this country by gardeners under the name, *Queen Anne's Pocket Melon*, simply for its attractive appearance, the fruit being about the size of an ordinary orange, and beautifully barred with green and orange or deep orange-red. (*Dudaim* is the Hebrew name rendered *Mandrake* in Scripture.) *Connemon* is the fruit of *C. conomon*, which is grown everywhere in Japan, and preserved and sold as an article of food. *C. anguria*, a West Indian species, with fruit about the size and shape of a pullet's egg, is esteemed as an ingredient in soups, and is also eaten raw, but considered inferior in that state to the common cucumber. The Snake Cucumber (*C. flexuosus*) has fruit of great length which is eaten either pickled or raw, and has similar qualities to the common cucumber. A number of species of Cucurbitaceæ are natives of the United States, but they are all of small economic importance. For other representatives of the natural order Cucurbitaceæ (q.v.), see COLOCYNTH, ELATERIUM, MELON, &c.

**Cucumber-tree.** See OXALIDACEÆ.

**Cucumis.** See CUCUMBER, MELON.

**Cucurbitaceæ**, an important order of sym-petalous dicotyledons, of which the 650 species are mostly herbaceous climbers, inhabiting the warmer regions of the globe; only one, the Common Bryony (q.v.), reaching the south of England. The young shoots and leaves of many species are used as potherbs, and the persistent rhizomes or roots of others are sometimes esteemed on account of their store of starch. Acridity, however, is a common characteristic of the order; and Bryony, Elaterium, and especially Colocynth (q.v.) are of old medicinal repute. But the central importance of the order is due to the characteristic fruit, which is technically known as a *pepo*, but which may be regarded as a large and many-seeded berry, with its more or less succulent pulp protected by a hardened wall. The many specific and varietal forms are known as Cucumbers, Melons, Gourds, Pumpkins, Squashes, Vegetable-marrows, Bottle-gourds, &c., and are described under separate articles. The seeds of some species are medicinal, others edible, while the fibro-vascular skeleton of the fruit of an Egyptian species of *Luffa* (loofah) is a familiar adjunct of the bathroom.

**Cúcuta**, SAN JOSÉ DE, an inland town in north-east Colombia, on the Río Zulia, 35 miles S. of Puerto Villamizar by rail. It is the third commercial town of the republic, a centre of coffee and cacao cultivation. It was destroyed by earthquake in 1875, but has been well rebuilt.

Pop. 30,000.—ROSARIO DE CUCUTA, to the SE., was the seat of the first Colombian congress in 1821, and the birthplace of the patriot General Santander (1792–1840). It has large plantations of coffee and cacao. Pop. 6000.

**Cud**, the sodden bolus of hastily swallowed fodder which Ruminants (q.v.) drive from their paunch and honeycomb stomach back again into the mouth. There the cud is leisurely chewed, and the semi-fluid result passes down again into the stomach, usually into the manyplies. One bolus is driven upwards after another until the greater part of the cropped herbage has been chewed.

**Cudbear**, a dye-stuff, is Archil (q.v.) paste dried and ground. With indigo, logwood, fustic, and other colouring materials it gives rich browns. The preparation of archil, known as Fiench purple, was used for a short time in calico-printing, and produced fine and delicate purples, but it was superseded by aniline mauve. The ancient Cretan purple was probably obtained from the same source. The name cudbear is derived from that of Dr Cuthbert Gordon, under whose management the manufacture was begun in Leith about the year 1777.

**Cuddalore** (*Kūḍalūr* or *Gudulūr*), the chief town in South Arcot, Madras, on the Coromandel or east coast of Hindustan. It is situated on a backwater formed by the confluent estuaries of two rivers, 16 miles S. of Pondicherry, and 127 S. of Madras by rail. It has a large trade by land with Madras in oils, indigo, and sugar, and exports grain by sea. Though the river itself is silted up, and admits only native craft, yet there is good anchorage off-shore at the distance of a mile and a half. Cuddalore was at one time a place of great strength; and in that respect it was frequently an object of contention in the wars which, during the later half of the 18th century, so long desolated this neighbourhood. In 1753 it was taken by the French from the British, who had held it for 77 years; and was finally ceded to the British in 1785. Pop. 57,000.

**Cuddapah** (KADAPA), a town in the province, and 161 miles NW. by rail of the city, of Madras. It stands, at the height of 507 feet above the sea, near the south bank of the northern Pennar, which flows into the Bay of Bengal. Till 1868 it was a military cantonment. Pop. 18,000.—The district of Cuddapah, partly lowland and partly highland, has an area of 5900 sq. m., and a pop. of 900,000. It has been British since 1800.

**Cuddesdon**, a village of Oxfordshire, 6 miles ESE. of Oxford. Here is the palace of the bishops of Oxford, rebuilt by Bishop Fell in 1679, with a chapel added in 1846 by Bishop Wilberforce, to whom the adjoining theological college (1854) also owes its existence. The church is a fine old cruciform building.

**Cuddy** was the name first applied in East India trading ships to a cabin under the poop, where the men messed and slept. The same name was afterwards given to the only cabin in very small vessels, and sometimes to the cooking-room.

**Cudweed**, the popular name of many small inconspicuous species of composite weeds of the genera *Gnaphalium*, *Filago*, and *Antennaria*, the stems and leaves of which are more or less covered with a whitish cottony down. The heads of flowers consist, in great part, of dry involucreal scales, and may be kept for a long time without undergoing much apparent change, so that they may be reckoned among *Everlasting Flowers* (q.v.). *Antennaria dioica* (also called Cat's-foot) is very frequent in dry mountain-pastures. All the three genera are represented in Great Britain, and

also in the United States, where *Gnaphalium polycephalum* has some repute in domestic medicine.

**Cudworth**, RALPH, the chief figure in the group of 'Cambridge Platonists,' was born in 1617 at Aller, in Somersetshire, and admitted pensioner of Emmanuel College, Cambridge, in 1632. He graduated B.A. in 1635 and M.A. in 1639, and was in the same year elected fellow of his college, where he became a popular tutor. In 1645 he was appointed by parliament Master of Clare Hall, and in the same year regius professor of Hebrew. In 1650 he was presented to the college living of North Cadbury, in Somersetshire, and in 1654 was elected Master of Christ's College, an appointment the confirmation of which at the Restoration his acquiescence with the rule of the Commonwealth did not prevent. In 1662 he was presented by Archbishop Sheldon to the rectory of Ashwell, Hertfordshire; and in 1678 he was installed prebendary of Gloucester. He died at Christ's College, July 26, 1688. His daughter Damaris, who became the second wife of Sir Francis Matcham of Oates, in Essex, was a friend of Locke, and herself wrote a well-reasoned *Discourse concerning the Love of God* (1696).

Cudworth's great work, entitled *The True Intellectual System of the Universe*, was published in 1678. It is a learned, ample, and discursive work, singularly large-minded and sagacious; but its logical consistency as a consecutive argument is somewhat marred by discussions on such subjects as the true meaning of the pagan mythology, and the relation of the Platonic and Christian trinities. Its aim was to establish the reality of a supreme divine Intelligence against the materialism of Democritus and Epicurus, the 'atheism of atomicism;' to vindicate the eternal reality of moral ideas against the old nominalists and their successors; and to prove the reality of moral freedom and responsibility in man as against pantheistic naturism and stoicism. The only basis for a philosophy of religion rests on the conception of man as a free moral subject, capable of choosing good or evil. The portentous erudition of this famous treatise, and the redundant fullness of its endless digressions, with its strange Alexandrian amalgamation of fancy and speculation, have tended to obscure its real merits. Perhaps its most honourable distinction is the marvelously honest and impartial statement of the best arguments of his antagonists, which, indeed, laid him open to the charge of having fallen into the same heresy with Milton and with Clarke, and even into atheism, simply for being just to the arguments of atheistic writers. 'He has raised,' says Dryden, 'such strong objections against the being of a God and Providence that many think he has not answered them'—'the common fate,' adds Shaftesbury, 'of those who dare to appear fair authors.'

Cudworth's admirable sermon, preached before the House of Commons in 1647, shows the best features of that much-abused Latitudinarian school to which he belonged, and, says Mackintosh, 'may be compared even to Taylor (*Liberty of Prophecy*, published the same year) in charity, piety, and the most liberal toleration.' In its insistence upon the co-ordinate relativity of all knowledge, and the connection of religion with life and morality, the author lays down a sound basis for a harmony between philosophy and religion, between reason and faith. Many of Cudworth's MSS. still lie unprinted. His *Treatise concerning Eternal and Immutable Morality* was published in 1731, and is a contribution of real value to ethics. See Tulloch's *Rational Theology in England in the XVII. Century* (1872), Dr Martineau's *Types of Ethical Theory* (1885), and monographs by Lowrey (New York, 1884) and W. R. Scott (1891).

**Cuenca**, a picturesque decayed city of Spain, 85 miles ESE. of Madrid. It stands on a rocky hill-girt eminence, 2960 feet above the sea-level, at the confluence of the Jucar and Huecar—the latter spanned by the noble bridge of San Pablo (1523), 150 feet high and 350 long. Of Moorish origin, Cuenca has narrow, crooked streets, and a very interesting cathedral (1177–1669). Pop. 13,000. —Cuenca gives name to a mountainous, well-watered province, yielding excellent timber, honey, wine, and grain, with good pasture, and various minerals, including iron, coal, copper, and silver. Area, 6726 miles. Pop. 282,000.

**Cuenca**, a city of Ecuador, on the Río Paute, 190 miles SSW. of Quito, stands on a fertile tableland, 8469 feet above the sea, and enjoys a perpetual spring. It is the seat of the Azuay University. Its streets are wide, and several canals intersect the town; the principal buildings are the cathedral and high school. There is some trade in cheese and grain, and manufactures of hats, woollens, earthenware, and candied fruits. Pop. 30,000.

**Cuernavaca**, capital of the Mexican state Morelos, lies in a lovely and fruitful valley, about 40 miles S. of Mexico city. It has a church built by Cortes, an agricultural school, and refineries of sugar and brandy. Pop. 13,000. Near by is the famed *teocalli* of Xochicalco, with five terraces.

**Cuevas de Vera**, a town in the Spanish province of Almería, situated on the Almanzora. It has an old Moorish castle, and a considerable industry in connection with the silver-mines of the neighbouring Sierra Almagrera. Pop. 20,000.

**Cufic**. See KUFIC.

**Cui**, CÉSAR ANTONOVICH, a leader of the school of Russian composers, though himself Russian neither in his music nor in his birth, was born at Vilna, 18th January 1835, son of a Frenchman and a Lithuanian. He studied military engineering at St Petersburg, became a lecturer on fortifications and a lieutenant-general. His music is delicate rather than strong. It includes *William Ratcliff*, *Angelo*, *Le Flibustier*, *The Saracen*, and other operas, and many songs.

**Cui Bono?** ('for whose advantage?'), a Latin phrase not infrequent in Cicero and elsewhere, and very common in newspaper jargon, usually in the sense of 'what's the good?'

**Cuirass**. See BREASTPLATE, ARMOUR.

**Cuirassiers** are heavy cavalry wearing the 'cuirass' and helmet. They represent the troopers of the 16th and 17th centuries, who were similarly protected. In the British army no regiments are officially styled cuirassiers, but the two regiments of Life Guards and the Royal Horse Guards were given steel cuirasses in 1821, which, however, they do not wear on active service. See GUARDS. Napoleon III. at one time maintained a bodyguard of cuirassiers, called 'Centgardes', who wore cuirasses of aluminium, much lighter than steel ones, but, like them, not proof against a rifle-bullet striking them directly.

**Cujacius**, properly JACQUES DE CUJAS or CUJAUS, jurist, born in 1522, was the son of a tanner of Toulouse. After studying law, he lectured on the *Institutes* at Cahors, Bourges, and Valence (1554–67); lived at Turin and Grenoble; and after repeated changes, finally settled in 1577 as professor at Bourges, where he resided till his death, October 4, 1590. His great reputation as a jurist was founded on a lucid exposition of Roman law, based on conscientious study of the original authorities. He had in his library 500 MSS. on Roman law, and by his emendations contributed greatly to remove the obscurities of jurisprudence. A complete collection of his works was edited by

Fabrot (10 vols. Paris, 1658), and frequently republished. See Spangenberg's *Cujacius* (1822).

**Culbin Sands**. See DRIFT.

**Culdees**, or KELDEES (Celt. *Ceile De*, 'a companion of God'; Lat. *Colidei*, *Culdei*, *Calledei*, *Keldei*, *Keledei*), the name given to an ancient order of ecclesiastics with monasteries in Scotland and Ireland, those in the former country being best known. In England and Wales only two instances of their occurrence seem to be authenticated—the first, where the canons of St Peter's at York were called Culdees in the reign of Athelstan (924–31), and the second, where Giraldus Cambrensis, writing about 1190, describes the island of Bardsey on the coast of Carnarvon as inhabited by 'most devout monks called celibates or Culdees.'

The origin and early history of these bodies is involved in almost hopeless obscurity. The name is not mentioned in the works of Adamnan, Eddi, or Bede, and makes its first appearance only about the 8th century. The conclusion at which Dr Skene arrived is 'that the Culdees originally sprang from that ascetic order who adopted a solitary service of God in an isolated cell as the highest form of religious life, and who were termed *Deicolae*; that they then became associated in communities of anchorites or hermits; that they were clerics, and might be called monks, but only in the sense that anchorites were monks; that they made their appearance in the eastern districts of Scotland at the same time as the secular clergy were introduced, and succeeded the Columban monks, who had been driven across the great mountain-range of Drumalban, the western frontier of the Pictish kingdom; and that they were finally brought under the canonical rule along with the secular clergy.'

When the Culdees appear clearly in history in the 12th century each monastery was evidently an independent community, connected with the others by no ties whatever, and owning no control except that of its own abbot, in this and other respects resembling the secular canons or monastic 'families' of England, Ireland, and the Continent in the 11th century. The monasteries seem indeed to have undergone a similar secularising process to that which took place in the Northumbrian Church after the withdrawal of the Columban clergy, when, according to Bede, false monks, under pretext of founding monasteries, purchased for themselves territories, and caused 'these to be assigned to them by royal edicts for an hereditary possession.' There seem to have been at this period two sections in each community, one still performing divine service and other religious duties pertaining properly to the body; while the other had become thoroughly lay, and so free from monastic discipline as to marry. Indeed, if a tradition of the 16th century can be received as authority for what passed in the 12th, the Culdees of Dunkeld were all married; but, like the priests of the Greek Church, lived apart from their wives during their period of service at the altar.

According to the records of the see of St Andrews, the state of the Culdee monastery there (and it may probably be taken as typical of all the rest) was in the middle of the 12th century far from satisfactory. They tell that there were thirteen Culdees holding their office by hereditary tenure, and living rather according to their own pleasure and the traditions of men, than after the rules of the holy fathers; that some few things of little importance they possessed in common; that the rest, including what was of most value, they held as their private property, each enjoying what he got from relatives and kinsmen, or from the benevolence granted on the tenure of pure friendship, or

otherwise; that after they became Culdees they were forbidden to have their wives in their houses, or any other women of whom evil suspicion could arise; that the altar of St Andrew was left without a minister, nor was mass celebrated there except on the rare occasion of a visit from the king or the bishop, for the Culdees said their own office after their own way in a corner of the church. The first attempt to reform this state of matters was made by Queen Margaret, and her efforts were followed up by her sons, Alexander I. and David I.; so that from the time of the appointment of Turgot to the see of St Andrews, when we are told that 'the whole rights of the Keledei over the kingdom of Scotland passed to the bishopric of St Andrews,' the history of the Culdees is simply that of a vain resistance to foes backed by all the weight of the royal power.

If tradition could be trusted, the first appearance of Culdees in Scotland was later than in Ireland, and should be placed about the middle of the 9th century. A leaf of the Register of St Andrews, written about 1130, relates that Brude, the son of Dergard, the last king of the Picts (who ceased to reign about 843), gave the island, since called St Serf's Inch, in Lochleven, to God, St Servan, and the Culdee hermits serving God there. They were governed by an abbot; and about the year 1093, during the rule of Abbot Ronan, they gave up their island to the Bishop of St Andrews on condition that he should find them in food and raiment. On this island they remained in peace, receiving grants of lands or immunities from all the kings of the Scots from the time of Macbeth till that of David I.; but in 1144, Robert, Bishop of St Andrews, gave their island, and all their possessions, including their church vestments and their books (a complete list of which is given in the charter), to the newly-founded Canons Regular of St Andrews, in order that a priory of that rule might supplant the old abbey of Culdees on St Serf's Inch. The bishop's grant was enforced by a charter from King David, in which it was ordered that such of the Culdees as chose to live canonically and peacefully under the new canons should remain in the island. We hear no more of the Culdee hermits of Lochleven.

The Culdees of St Andrews were of more importance than those of Lochleven, and when the Canons Regular were established there, the members of the older body were treated much more considerably than their unfortunate brethren of St Serf's Inch, those who refused to become Canons Regular being allowed to retain a liferent of their revenues. Not only was this so, but they had sufficient influence to manage to remain a distinct community down to the early part of the 14th century, and were even able to assert their right to take part in the election of the bishop till 1273. In that year they were excluded under protest, and in 1332 they were excluded entirely, and thereafter the name seems to have disappeared.

The Culdees of the church of St Mary at Monymusk, in Aberdeenshire, appear to have been settled by the Bishop of St Andrews towards the end of the 11th century. In the beginning of the 13th century they are found making a claim to be regarded as Canons Regular, which was, after an appeal to Rome, settled by a compromise.

Culdees are found at Abernethy, in Strathearn, about 1120. In the end of that century part of their possessions passed to their hereditary lay-abbot (the founder of the noble family of Abernethy), and in 1273 they were transformed into Canons Regular. After a similar division at Brechin, the prior and his Culdees were absorbed into the chapter of the new bishopric, founded by King David I. about 1145, and in less than a hundred years the name of Culdee disappears. The same

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silent change of Culdees into secular canons took place during the 13th century at Dunblane, at Dunkeld, at Lismore, at Rosemarkie, and at Dornoch. At Dunkeld, as at Brechin and at Abernethy, great part of the Culdee revenues was held by a lay-abbot, whose office was of such mark as to be hereditary in the royal family. The father of 'the gracious Duncan,' and the son of St Margaret, were Culdee abbots. Culdees are found holding land at Monifieth, near Dundee, about 1200; at Muthil, in Strathearn, in the beginning of the 13th century; and at Iona in the middle of the 12th.

The Culdees of Armagh, dissolved at the Reformation in 1541, were resuscitated for a brief space in 1627. Their old possessions—among which were seven town-lands, containing 1423 acres, seven rectories and four vicarages, were in 1634 bestowed upon the vicars-choral of the cathedral. There were at least seven other houses of Culdees in Ireland—viz., at Clonmacnois, Clondalkin, Devenish, Clones, Popull, Monanincha, and Sligo.

Such is a concise recapitulation of all that is certainly known of the Culdees. Before their history was ascertained, opinions were held regarding them which now find few if any supporters among archæologists. It was believed that they were our first teachers of Christianity; that they came from the East before corruption had yet overspread the church; that they took the Scriptures for their sole rule of faith; that they lived under a form of church-government approaching to Presbyterian parity; that they rejected prelacy, transubstantiation, the invocation of saints, the veneration of relics, image-worship, and the celibacy of the clergy; and that they kept their simple worship and pure doctrines undefiled to the last, and were suppressed only by force and fraud, when the Roman Catholic Church triumphed over their older and better creed. For all this it is now clearly seen that there is no foundation.

See Reeves, in the *Proceedings of the Royal Irish Academy* for 1860, and his *Culdees of the British Islands* (1864); and Skene's *Celtic Scotland*, vol. ii., whose views have found acceptance both with Catholics and Presbyterians. The old views (controverted by Pinkerton and Chalmers) will be found in Selden's preface to the *Decem Historie Anglicanæ Scriptores*, and Jamieson's *Historical Account of the Ancient Culdees* (1811). Williams in his *History of Early Christianity in Britain* (1912) maintains that the Culdees were originally Celtic monastics who adhered to the early British polity, and refused to adopt the Roman system.

**Culenberg**, or **KULENBURG**, a town of Holland, 11 miles SSE. of Utrecht, on the left bank of the Lek, which is crossed here by a railway viaduct 1420 yards long; pop. 10,000.

**Culiacán**, an ancient city of Mexico, on the Río de Culiacán, 30 miles from the W. coast, and capital of the state of Sinaloa; pop. 14,000.

**Culilawan Bark**, also called **CLOVE BARK**, an aromatic bark, the product of the *Cinnamomum Culilawan*, a tree of the same genus with the Cinnamon (q.v.) tree, growing in the Molucca Islands. It has an odour resembling that of nutmeg and cloves, and was formerly employed to some extent for cases of indigestion, diarrhoea, &c.

**Cullen**, a fishing-town of Banffshire, on the Moray Firth, 67 miles NW. of Aberdeen by railway (1885). Backed by the conical Bin Hill (1050 feet), it has a harbour formed in 1817-34, and a cruciform parish church, which was founded by Robert Bruce, whose second queen died here, and which in 1543 was made collegiate. Cullen House, a seat of the Earl of Seafield, is a Scottish baronial pile, enlarged and remodelled in 1861. Cullen has been a royal burgh since about 1200, and till 1918 (when it was merged in the county)

united with Elgin and five other burghs to return one member to parliament. Pop. 2000.

**Cullen, PAUL**, a great Irish churchman, was born near Ballitore, in County Kildare, April 27, 1803. After a brilliant course in the Collegio Urbano of the Propaganda at Rome, he was ordained priest in 1829, and filled in succession the offices of vice-rector and rector of the Irish College in Rome, and rector of the Propaganda College. During the period of Mazzini's power in Rome in 1848, Cullen astutely saved the property of his college by placing it under American protection. At the close of 1849 the three names sent up to the pope having been passed over, Cullen unexpectedly found himself nominated to the archbishopric of Armagh and primacy of Ireland. He was consecrated early in the following year, and at once commenced a vigorous and uncompromisingly ultramontane reign of eight-and-twenty years, in which he established lasting memorials to his memory in new churches, schools, convents, and hospitals, such as the Mater Misericordiae. He denounced mixed education in every form, and from the outset opposed all revolutionary and anti-constitutional opposition to the crown. His vigorous denunciations of Fenianism made him many enemies among the more hot-headed Irishmen, but greatly increased the respect of English Protestants for a church that would make no terms with crime, even when committed by its own children. At the Synod of Thurles in 1851, principally by Cullen's persuasion, the establishment of a Catholic university in Ireland was recommended. Translated to Dublin in 1852, he was created a cardinal priest in 1866, the first Irishman who had reached that elevated rank. One of the majority at the Vatican Council, he long enjoyed the familiar friendship of Pope Pius IX. He died at Dublin soon after his return from a journey to Rome, October 24, 1878.

**Cullen, WILLIAM, M.D.**, physician, was born at Hamilton, Lanarkshire, on 15th April 1710, his father being factor to the Duke of Hamilton. After learning his profession, first as apprentice to a surgeon-apothecary in Glasgow, next as surgeon on board a West Indian trading ship, and then as assistant to an apothecary in London, he returned to Scotland in 1731, and commenced practice in his native county. Feeling the necessity of more systematic study, he spent two winters at Edinburgh University under Munro primus, and then removed to Hamilton, where he soon secured a good practice. One of his articulated pupils was William Hunter (q.v.), to whom he became extremely attached; and it was agreed that one of them should be alternately allowed to study during the winter, while the other carried on the practice. Cullen spent the first winter at Edinburgh, and it is at this time that he appears to have taken an important part in founding what is now known as the Royal Medical Society. It being Hunter's turn next year he went to London, and having attracted attention there, did not return, Cullen generously cancelling the articles. In 1740 Cullen graduated M.D. at Glasgow University, gave up surgical work, and soon after established himself in Glasgow as a physician. At that time there was not in Glasgow any regular course of medical study, and Cullen occupied himself much in the foundation of a medical school, himself lecturing on various subjects. One of his pupils was the famous Dr Joseph Black (q.v.). Cullen's labours resulted in his appointment to the chair of Medicine in the university, which he occupied four years. In 1755 he was persuaded to leave Glasgow for Edinburgh, and for the next thirty-five years was one of the mainstays of the Edinburgh medical

school. During this long period he occupied successively the chairs of Chemistry, Institutes of Medicine, and Medicine, besides teaching clinically in the Royal Infirmary all the time.

Living as he did in what might be termed the renaissance period of the history of medicine, Cullen was essentially a man of his time, and did much to advance the science. For many centuries all disease had been referred to disorders of the fluids of the body. Just before Cullen's time, Boerhaave had added to this a pathology of the 'fibres' still strongly tinged with the old fluid or humoral pathology. To Cullen is largely due the recognition of the important part played by the nervous system both in health and disease. He denied the theory supported even by Boerhaave, that the brain was an excretory organ and the nervous influence a fluid. Many of his speculations as to reflex nervous action, the possible presence in a single nerve of both sensory and motor fibres, and the connection of sensory and motor nerves with the anterior and posterior nerve roots, have now been proved to be facts. He had a singularly open and candid mind, and while himself introducing the use of several new drugs, as oxide of antimony and tartar emetic, was careful to distinguish between the action of drugs and the curative operations of nature. It may be said of him in his own words when speaking of Sydenham, 'that he rather sought for theory to connect his facts, than for facts to support his theory.'

In the later years of his life arose the controversy on the Brunonian system (see BROWN, JOHN, M.D.), which system Cullen bitterly opposed. Brown's specious division of diseases into sthenic and asthenic was obviously a deduction from Cullen's theories of nerve influence, and was only one instance out of many where a reputation was built on ideas borrowed from Cullen.

Cullen died on 5th February 1790 at his small estate of Ormiston Hill, having nearly completed his seventy-ninth year, and having been actively engaged in teaching and consulting practice till within a few months of his death. Cullen's most important works are *First Lines of the Practice of Physic* (Edin. 1777), *Synopsis Nosologiae Methodicae* (1785), *Institutions of Medicine* (1777), *A Treatise on the Materia Medica* (1789). See Biography, vol. i. by Dr John Thomson (1832), vol. ii. by Cullen's son and Dr David Craigie (1859), also an article by Sir W. Hamilton in the *Edinburgh Review* (1831).

**Cullera**, a town and port of Spain, near the mouth of the Jucar, 25 miles SSE. of Valencia. It exports rice, pistachio-nuts, oranges, wine, and oil. Pop. 13,000.

**Cullod'en**, or DRUMMOSSIE MUIR, a broad flat sandstone ridge, 300 to 500 feet high, 6 miles ENE. of Inverness. Planting and culture have changed its aspect much since 16th April 1746, when it was the scene of the total rout of 5000 Highlanders under Prince Charles Edward by 12,000 regulars under the Duke of Cumberland. Since 1881, a cairn, 20 feet in height, with an inscription, marks the spot where the battle was fiercest, and where many of the slain lie buried. Within 2 miles stands Culloden House, the seat of Duncan Forbes and his descendants.

**Culm**, a kind of impure Anthracite (q.v.). In some districts the culm obtained from the pits in a broken and crumbling condition is used as fuel, being made up into balls, with one-third of its bulk of wet viscid clay. It burns without flame, producing a strong and steady heat, well adapted for cooking (see BRIQUETTES). The term *Culm-measures* is applied to the carboniferous strata of Devonshire, on account of the workings for culm near Bideford, and other places.

**Culm**, the peculiar cylindrical hollow and jointed stem of Grasses (q.v.).

**Culmination**, an astronomical term, signifying the passage of a star across the meridian. The star is then at the highest point (*culmen*) of its course; hence the name. The sun culminates at mid-day, or twelve o'clock, apparent solar time—which seldom agrees exactly with mean time, as shown by a watch or clock. The full moon culminates at midnight.

**Culna**. See KALNA.

**Culpa** simply means fault (generally the omission of some act) which leads to legal liability for the immediate consequences. It may arise under a contract, especially where many of the obligations of the parties are left to implication—e.g. in the contract of carriage of passengers; or from the mere relative position of parties, as where a member of the public, or a neighbour, is injured by the negligent use of property. The distinction between culpa and breach of contract, while theoretically clear, is practically difficult; and accordingly the opinion of a jury is constantly required to ascertain whether fault has been committed in the execution of a contract.

**Culpable Homicide**. See MANSLAUGHTER, and MURDER.

**Culpeper, JOHN**. See COLEPEPER.

**Culpeper, NICHOLAS**, was born in London in 1616, and after studies at Cambridge and elsewhere, started in 1640 to practise astrology and physic in Spitalfields. In 1649 he published an English translation of the College of Physicians' Pharmacopœia under the title *A Physical Directory, or a Translation of the London Dispensatory*, renamed in 1654 as *Pharmacopœia Londinensis, or the London Dispensatory*. This infringement upon a close monopoly, together with his sturdy and uncompromising support of Puritanism and the parliament, brought Culpeper many enemies and much obloquy. In 1653 he published *The English Physician Enlarged*. Both books had an enormous sale, and both are included in Dr Gordon's collective edition of his Works (4 vols. 1802). Culpeper wrote numerous other books, many of which were left unprinted, and died worn out before his time, 10th January 1654.

**Culpeper, SIR THOMAS**, was born of good Kentish family in 1578. He studied at Hart Hall, Oxford, and at one of the Inns of Court, next bought Leeds Castle in Kent, where, or at Greenway Court, near Hollingbourn, he mostly lived till his death, which took place in 1662. He was knighted by James I. in 1619. His *Tract against the high rate of Usury*, published in 1621, contended for the reduction of interest to six per cent.—His third son, SIR THOMAS CULPEPER, born in 1626, made his studies at University College, Oxford, and after making the grand tour, and being knighted soon after the Restoration, retired to his estate of Greenway Court, where he died in 1697. Besides editing and prefacing his father's treatise on exorbitant usury in 1668, he himself published many pamphlets on the same subject, repeating his father's arguments. He wrote also *Essays or Moral Discourses on several Subjects* (1655 and 1671).

**Culross**, an old-world village of Fife (till 1890 in a detached portion of Perthshire), on the north shore of the Firth of Forth, 7 miles W. by S. of Dunfermline. With memories of St Serf and St Kentigern, James VI., and the Elgin and Dundonald families, it has a Cistercian abbey (1217, restored 1906), but has lost its manufacture of girdles, its salt-works, shipping, and submarine coal-mines. A royal burgh since 1588, it united till 1918 with Stirling and

three other towns to return one member to parliament. Pop. 500. See Beveridge's *Culross and Tulliallan* (1885).

**Cultivated Plants**. That the history of material progress is directly connected with and measured by man's increasing utilisation of the vegetable and animal, no less than of the mineral world, is an idea of common experience, which the researches of archaeologists in all parts of the world have amply confirmed. The whole subject forms, indeed, one of the most fascinating aspects of the history of civilisation. Primitive man, acquiring his acquaintance with useful plants by slow and often bitter individual experience at the very margin of subsistence, offers a striking contrast with the experimental organiser of new and in every sense remotely productive cultures like that of the cinchona-tree in the Himalayas,—a contrast which spans the whole range alike of the practical resources and the scientific culture of the human race.

Without speculation as to the precise steps by which man passed from the hunting or merely pastoral to the agricultural state, we find positive evidence of the existence of agriculture long before written records. Thus, though the 'kitchen-middens' of northern countries contain no trace of cultivated plants, the deposits of Swiss lake-dwellings have yielded remains of fruits, of cereal and other seeds, and of linen fabrics, showing the existence of a considerable agriculture before the use of metals. Ancient traditions and ceremonials of China also bear witness to the remoteness of cultivation there. The earliest Egyptian picture-writings and the greater number of cultivated species have arisen in that central cradle of civilisation which may be broadly marked off by drawing lines from the delta of the Nile to the head of the Persian Gulf, and from the Dardanelles to the Caspian—i.e. between 30° and 40° lat. From this region the majority of European plants are derived. Another great centre of ancient agriculture, however, is China; while the third is intertropical America, where the ancient Mexicans and Peruvians practised the culture of not a few plants, of which some have become almost cosmopolitan since the epoch-making voyage of Columbus.

Since the rise of modern botany (see BOTANY), our knowledge of species at least possibly useful has been greatly extended, yet there seems little risk of displacement of the established cereals, fruit-trees, &c., since these have the advantage of an enormous past of artificial selection, which has in many cases practically transformed them into new species, apparently distinct from their wild congeners, and incapable of continued existence in the uncultivated state—e.g. wheat, barley, maize, pea, sugar-cane, yam, &c., and probably also bean, tobacco, manioc, &c. Moreover, such long cultivated plants usually exhibit greater variability than naturally wild species, and thus in every way new cultures tend to be unremunerative. Hence the majority of species of primary nutritive importance to man at present are among those which have been in cultivation for the past 2000 years; and the progress which is now being made is essentially on lines which merely supplement these; the newer plants, cultivated for less than 2000 years, being, according to De Candolle, chiefly artificial fodders, which the ancients scarcely knew; then bulbs, vegetables, medicinal plants (cinchona); plants with edible fruits or nutritious seeds (buckwheat), or aromatic seeds (coffee). Here, of course, the demand for variations in food and drink, for narcotics and medicines, for textiles and timber, all combine towards progress; in most of these the demand is at bottom more largely æsthetic than utilitarian,

while this becomes exclusive in the newest but extending department of flower gardening.

See the articles AGRICULTURE, GARDENING, FRUIT, PASTURE, PLANTS (MEDICINAL), &c.; those on special plants—e.g. BARLEY, COCA, DATE, MAIZE, &c.; also De Candolle, *Origin of Cultivated Plants* (Inter. Sc Series, 1884); and Hehn's *Wanderings of Plants and Animals* (1886).

**Cultivator**, a farm implement. See GRUBBER.

**Culverin**, one of the earlier forms of Cannon (q.v.), of great length, generally an 18-pounder, weighing 50 cwt.; the *semi-culverin* being a 9-pounder, weighing 30 cwt.

**Culver's Root**, the rhizome of *Veronica virginica*, used medicinally as *radix leptandree* of U.S. Pharmacopoeia.

**Culvert** is the name given to an arched channel of masonry for the conveyance of water underground or beneath an embankment.

**Culverwel**, NATHANAEL, one of the Cambridge Platonists, was born in Middlesex, and entered Emmanuel College in 1633. He graduated B.A. in 1636, M.A. in 1640, was elected fellow in 1642, and died not later than 1651. In 1652 was published *An Elegant and Learned Discourse of the Light of Nature*, with several other treatises—viz. the Schism, the Act of Oblivion, the Child's Return, the Panting Soul, Mount Ebal, the White Stone; *Spiritual Optics*; and the *Worth of Souls*. An edition of the *Light of Nature* was issued in 1857, edited by Dr John Brown of Edinburgh, with a critical essay by Principal Cairns. It is a treatise of great power and learning, written in a vivid and vigorous style, and is a work not unworthy of the college of Cudworth, Whichcote, and John Smith. See Tulloch's *Rational Theology*, vol. ii. (1874), and Campagnac's *Cambridge Platonists* (1902).

**Cumæ**, an ancient city on the coast of Campania, probably founded conjointly on an ancient site by Chalcians from Euboea, and Æolians from Cyme in Asia Minor. The date of its foundation is uncertain, but according to Strabo it was the earliest of all the Greek settlements either in Italy or Sicily. It soon attained to wealth and power, built several harbours or port-towns of its own, kept a tolerably large fleet, extended its influence over the native tribes of the neighbouring territories, planted colonies in Italy and Sicily, at Puteoli, Neapolis, and Zancle (Messina). Spite of attacks from the Etruscans and Umbrians without, and dissensions within, for the two hundred years before 500 B.C. it was the most important and civilised city in Southern Italy. In 474 its ally, Hieron, king of Syracuse, defeated the combined fleets of the Etruscans and Carthaginians, who had attacked it by sea. Cumæ at length lost its independence (417 B.C.) when it was conquered by the Samnites, who killed or enslaved most of the citizens. It ultimately became a Roman municipium and colony, but continued to decline. It re-assumed a momentary importance during the wars of Belisarius and Narses. Its strong fortress, garrisoned by the Goths, was the last place in Italy that held out against the Byzantine army. Cumæ is famous as the residence of the Sibyl (q.v.), whose cave was identified with one of the many subterranean passages in the rock on which the citadel stood. Most of these are now choked up. See for excavations E. Gabrici, *Cuma* (Acc. dei Lincei, 1913, &c.).

**Cumaná**, a town in the north of Venezuela, on the Manzanares, a mile above its mouth, where the port of Puerto Sucre lies on the Gulf of Cariaco. It has a national college, and some export trade, but is chiefly of interest as the oldest European town on the South American mainland, having been founded by Christopher Columbus's son Diego

as New Toledo c. 1521. It has suffered much from earthquakes, and was almost entirely destroyed in 1853. Population, 16,000.

**Cumania**, a region in eastern and central Hungary divided into *Great Cumania*, east of the Theiss, and *Little Cumania*, between the Danube and the Theiss, now incorporated in the adjoining Hungarian provinces. The inhabitants, the Cumans, are the descendants of a race of nomad invaders of the Turkish stock, who forced their way into Hungary from beyond the Volga in the 11th century. They long held their own in alternate alliance and war with the surrounding states. They maintained their heathenism and their barbarous customs, till in 1278 a crusade was proclaimed against them by Pope Nicholas IV., and they were compelled to accept Christianity and adopt the ways of their Magyar neighbours. They are now wholly Magyarised.

**Cumberland**, a Border county of England, washed on the W. by the Irish Sea and the Solway Firth, and elsewhere bounded by Dumfries and Roxburgh shires, Northumberland, Durham, Westmoreland, and Lancashire. Eleventh in size of the English counties, it has a maximum length of 75 miles, a maximum breadth of 45, a coast-line of 75, and an area of 1520 sq. m. The surface is mountainous in the south-west and east; the middle consists of hills, valleys, and elevated ridges; and the north and north-west districts, including the vale of Carlisle, are low, flat, or gently undulated. The mountains in the south-west are high, rugged, and sterile, with deep and narrow valleys, lakes, rivers, waterfalls, and woodlands. The chief mountains are Scaw Fell Pike (3210 feet), Scaw Fell (3162), Helvellyn (3118), Skiddaw (3058), Bow Fell (2960), and Cross Fell (2892). The largest lakes are Ullswater, Derwentwater, Bassenthwaite, Crummock Water, Thirlmere, Buttermere, Wastwater, and Ennerdale. Six of the chief waterfalls are 60 to 156 feet high. The chief rivers are the Eden, the Esk, and the Derwent. The Lancaster and Carlisle railway route from London to Edinburgh crosses the north-east part of Cumberland.

The Lake district, or nearly the south-west half of Cumberland, consists of Silurian slates, with protrusions of granite and trap rocks, and with New Red sandstone along the coast south of St Bees Head. In the north is a semicircular strip of carboniferous limestone; then follow strips of coal strata and Permian rocks; then the new red sandstone plain of Carlisle, with carboniferous limestone on the north-east, including a trap-dike 30 miles long. Cumberland abounds in mineral wealth—silver, copper, lead, iron, zinc, plumbago, gypsum, limestone, coal, slates, marbles, marl, and several of the rarer minerals are or have been worked.

In the mountainous parts the climate is wet and variable, especially from July to October; on the coast it is mild. There is an annual rainfall of 50 inches at Whitehaven, and of 59 at Keswick; while at Styhead Pass, at an altitude of 1077 feet, the rainfall has been as much as 243·98 inches. Half of the cultivated soil consists of dry loam. Much of the subsoil is wet clay. The chief crops are wheat, barley, oats, turnips, and potatoes. There are many small dairies. Sheep and cattle are reared in the mountains. The estates are generally small, and farmed by the owners, or held under the lords of the manors by customary tenure. Many of the small proprietors, or 'statesmen,' have had their lands in their families for centuries, and have a high spirit of independence. There are manufactures of woollens—much being domestic—cottons, linens, earthenware, and glass. The chief towns are Carlisle, Cockermouth, Whitehaven, Workington, Maryport, Wigton, Penrith, Keswick,

Egremont. Since 1918 Cumberland has returned one member for each of the four divisions—Northern, Penrith and Cockermouth, Whitehaven, and Workington. Pop. (1801) 117,230; (1841) 178,038; (1871) 220,253; (1901) 266,921; (1921) 273,037. Near Keswick and Kirkoswald are two fine stone circles; and many Roman relics have been found, such as altars, coins, and inscriptions. For centuries part of Cumbria or Strathclyde, the present county was finally annexed to England in 1157. For three hundred years prior to the union of the crowns it was the constant scene of war and devastation, from incursions of the English and Scots; and it suffered again in both the '15 and the '45. Cumberland has many old crosses, and remains of some monasteries and hospitals; and on the Border, many towers or peel-houses. See **BORDERS, LAKE DISTRICT**; R. S. Ferguson's *History of Cumberland* (1890); and the 'Victoria History' (1901, *et seq.*).

**Cumberland**, a river, rises in Kentucky, flows into Tennessee, and returning to Kentucky, enters the Ohio at Smithland, after a course of about 650 miles, of which nearly 200 are navigable for steamboats.—For Cumberland Mountain, see **APPALACHIANS**.

**Cumberland**, capital of Allegany county, Maryland, on the Potomac River, 120 miles W. by N. of Baltimore. It is a canal terminus and an important railway centre; manufactures iron and steel, brick, cement, flour, and leather; and trades extensively in coal. Pop. 30,000.

**Cumberland**, DR RICHARD, was born in London, 15th July 1631. Educated at St Paul's School and Magdalene College, Cambridge, he was preferred to the rectory of Brampton, Northamptonshire, in 1658; in 1667 to the living of All Saints, Stamford; and in 1691 to the bishopric of Peterborough. Cumberland was a man of great acquirements, and of sincere and simple piety; his frequent saying, 'A man had better wear out than rust out,' explains his unusually high idea of episcopal duty. He wrote several works, of which one, perhaps, is still read, his *De Legibus Naturæ* (1672), written in reply to Hobbes, and remarkable as placing the foundation of morality on a utilitarian basis. His *Essay on Jewish Weights and Measures* was dedicated to his old college friend Pepys, as president of the Royal Society. As an instance of Cumberland's insatiable thirst for knowledge, it is mentioned that he learned Coptic after the age of eighty-three. He died 9th October 1718.

**Cumberland**, RICHARD (1732–1811), dramatic writer, novelist, and essayist, was born in the lodge of Trinity College, Cambridge. He was the great-grandson of Dr Richard Cumberland (q.v.), and grandson, by the mother's side, of Dr Richard Bentley. From Bury St Edmunds and Westminster, where he was contemporary with Cowper, Churchill, and Warren Hastings, he passed to Trinity College, Cambridge, and here was elected to a fellowship at twenty. Becoming private secretary to Lord Halifax, he gave up his intention of entering the church, and, after passing through several subordinate offices, was appointed secretary to the Board of Trade. He held that office after his return from an unfortunate secret mission to Spain (1780), which cost him as much as £5000, a sum that ministers refused to reimburse, when the Board was suppressed. Having obtained a compensation allowance of about half his salary, Cumberland retired to Tunbridge Wells, where he devoted himself to literature, and wrote incessantly farces, tragedies, comedies, pamphlets, essays, and two novels of some merit, *Arundel* and *Henry*. Many of his comedies were successful at the time of their appearance, although they have

not kept possession of the stage. Among them may here be named *The West Indian*, *The Brothers*, *The Fashionable Lover*, *The Jew*, and *The Wheel of Fortune*. Cumberland is alluded to in Goldsmith's *Retaliation* with not unkindly satire as 'the Terence of England, the mender of hearts;' in Sheridan's *Critic* he is gibbeted as 'Sir Fretful Plagiary.' His essays and translations from the Greek poets are long forgotten. His inaccurate Memoirs of himself were published in 1807. See his *Life and Dramatic Works*, by S. T. Williams (1918).

**Cumberland**, WILLIAM AUGUSTUS, DUKE OF, second son of George II., was born in 1721. He adopted a military career, was wounded at Dettingen in 1743, and defeated, not ingloriously, at Fontenoy, by Marshal Saxe, in 1745. He was next sent to crush the Young Pretender's rebellion, which he did effectually at Culloden (1746); and by a series of severe measures against the broken and dispirited Highlanders he earned for himself the lasting title of 'the Butcher,' to set off against his reward of £25,000 a year and the thanks of parliament. In 1747 he was defeated by Saxe at Lawfeldt, and in 1757 had to surrender and disarm his army at Kloster-Seven; after which he retired into private life, and died 31st Oct. 1765. See *Lives* by Rev. A. N. Campbell-Maclachlan (1876) and Hon. Evan Charteris (1913), and the latter's *Duke of Cumberland and the Seven Years' War* (1925).—For other dukes and earls of Cumberland, see **HANOVER** and **CLIFFORD**.

**Cumberland Island** (so called) is a peninsula of Baffin Land, extending into Davis Strait.

**Cumberland Presbyterians**, a religious denomination which sprang up in 1810 in the state of Kentucky, in consequence of a dispute between the presbytery of Cumberland in that state, and the Kentucky Synod of the Presbyterian Church in America, concerning the ordination of persons who had not passed through the usual educational curriculum, but whose services the presbytery regarded as demanded for the ministry by the exigencies of the times. Their form of government is presbyterian, though they have added a system of itinerating like the Methodists. Arminian in doctrine, they deny unconditional election and predestination, and believe in the universality of the atonement. A university in connection with the church was set up at Lebanon, Tennessee, in 1844.

**Cumberland Valley**. See **PENNSYLVANIA**.

**Cumbræ**, BIG or GREAT, an island of Bute-shire, in the Firth of Clyde, 2½ miles E. of Bute at the narrowest, and 1½ mile WSW. of Largs. With the shape of a shark's tooth, it is 3½ miles long, 2 broad, 10½ in circumference, and 5 sq. m. in area. It rises to a height of 417 feet, and consists of Old Red Sandstone, with wall-like dykes intersecting it. There is some fishing and a little farming. Millport, on the south shore, 19 miles SSW. of Greenock (*via* Wemyss Bay), is a crowded resort in summer, with a biological station.—**LITTLE CUMBRAE**, 1½ mile SSW. of Millport, is barely 1 sq. m. in area. It rises 409 feet, and has a lighthouse (1826).

**Cumbria**. See **CAMBRIA** and **STRATHCLYDE**; also **BRETTS**.

**Cummin**, or **CUMIN** (*Cuminum*), a genus of Umbelliferae, containing only one known species (*C. cyminum*), common in Egypt and the neighbouring countries, sometimes as an annual weed, but more frequently in cultivation, as also in southern Europe and India. It is referred to in Scripture (as in Matt. xxiii. 23). The fruit-lobes separate in the way characteristic of the order, and are thus popularly called seeds; their odour and properties resemble those of Caraway (q.v.),

but are stronger, and therefore to some palates more pleasant. It is employed as a carminative flavouring in many parts of the world; but its strictly medicinal use (as in plasters) is now chiefly confined to veterinary practice. In Germany, it is often put into bread; in Holland, sometimes into cheese. It contains a peculiar volatile oil (*Oil of Cummin*). Cummin-seed is brought to Britain mostly from Sicily and Malta.—The fruit of *Lagoeia cuminoides*, another umbelliferous plant, a native of the Levant, is similar in its qualities and uses to that of cummin. For the Black Cummin of the ancients, see NIGELLA.

**Cumming**, CONSTANCE FREDERIKA GORDON (1837–1924), was born at Altyre, a sister of the lion-hunter (see below). Her sprightly and entertaining volumes include *From the Hebrides to the Himalayas* (1876); *At Home in Fiji* (1881); *A Lady's Cruise in a French Man-of-war* (1882); *Fire Fountains—Hawaii* (1883), books on China (1885), and Ceylon (1891), an account of W. H. Murray, inventor of numeral type for the use of blind and illiterate Chinese (1898), and *Memories* (1904).

**Cumming**, JOHN (1807–81), divine and author, was born in Fintray parish, Aberdeenshire. He took his M.A. at King's College, Aberdeen, in 1827, and in 1832 was ordained to the Scotch Church, Crown Court, Covent Garden, London, where he preached with great popularity and success till 1879. Edinburgh University gave him the degree of D.D. in 1844. He was active in philanthropic projects, and as a controversialist and lecturer both against the party that formed the Scottish Free Church and in the 'anti-Popery' cause; but his celebrity was chiefly due to his writings on the interpretation of prophecy. His audacity in this perilous enterprise drew upon him much ridicule. In 1868 he asked the pope if he might attend the Oecumenical Council, but his application was declined through Archbishop Manning. His works number over a hundred. Among them are *Apocalyptic Sketches* (three series, 1848–50), *Prophetic Studies* (1850), *Signs of the Times* (1854), *The Millennium Rest* (1862), *Ritualism the Highway to Rome* (1867), *The Sounding of the Last Trumpet* (1867), and *The Seventh Vial* (1870).

**Cumming**, ROUALEYN-GEORGE GORDON, the African lion-hunter, was born 15th March 1820, and educated at Eton. He became a cornet in the Madras Cavalry in 1838, served for a time in Canada, and joined the Cape Mounted Rifles in 1843; but he soon resigned his commission, and, till his return to England in 1848, engaged in those famous exploits narrated in his *Five Years of a Hunter's Life* (1850); abridged as *The Lion-hunter of South Africa*, (1858). He died 24th March 1866.

**Cummings**, BRUCE FREDERICK ('W. N. P. Barbellion,' 1889–1919), English naturalist and author, was a native of Devonshire, and became assistant, first at the laboratory of the British Marine Biological Association at Plymouth, and later at the British Museum of Natural History, South Kensington. In 1914 illness, necessarily fatal, ended his promising career as a zoologist, but afforded leisure for literature, and in 1919 appeared his *Journal of a Disappointed Man*, a realistic account of his life, distinguished in style, and a mingling of bitterness and humour. *Enjoying Life* (1919) and *A Last Diary* (1920) were published posthumously.

**Cummins**, MARIA SUSANNA (1827–66), American novelist, born at Salem, Massachusetts, wrote for the *Atlantic Monthly* and other magazines. Her first novel, *The Lamplighter* (1854), had a prodigious sale. Her other books include *Mabel Vaughan* (1857), *El Fureidis* (1860), and *Haunted Hearts* (1864).

**Cumnock**, OLD, a town of Ayrshire, on Lugar Water, 18 miles by rail E. of Ayr, and 43 NW. of Dumfries. The manufacture of wooden snuff-boxes was many years since transferred to Mauchline, and mining is now the chief industry. The Covenanting 'prophet,' Peden (1626–86), lies in the churchyard. Dumfries House, a seat of the Marquis of Bute, is 2 miles W. Pop. (Cumnock and Holmhead police burgh), 3500.—NEW CUMNOCK, on the Nith, is 5½ miles SE. of Old Cumnock.

**Cumulative Voting**. See REPRESENTATION.

**Cunard**, SIR SAMUEL, was born 21st November 1787 at Halifax, Nova Scotia, where his father, a Philadelphia merchant, had settled. Becoming early a successful merchant and shipowner, Cunard came to England in 1838, joined with George Burns, Glasgow, and David M'iver, Liverpool, in founding (1839) the British and North American Royal Mail Steam Packet Company, and obtained a contract from the British government for the mail service between Liverpool and Halifax, Boston, and Quebec. The first passage was that of the *Britannia* in 1840, the time occupied being fourteen days eight hours. Iron steamers were first used in 1855, and paddle-wheels gave way entirely to the screw after 1862. From its small but successful beginning, Cunard's undertaking soon developed into one of the vastest of private commercial concerns. In 1878 it was made into a joint-stock company. Created a baronet in 1859, Cunard died at London, 28th April 1865.

**Cunaxa**, in Babylonia, east of the Euphrates, about 60 miles N. of Babylon, noted for the battle (401 B.C.) between Cyrus the younger and his brother Artaxerxes Mnemon, in which the former was killed.

**Cundinamarca**, a department of Colombia, extending east to Venezuela. It was the second largest department of the republic, but was reduced in 1905 from 80,000 to 5000 sq. miles, and disappeared in the new territorial division of 1908. In 1909 it was restored with about 8000 sq. miles. The western part is mountainous, with fertile valleys and plateaus; in the east are vast plains. It is well wooded, rich in minerals, and famous for its Bogotá coffee. Pop. 812,000. The capital is Bogotá (q.v.), also capital of the republic.

**Cuneiform**, Cuneatic, Wedge-shaped, Arrow-headed (Fr. *tête-à-clou*, Arab. *mismari*), are terms for a certain form of writing, of which the component parts are wedges. It was used by the ancient peoples of Sumer, Akkad, Babylonia, Assyria, Elam, and Persia; and was inscribed upon stone, bronze, iron, glass, and clay. Cuneiform inscriptions were chiselled upon stone and iron, but they were impressed upon soft clay with a pointed stylus having three unequal facets, the smallest to make the fine wedge of the cuneiform signs, the middle-sized to make the thicker wedges, and the largest to make the outer and thick wedges of the characters. The first date that can be assigned to the use of cuneiform writing is about 4000 B.C., and its use was continued until after the birth of Christ. One of the earliest inscriptions at present known is that inscribed upon the porphyry mace-head of Shar-gali-Sharri I. of Agade; the latest is a tablet preserved at Munich, which may have been written about 83 A.D. Cuneiform writing was widely used in Elam, Babylonia, and Assyria, whence it spread to the districts north of Nineveh. For nearly 1600 years after its extinction its very existence was forgotten. The immense ruins found all over Persia, and especially those of ancient Persepolis, had at all times attracted the attention of eastern travellers; still no one seems to have dreamed that those strange wedges which com-

pletely covered some of them could have any meaning. It was Garcia de Sylva Figueroa, ambassador of Philip III. of Spain, who, on a visit to Persepolis in 1618, first became possessed with the firm conviction that these signs must be inscriptions in some lost writing and, perhaps, language, and had a line of them copied. Amongst subsequent travellers whose attention was attracted to the subject, Chardin, after his return to Europe in 1674, published three complete groups of cuneiforms, copied by himself at Persepolis, together with a comparatively long and minute account of the mysterious character. He likewise declared it to be 'writing and no hieroglyphs: the rest, however, will always be unknown.' Michaux, a French botanist, in 1782 sent from Bagdad to Paris a boundary stone covered with Babylonian cuneiforms. Ever since, the materials for the investigation of a subject the high importance of which by that time was fully recognised have been rapidly accumulating. Sir H. Jones, Ker Porter, Robert Stewart, Sir W. Ouseley, Bellino, Di Schultze—up to Rich and Botta, Flandin, Rouet, Rawlinson, Layard, Oppert, Smith, Rassam, Budge, King, Hall, Woolley, and Sydney Smith, each in his turn brought back more or less valuable materials from his eastern travels; and, naturally enough, those explorers were among the foremost to engage in the study of the records they had brought to light.

Now that we are able to explain so much of these inscriptions, it is highly interesting and instructive to notice the opinions first entertained of them by the wise and learned in Europe. In the *Transactions of the Royal Society of June 1693*, they first appeared from a copy made by Flowers, and they are held to be 'the ancient writing of the Gaures or Gebres.' Thomas Hyde, the eminent Orientalist, declared them, in his learned work on the religion of the ancient Persians (1700), to be nothing more or less than idle fancies of the architect, who endeavoured to show how many different characters a certain peculiar stroke in different combinations could furnish. Witte, in Rostock, saw in them the destructive work of generations upon generations of worms. Generally, they were pronounced to be talismanic signs, mysterious formulæ of priests, astrological symbols, charms which, if properly read and used, would open immense vaults full of gold and pearls—an opinion widely diffused among the native savants. The next step was to see in them a species of revealed digital language, such as the Almighty had first used to Adam. Lichtenstein read in some of them certain passages from the Koran, written in Kufic, the ancient Arabic character; in others, a record of Tamerlane; and was only surprised that others should not have found this, the easiest and clearest reading, long before him. Kämpfer was not quite sure whether they were Chinese or Hebrew characters. That they were Runes, Oghams, Samaritan, or Greek characters, were some of the soberest explanations.

It was Karsten Niebuhr who first showed the way, to the more sensible portion of the learned, out of this labyrinth of absurdities. Without attempting to read the character itself, he first of all established three distinct cuneiform alphabets instead of one, the letters of which seemed to outnumber those of all other languages together. The threefold inscriptions found at Persepolis he rightly took to be transcripts of the same text in three alphabets, in a hitherto unknown language. Tychsen of Rostock (1798), and Münter of Copenhagen (1800), affirmed and further developed this conjecture. The latter went so far as to divide the characters and inscriptions into alphabetical, syllabic, and monogrammatical, and to assume two different languages—Zend for inscriptions of a religious, Pehlevi for those of a political character.

The real and final discovery, however, is due to Grotefend of Hanover, and dates from 1802. On the 7th of September of that year he laid the first cuneiform alphabet, with its equivalents, before the Academy of Gottingen—strangely enough, in the very same sitting in which Heyne gave an account of the first reading of hieroglyphs. The process by which Grotefend arrived at that wonderful result is so supremely interesting, that we cannot omit to sketch it briefly. He fixed upon a Persepolitan inscription of what was called the first class, and counted in it thirty promiscuously recurring groups or combinations of cuneiforms. These groups he concluded to be letters, and not words, as a syllabary of thirty words could not be thought of in any language. Then, again, a certain oblique wedge, evidently a sign of division, which stood after three, four, five, up to eight or nine such groups or letters, must show the beginning or end, not of a phrase, but of a word. Tychsen and Münter had already pointed out a certain combination of seven characters as signifying the royal title. Grotefend adopted this opinion. The word occurred here and there in the text, and after the first words of most of the inscriptions, twice; the second time with an appendage, which he concluded to be the termination of the genitive plural, and he translated these two words, without regard to their phonetic value, 'King of Kings.' He then, in comparing the words preceding the royal titles in two tablets, found them repeated in what he assumed to be a filial relation; thus: There were three distinct groups, words, or names, which we will call X, D, and H, and this is how they occurred: (1) X, King of Kings, son of D, King of Kings; (2) D, King of Kings, son of H; but the (3) H was *not* followed by the word King. H, therefore, must have been the founder of the dynasty. Now the names themselves had to be found. Grotefend, unlike his predecessors, had recourse not to philology, but to archaeology and history. The inscriptions in question were by that time proved to belong to the Achaemenian dynasty, founded by Hystaspes = group H. He was followed by Darius, 'King of Kings, son of Hystaspes,' or Darius Hystaspes = group D; he, again, by Xerxes, King of Kings, son of Darius, King of Kings = group X—and the problem was solved. It could not have been Cyrus and Cambyses, as the groups did not begin with the same signs (C); nor Cyrus and Artaxerxes, the first being too short for the group, the second too long—it could only be Darius, Xerxes, Hystaspes—of course in the orthography of their, not of our time; and wherever in these names the same letters recurred, they were expressed by the same combinations of signs. A further proof of the correctness of the reading was furnished by a vase in Venice, bearing a cuneiform and a hieroglyphical inscription, which were both read at the same time independently: 'Xerxes.' Innumerable difficulties, however, remained, and remain up to this moment. Grotefend had, after all, only read—and not altogether correctly—three names, which did not contain more than twelve letters—the rest being mere conjecture—and there were many more in this alphabet. The other two alphabets, with an infinite variety of letters, had hardly been properly approached yet. Moreover, the discovery of Grotefend was in itself so startling, so extraordinary and bold, that no one ventured to follow it up for the next twenty years, when H. Martin found the grammatical flexions of the plural and genitive case. We cannot now specify his further discoveries, or those of Rask, Burnouf, Lassen, Westergaard, Beer, Jacquet, and others who followed; we will only say that they mostly secured for themselves fame and name by rectifying or fixing one or two letters. The last and greatest of investigators of this first alphabet

is Rawlinson, who not only first copied, but also read, the gigantic Behistun inscription—containing more than 1000 lines—of which more anon.

Inscriptions in the Persian cuneiform character are mostly found in three parallel columns, and are then translations of each other in different alphabets and languages, called respectively Persian, Median, and Babylonian; the Achæmenian kings being obliged to make their decrees intelligible to the three principal nations under their sway, as in more recent days the Shah of Persia might have used the Persian, Turkish, and Arabic languages, to make himself understood in Bagdad and Tehran.

The first of the three, the Persian, consists of thirty-nine to forty-four letters, and is the most recent, the most ancient being the Babylonian. It is distinguished by the oblique stroke which divides its words. Its letters are composed of not more than five strokes or wedges placed side by side horizontally or perpendicularly, or both, but never—with one exception—crossing each other. The language is pronounced by all investigators to be as near Zend (q.v.) as possible, and to be the mother-language of modern Persian. It is only twice found by itself; all the other inscriptions are trilingual. The time of its use is confined to the years 570-370 B.C. The oldest instance of its employment is an inscription of Cyrus the Great at Pasargadæ; the most recent, that of Artaxerxes Ochus at Persepolis. The most important is that of Darius Hystaspes, in the great inscription of Behistun (q.v.), which contains, besides genealogical records, a description of the extent of his power, the leading incidents of his reign, prayers to Ormuzd and the angels, and reference to the building of the palaces. Most of these inscriptions occur at Persepolis, Behistun, Naksh-i-Rustam, and Hamadan.

The second kind is called the Median, because it takes the second place in the trilingual inscriptions, under the conquering Persians, but over the conquered Assyrians, and as the Medes stood somewhat in that relation to these two nations, that name was selected. Another name, 'Scythic,' has been proposed, or, by way of compromise, 'Medo-Scythic,' and the language—supposed to have been spoken by those innumerable Tataro-Finnic tribes which occupied the centre of Asia—has been pronounced to be a Turanian dialect. But the process of constructing out of such slender elements as Samojed and Ostiak words, a so-called 'Scythic,' is somewhat similar to the attempt of reconstructing Sanskrit from some detached and very doubtful French and English words. These inscriptions never occur by themselves (one instance again excepted), and being translations of the Persian records, about ninety names have been ascertained, and an alphabet of about one hundred characters—combinations of a syllabic nature—has been established. The principal investigators of this character are Westergaard, De Sauley, Hincks, Norris, and Oppert. Gobineau holds the language to be Huzavaresh, a mixture of Iranian and Semitic.

The third and most important is the Babylonian portion of the cuneiforms. The trilingual records gave the first clue to the deciphering of this character; but many original documents, more than three thousand years older, have since been found in Babylon, Nineveh, and other places near the Euphrates and Tigris, and even in Egypt. On one occasion, the Asiatic Society submitted a cylinder of Tiglath-pileser to four prominent investigators of the subject, and they independently read it nearly alike, with the exception of the proper names, where they widely differed. As a proof of the enormous importance of this character for history, grammar, law, mythology, archæology, and antiquities generally, we name some of the

records which Rawlinson began to publish (now in progress): Babylonian Legends, such as the Fight between Marduk and Tiamat, the Descent of Ishtar into Hades (2000-1500 B.C.); Bricks from Kal'at Sherkât of the early Kings of Assyria (1350-1100 B.C.), in a character much complicated; Annals of Tiglath-pileser I. (1120 B.C.); Annals of Assur-nasir-pal, of Shalmaneser I. and II., Sargon, Sennacherib, Assur-bani-pal, son of Esarhaddon; Inscriptions of Nebuchadnezzar I. and II.; Cylinders containing the name of Belshazzar, &c.; besides syllabaries, vocabularies, mathematical and astronomical tablets, calendars, and a selection from the mythological tablets.

In order to give the reader some idea of the appearance of the cuneiform character, we subjoin the name of Darius, written in the Persian, Scythic, and Babylonian characters.

𐎠 𐎡 𐎢 𐎣 𐎤 𐎥 𐎦 𐎧 𐎨 𐎩 𐎪 𐎫 𐎬 𐎭 𐎮 𐎯 𐎰 𐎱 𐎲 𐎳 𐎴 𐎵 𐎶 𐎷 𐎸 𐎹 𐎺 𐎻 𐎼 𐎽 𐎾 𐎿

Persian.

𐎠 𐎡 𐎢 𐎣 𐎤 𐎥 𐎦 𐎧 𐎨 𐎩 𐎪 𐎫 𐎬 𐎭 𐎮 𐎯 𐎰 𐎱 𐎲 𐎳 𐎴 𐎵 𐎶 𐎷 𐎸 𐎹 𐎺 𐎻 𐎼 𐎽 𐎾 𐎿

Scythic.

𐎠 𐎡 𐎢 𐎣 𐎤 𐎥 𐎦 𐎧 𐎨 𐎩 𐎪 𐎫 𐎬 𐎭 𐎮 𐎯 𐎰 𐎱 𐎲 𐎳 𐎴 𐎵 𐎶 𐎷 𐎸 𐎹 𐎺 𐎻 𐎼 𐎽 𐎾 𐎿

Babylonian.

The cuneiform signs were originally pictures of objects. It appears that they were first drawn in outline upon some vegetable substance, called in the native documents *ikkhursi*. Whether the supply of this material failed it is impossible to say, but it is quite certain that at a very early period in the history of Babylonia, clay was adopted as a substance for writing upon. On substances like papyrus and leather it is quite easy to draw in outline a picture of any object; but it became more difficult to do this when clay was used, because the outlines of the object represented had to be pressed into it. The necessary result of this was that the shapes of the objects became altered. Thus a circle (1) represented the sun, but when inscribed upon clay it became 2; and a star (3) became 4: in process of time, as scribes became busier, these signs were represented by 5 and 6 respectively.



The use of clay as a writing material completely modified the shape of nearly every character in the cuneiform syllabary. The signs inscribed upon stones of the early empire are most complex, and in many of them it is difficult to see what object they are intended to represent. As time went on, these complex signs became simplified, and wedge after wedge was discarded, until the character was reduced to its simplest form. Lenormant, Hyde Clark, and others adopting their theory, have tried to prove that the Babylonian and Chinese signs are related. In the time of Esarhaddon and Assur-bani-pal, it became the fashion to write inscriptions in the ancient complex character, and special syllabaries of such signs were drawn up. Fragments of these are now in the British Museum. The cuneiform syllabary contains about two thousand signs of a phonetic, syllabic, and ideographic nature. Each sign originally represented an object, but no attention was paid to its ideographic signification when its

syllabic or phonetic value was employed in a word. Before the name of a king, town, city, or private person, &c., a cuneiform sign, being the ideograph for the word following, was placed; after names of places like *Babûlu* (Babylon), a suffix *li*, meaning 'earth' or 'land,' was placed. It is the opinion of some that the cuneiform characters were invented by the primitive Sumerian inhabitants of Chaldæa (who spoke an agglutinative language). See the articles ASSYRIA, BABYLON, WRITING.

See Sir H. Rawlinson, *The Cuneiform Inscriptions of Western Asia* (5 vols. folio, ed. by E. Norris, G. Smith, and T. G. Pinches, 1861-80); Grotefend, *Die Keilinschriften aus Behistun* (1854); Lassen u. Westergaard, *Ueber die Keilinschriften* (1845); Hincks, *On the First and Second Kinds of Persepolitan Writing* (Transact. Roy. Ir. Soc. 1846); Norris, *Memoir on the Syriac Version of the Behistun Inscription* (Journal As. Soc. 1853); Rawlinson, *A Commentary on the Cuneiform Inscriptions of Babylon and Assyria* (1850); A. J. Booth, *The Discovery and Decipherment of the Cuneiform Inscriptions* (1902); L. W. King, *Inscriptions of Darius the Great at Behistun* (1907).

**Cune'ne**, a river of Portuguese West Africa, rises on the edge of the interior plateau, and runs 600 miles southward and westward to the sea 60 miles north of Cape Frio. It is nearly useless for navigation, being shallow and barred by sand-banks.

**Cuneo**. See CONI.

**Cunningham**, ALLAN, poet and industrious man of letters, was born at Blackwood, Dumfriesshire, 7th December 1784. His father became factor or land-steward to Miller of Dalswinton, and therefore neighbour to Burns at Ellisland; and Allan, a boy of twelve, followed at the great poet's funeral. At eleven he was apprenticed to a stone-mason, but continued to give all his leisure to poring over native songs and stories. His first publications were his verse and prose contributions to Cromek's sham-antique *Remains of Nithsdale and Galloway Song* (1810). These, while they did not of course deceive the learned, or apparently even Cromek himself, procured the clever young mason the acquaintance of Sir Walter Scott, with whom 'Honest Allan,' as he called him, was always a great favourite. He now removed to London, and became one of the best-known writers for the *London Magazine*, as well as secretary and manager in Chantrey's studio, a post which he held till Chantrey's death in 1841. Though thus busily employed all day, Cunningham maintained an indefatigable literary activity, writing tales, novels, magazine articles, poems, songs, and biographies. His best works were his *Traditional Tales of the English and Scottish Peasantry* (1822); *The Songs of Scotland, Ancient and Modern* (1825); *Lives of the Most Famous British Painters, Sculptors, and Architects* (6 vols. 1829-33); and his edition of Burns, with Life (8 vols. 1834). His *Life of Sir David Walker* appeared posthumously. He died in London, 30th October 1842. Cunningham was a remarkably worthy and kindly man, whose 'stalwart healthy figure and ways' pleased even Carlyle—but then he was from Dumfriesshire. As a Scots poet, he ranks, perhaps, after James Hogg. His songs, although marred by defects in taste, have the true lyrical impulse and movement. See Life by the Rev. David Hogg (Dumf. 1875).

Of his sons, the eldest, Joseph Davey (1812-51), rose in the Indian service, and wrote a good history of the Sikhs (1849); Major-general Sir Alexander (1814-93) wrote on Indian archaeology and statistics; Peter (see below) became a well-known man of letters; Francis (1820-75), also an Indian soldier, edited Marlowe, Massinger, and Ben Jonson.

**Cunningham**, PETER (1816-69), son of Allan Cunningham (q.v.), was born in Pimlico. He was educated at Christ's Hospital, London, entered the

Audit Office in 1834, ultimately became chief clerk, and retired in 1860. He edited a number of the English classics, and wrote various biographical and topographical works, the most important being his *Life of Drummond of Hawthornden* (1833), and his *Handbook of London* (1849).

**Cunningham**, WILLIAM, a distinguished Scottish theologian, was born at Hamilton in 1805, educated at Duns and Edinburgh, and ordained minister at Greenock in 1830. He was called to Trinity College Church, Edinburgh, in 1834, and soon became one of the foremost leaders on the 'Non-intusioneer' side in the great controversy that preceded the Disruption of 1843. He was appointed professor of Theology in the Free Church College in 1843, of Church History in 1845, and its principal on Chalmers's death in 1847. He was moderator of the Free Assembly in 1859, when he received a testimonial amounting to over £7000. He died at Edinburgh, 14th December 1861. His literary executors published *Historic Theology* (1862), *Reformers and Theology of the Reformation* (1862), and *Discussions on Church Principles* (1863). See his Life, by Rainy and Mackenzie (1871).

**Cunningham**, WILLIAM (1849-1919), British economist, was born in Edinburgh, and educated at the university there, and at Trinity College, Cambridge. He took holy orders in 1873, became vicar of Great St Mary's, Cambridge, in 1887, and archdeacon of Ely in 1906. Meanwhile he had been lecturer in history at Cambridge (1884-91), and professor of Economics at King's College, London (1891-97). He wrote much on economic subjects, and did pioneer work in the field of English economic history. His *Growth of English Industry and Commerce during the Early and Middle Ages* (1st ed. 1890), and his *Growth of English Industry and Commerce in Modern Times* (1st ed. 1892), continue standard works.

**Cunninghame-Graham**, ROBERT BONTINE, born 1852, showed his power of vivid observation and caustic criticism in *Moghreb el Akssa*, the record of a journey in Morocco, and in many articles and volumes on South American, Spanish, and Scottish subjects, besides stories. He was associated with Mr Hyndman in the Socialist movement.

**Cunninghamia**, a genus of the Taxodiaceæ family of Coniferae (q.v.), of which the only species (*C. sinensis*) is a lofty evergreen tree of southern China and Cochin China, with sessile leathery leaves, somewhat resembling those of an Araucaria. It is too tender for the climate of Britain, save in peculiarly favourable localities.

**Cuno**, DR WILHELM, president of the Hamburg-Amerika line, became in November 1922, on the resignation of Dr Wirth, chancellor of the German Reich, with a 'bourgeois' coalition cabinet. He resigned in August 1923.

**Cup**, DIVINATION BY, was practised by the ancient Egyptians, and still survives, though with but little credit, in many countries. One of the eastern methods consisted in throwing small pieces of gold or silver leaf into a cup of water, in which were placed precious stones, with certain characters engraved upon them. The infernal powers were then invoked, and returned answer, either in an intelligible voice, or by signs on the surface of the water, or by a representation in the cup of the person inquired about. By a modern method, a fortune is told by observing the sediment in a teacup.

**Cupar**, or CUPAR-FIFE, the county town of Fife, on the Eden, 10 miles W. by S. of St Andrews, 30 NNE. of Edinburgh, and 13 S. of Dundee. In the 12th century a castle of the Macduffs, Earls of Fife, crowned the 'School Hill,' whose northern

slope was afterwards the show-place of mystery-plays and moralities such as the *Thrie Estaitis* (1535) of Sir David Lyndsay (q.v.). Cupar has a handsome United Free Church (1877), the Duncan Institute (1870), and a public park (1871-72). There is a large corn-market. Lord Campbell was a native. The place has been a royal burgh since at latest 1363, and till 1918 it united with St Andrews and five other towns in returning one member to parliament. Pop. 4000.

**Cupellation.** See ASSAYING.

**Cupid** (Lat. *cupido*, 'desire'), also AMOR, the Latin name for the Greek Eros, the god of love. Eros is not mentioned in Homer, but occurs first in Hesiod, whose conception of him is that of a cosmogonic force uniting, as it were, in harmony and love, the conflicting elements of primal chaos. Thus Plato, in his *Symposium*, speaks of him as the oldest of the gods. Quite different, however, from this venerable and somewhat impersonal deity is the Eros of the epigrammatic and erotic poets, the Cupid of Horace and Ovid. The genealogy of this meddling deity is rather confused. He is variously represented as the son of Aphrodite (Venus) by Ares (Mars), Zeus (Jupiter), or Hermes (Mercury). He appears as a wanton boy, playful and mischievous, with bow, arrows, sometimes a torch, quiver, and wings. The eyes are often covered, so that he shoots blindly. His darts could pierce the fish at the bottom of the sea, the birds in the air, and even the gods in Olympus. The immensity of space was his home, but like his mother, he specially loved the flowery thickets of Cyprus. Later poets make a number of Erotes (Amores and Cupidines), with the same attributes as the prototype. We find also an Anteros ('return love'), whose function it is to punish those who do not return the love of others. Thespiæ in Boeotia was the chief seat of the worship of Eros; here was held the Erotidia, a quinquennial festival. Eros or Cupid was a frequent subject for Greek and Roman works of art. The most celebrated statue was that by Praxiteles at Thespiæ.

The beautiful fable of Cupid and Psyche, as given by Apuleius, is a literary version of one of the best-known stories in the world. Of course it is merely an ordinary household tale, with nothing but the names to connect it with the recognised Greek mythology. Here Cupid is merely the invisible bridegroom of scores of stories the world over, with the added name and attributes of the winged son of Aphrodite. See a study of the myth by Andrew Lang, in the introduction to his reprint (1887) of Adlington's translation (1566) of the story as told by Apuleius.

**Cup-markings** on rocks and CUP-MARKED STONES belong to a peculiar class of archaic sculpturings which have attracted much attention among archaeologists. Cup-markings on rocks are chiefly of two varieties—circular cavities or 'cups' pure and simple, and cups surrounded by circles. The circles round the cups are shallow indentations, varying in number up to five or six. Both cups and circles often show the marks of a pointed tool, as if they had been formed by picking, but frequently they appear as if weathered or abraded to a perfectly smooth surface. The cups vary in size from about one inch to three inches or more in diameter. Sometimes they are confluent at the edges, but more usually separate, and occasionally two or more are connected by a shallow groove or duct. They usually occur in groups, sometimes to the number of several hundreds. In such groups the majority are plain cups, intermingled with occasional cups and circles. The circles placed concentrically round the cups are occa-

sionally incomplete at one side, and a radial groove or duct passes from the central cup out through the circles. The circles are only approximately circular, sometimes oval, and occasionally even roughly quadrangular. These groups of cups, mingled with cups and circles, and occasionally with imperfect spirals and other rude and irregular sculpturings, are found on the stones of sepulchral structures of the stone and bronze ages, on rock-surfaces and earth-fast boulders, and on loose stones of small size in the neighbourhood of sites of early habitations or strongholds over nearly all Europe. They are still subjects of superstitious regard in Scandinavia, and while they are found in connection with the megalithic monuments of Europe and India, a resemblance to them has been traced in the conventional symbols of Siva in the modern temples. On the other hand, recent cup-markings (but without the characteristic circles) have been found on the walls of churches in Prussia. A considerable number of examples have come from various parts of America, but few with circles. Many of the smaller cupped stones found there have been attributed to the Indian custom of cracking hickory nuts, by laying them in such cavities and striking them with another stone, while the larger-sized cups and basin-shaped cavities in earth-fast boulders and rocks have been classed as mortars. But the more elaborate sculpturings on rock-surfaces present the central cup, the surrounding circles and the radial groove of the European and Indian examples, and the inference is that they belong to the religious or ceremonial symbolism of primeval man. The most remarkable examples of rock-surfaces sculptured with cups and circles in Scotland are those at Achnabreac in Argyllshire, described by Professor Sir J. Y. Simpson, and at High Banks 'n Kirkcudbrightshire, discovered in 1887 and 1888, and described by George Hamilton in the *Proc. Soc. Ant. Scot.* (vol. xxiii.).

See *Archaic Sculpturings of Cups and Circles, &c.*, by Sir J. Y. Simpson (Edinburgh, 1867); *Incised Markings on Stone, &c.*, from drawings made for the Duke of Northumberland (Lond. 1869); *Skandinaviens Hällristningar* at A. E. Holmberg (Stockholm, 1848); *Observations on Cup-shaped and other Lapidarian Sculptures on the Old World and in America*, by Charles Rau (Washington, 1881); and *Cup-marks as an Archaic Form of Inscription*, by J. H. R. Carriac (1903).

**Cupola** (Ital., from the root of *cup*), a spherical vault, or concave ceiling, on the top of a building; the internal part of a Dome (q.v.). The term is also sometimes used for a dome which is ogival (not hemispherical or semi-elliptical) in outline, or for a small dome. Cupolas are often wholly or partially of glass.

**Cupping** was formerly a popular but is now a little used method of producing local depletion, by the application of partially exhausted *cupping-glasses* to the surface of the skin. By this means the blood is diverted from deeper structures to the surface of an affected part, whence it may be removed by scarifying the skin (wet cupping), or where it may be allowed to remain exuded in the subcutaneous tissues like a Bruise (q.v.), until it be removed by absorption (dry cupping).

Cupping has been a part of surgical practice from the earliest times, and instruments for performing it have been found in use among the least civilised nations. Of old, the cups were either small horns, open at both ends, from which the air was withdrawn by suction at the narrow extremity, or glasses of various shapes, with a small hole in the bottom of each. This hole was plugged with wax, the air exhausted by heat, and when the operator wished to remove them, he withdrew the plug, and allowed the air to enter. The modern cupping-glass is a beaker containing 3 to 6 fluid ounces,

with a finely-ground rim, which adheres closely to the surface of the skin.

The principal improvements have been in the methods of incising the skin. This used to be effected with a common lancet or narrow knife, but now by a 'scarificator,' an instrument consisting of several lancets. A scarificator, glasses, a torch, some spirits of wine, and a lighted candle are placed ready at hand; the part is sponged with hot water, so as to cause an increased flow of blood into it; then dried with a warm towel; the torch, previously saturated with the spirits of wine and lighted, is held for an instant in one of the glasses. By this means the air in the glass is quickly expanded, and when the glass is then rapidly applied to the smooth damp surface of the skin, the rapid rarefaction of its contained air causes it to adhere tightly, and gives rise to determination of blood to the part to which it is applied. When the skin under the glass has become red and swollen, the cupper removes it, applies the scarificator, and as rapidly as possible again exhausts the air from the glass, which he reapplies. The blood will now flow into it; and when enough has been taken, the glass is removed, and some antiseptic lint applied to the wounds. The number of glasses applied depends on the quantity of blood it is thought desirable to abstract; each one will probably withdraw from 3 to 5 ounces. This apparently simple proceeding requires considerable skill, for should the cuts be either too deep or too shallow the blood will not flow. There are many modifications of the ordinary cupping apparatus, but all act on the same principle.

*Dry Cupping* is simply applying the cups as described, without wounding the skin. A hard mass of extravasated blood is found occupying the skin at the site of this operation. The mass, at first cherry-red, becomes in a few days of a dead black colour, then greenish, and finally yellow, following the usual course observed in the healing of a Bruise (q.v.).

**Cupule** (*Cupula*), in Botany, a shortened axis with a number of more or less cohering bracts, numerous and crowded in the acorn, or three in the beech-nut, which more or less completely enclose the ripening fruit. The husk of the hazel-nut may be regarded as an incipient cupule.

**Cupuliferæ** (i.e. 'cupule-bearing'), an old order of dicotyledonous trees and shrubs, more naturally separated into (1) *Betulaceæ* or *Corylaceæ*, the birch and hazel family, including (a) the birch and alder, (b) the hornbeam and hazel; and (2) the *Fagaceæ* or *Cupuliferæ* proper, including (a) the beeches, (b) the chestnuts and oaks. See the articles on these separate trees. Some genera are chalcidogenic.

**Cur**, a name sometimes applied indiscriminately to small dogs of any kind not highly valued, and in this way often particularly appropriated to dogs of mongrel breed, but also used by naturalists as the common designation of many races, of which the Terriers (q.v.) may be considered as the type. See Dog.

**Cura**, CIUDAD DE, or VILLA DE CURA, a town in Venezuela, lies 60 miles SW. of Caracas, to the south of Lake Valencia, has a good deal of industry, extensive cotton plantations, and a pop. of 10,000.

**Curacao** (also spelt *Curacao* and *Curassow*) is the most important of the Dutch West India Islands. It lies about 40 miles from the coast of Venezuela, is 36 miles long by 8 broad, and has a population of 33,000. The capital of Curacao is Willemstad, a very handsome town, situated on the bay of St Anna, with 15,000 inhabitants. The chief produce is salt, and a rock rich in valuable phosphates. The soil of Curacao and its dependent islands is less productive than that of other tropical lands; but careful cultivation pro-

duces sugar, tobacco, maize, figs, cocoa, coconuts, lemons, and oranges. The Curacao orange, *Citrus Aurantium curassaviensis*, is a peculiar variety. Willemstad is the headquarters of the colonial government, which has authority not merely over the neighbouring islands of Aruba and Bonaire, but also over St Eustache, Saba, and the Dutch part of St Martin. Altogether Curacao and its dependent islands have a population of 55,000. The trade is mainly with the United States. Curacao was discovered by Spain in 1527, taken by the Dutch in 1634, conquered by the English in 1807, and restored to Holland in 1815.

**Curacao** is a well-known and esteemed liqueur, usually made in Holland with the dried peel of the Curacao orange, the peel being macerated with water, and then distilled with spirit and water. The result is sweetened with sugar, and a little Jamaica rum is often added. A palatable imitation can be made from the fresh peel of bitter oranges and whisky.

**Curari**, URARI, WOORALI, or WOORARA, is a celebrated poison used by some tribes of South American Indians for poisoning their arrows. It is by means of this poison that the small arrows shot from the Blowpipe (q.v.) become so deadly. It is brought to Europe as a black, brittle extract, resinous in appearance, and encrusting the sides of little gourds containing it. The source of this deadly poison was for long unknown, owing to the natives jealously guarding the secret. The process of manufacture has now, however, been witnessed and described by several travellers, and in each case some species or other of *Strychnos* has been recognised as the source of the poison. There seem to be four distinct varieties of curari, each characteristic of a different tract of country, and probably varying in their physiological action; but for our purpose we may confine ourselves to that kind which is used in physiological experiments. Curari is one of those poisons which, being difficult to absorb, have little action when taken into the stomach, but when introduced into a wound act with great promptness. The symptoms caused are loss of muscular power, feeble respiration, and death by suffocation. By means of artificial respiration it is possible to sustain life for a lengthened period, although the animal is apparently insensible to pain. The heart usually keeps beating after the cessation of breathing, and only after very large doses of the poison does the arterial pressure fall.

At first it was supposed that curari contained strychnine, but as its action was so entirely different, this view was soon abandoned. Prolonged research separated a special alkaloid, *Curarine*, which possesses the leading properties of the poison itself. It forms salts, and is said to be twenty times as strong as curari. There is also another alkaloid, *Curine*, present in curari, which is not so powerful or poisonous as Curarine. In medicine curari is very little used. It has been proposed to employ it in lockjaw, hydrophobia, and as an antidote in poisoning by strychnia; but although it quiets the spasm, it has no direct curative effect, and it may cause an equally fatal paralysis.

Besides curari proper, there are two other arrow-poisons called Corroval and Vao. These, which are brought from New Granada, have an entirely different action on the body, as they primarily stop the beating of the heart, whereas with curari the heart continues to beat after breathing has ceased.

**Curassow**, or HOCO (*Craw*), a genus of large game-birds inhabiting the forests of Central and South America. Their most distinctive features concern the head. This is adorned with a crest

of feathers, curled forwards, and capable of being raised and depressed; while the often brightly coloured cere is enlarged into a prominence at the root of the high beak. Eight species are found from Mexico to Paraguay, predominantly arboreal, living mostly on fruits, but in general habit like poultry. They are very unsuspicious of danger, especially careless at the love-making season, and are very readily tamed. The best-known species is *C. alector*—the Royal Pheasant of the Mexicans.



Crested Curassow.

It is a very sombre bird, about the size of a turkey. It is occasionally domesticated, and a stock imported into Holland at the end of last century seemed to become acclimatised. It was, however, lost amidst the troubles subsequent to the French Revolution. Though their love-making is keen, the birds are not very productive, and it is probable that the natives have discovered that this apparently very profitable bird will not breed readily under domestication. Closely allied, and of similar distribution and habit, are the fierce Guans and Penelopes (*Penelopinae*), and the rare Mountain Curassow (*Oreophaps derbianus*). The Turkeys (q.v.) are also near relatives.

**Curate**, literally one who has the cure (Lat. *cura*, 'care') of souls, in which sense it is used in the Church of England Prayer-book, 'all bishops and curates'; as the cognate word *curé* is used in French to denote the incumbent of a parish. It is, however, generally used now to denote the unbeneficed parochial clergy in the Church of England, more exactly styled 'assistant curates.' Formerly, such curates were usually the deputies of non-resident incumbents, but now they are mostly helpers of resident pastors. A curate, in this sense, is a minister employed by the incumbent of a church (rector or vicar), either as assistant to him in the same church, or else in a chapel of ease within the parish belonging to the mother-church. He must be licensed and admitted by the bishop of the diocese, or by an ordinary having episcopal jurisdiction, who also usually appoints his salary. Any curate that has no fixed estate in his curacy, not being instituted and inducted, is liable to removal on six months' notice from the incumbent, and to summary withdrawal of his license by the bishop. In the latter case, an appeal to the archbishop of the province is open. But there are *perpetual* curates as well as temporary, who are appointed where tithes are inappropriate and no vicarage was ever endowed: these are incumbents, and not removable, and in new district parishes their title is now vicar.

**Curator**, a term taken over from Roman law into Scots law for the guardian of minors, lunatics,

&c. See **GUARDIAN, INFANT, PARENT AND CHILD, TUTOR**; and for *Curator Bonis*, **INSANITY**.

**Curb**. See **BRIDLE**.—The lesion known as 'curb' in the horse is a bulging enlargement, a deviation backwards, opposite the lower part of the hock, of the straight line which normally runs from the point of the hock to the fetlock. It is usually due to sprain of the calcaneo-cuboid ligament, is not uncommon in short and in sickle hocks, and is sometimes hereditary. It is mostly confined to light-bred horses and to young animals. It is seldom met with in a horse that has reached maturity—except as the result of more than ordinary violence. There is often lameness at first, and if it be inflamed and painful a high-heeled shoe may be beneficial, with hot fomentations and an anodyne cooling lotion. As a rule in the course of a week the ordinary shoe may be adjusted, and the curb may require a blister. But for a permanent cure, and to enable an animal to stand hard work, there is nothing to equal the hot iron, which may be only lightly applied. A large curb may not disappear altogether, but after it has been treated and the inflammation has subsided, it seldom causes lameness, but is always a blemish.

**Curcas**. See **PHYSIO NUT**.

**Curculio**. See **WEEVIL**.

**Curcuma** (Arab. *kurkum*) an Indian genus of Zingiberaceæ, the ginger and cardamom order. *C. longa* is widely cultivated in Southern Asia, its rhizomes (*radix curcumæ longæ* of pharmacists) being the source of Turmeric (q.v.). Young plants also yield a kind of arrowroot, but this is especially prepared from *C. leucorrhiza*, with colourless rhizomes. *C. zedoaria* yields a tonic medicine (*radix zedoariæ officinalis* or zedoary of pharmacists), and is also used as food. *C. amada* is the mango ginger of Bengal.

**Curé**, the name applied in France to a priest with a cure of souls, properly the priest of a regular parochial as opposed to a succursal church, but commonly applied to any pastor with spiritual functions.

**Cures**, an ancient town of the Sabines, 25 miles NE. of Rome, whence the Romans, after the people of Cures united with them, came to be called *Quirites*. See **ROME**.

**Cureton**, **WILLIAM**, Syriac scholar, born at Westbury, Shropshire, in 1808, studied at Oxford, and was ordained in 1831. In 1837 he entered the British Museum as assistant-keeper of manuscripts, and here his labours brought to light a Syriac version of the Epistles of Ignatius (q.v.), remains of a Syriac recension of the Gospels, and other MSS. of more or less value, which involved their editor in long controversies. In 1849 Cureton was appointed canon of Westminster and rector of St Margaret's. Among other honours, he received the degree of LL.D. from Oxford and of D.D. from Halle, and was a Fellow of the Royal Society and a foreign associate of the Institute of France. He died 17th June 1864.

**Curfew** (Fr. *couvre-feu*, 'cover fire'). To William the Conqueror is ascribed the introduction of the curfew-bell into England, the object of which was to warn the people to cover up their fires, and retire to rest. The time for ringing these bells was sunset in summer, and about eight o'clock in winter; and certain penalties were imposed upon those who did not attend to the signal. The practice of ringing the curfew-bell, however, appears to have prevailed throughout Europe long before the era of the Norman Conquest, its object being the prevention of fires, which, owing to houses being chiefly composed of wood, were then both frequent and destructive.



against four, with a director styled *skip* for each; after which a certain length of ice is chosen on which to play. This is called the *rink*. Certain marks are then made at each end of the rink, consisting of several concentric rings, called *brougs*, and a centre, called the *tee*. The game is decided by time, or by one party first attaining a certain number of shots, such as 21 or 31; and the keenness displayed by rival sides in competing for victory is perhaps without a parallel in any other pastime whatever. One on each side plays alternately. The chief object of the player is to hurl his stone along the ice towards the tee, with proper strength and precision; and on the skill displayed by the players in placing their own stones in favourable positions or in driving rival stones out of favourable positions, depends nearly all the interest of the game. At a certain distance from each of the tees, a line—the *hog-score*—is drawn across the ice; and any stone not driven beyond this mark counts nothing, and is laid aside. In country places, a dinner composed of 'beef and greens,' the well-known curler's fare, generally concludes the day's diversion, which, taking place when outdoor labour is suspended, is felt to be no encroachment on rural occupations. Since 1902-3 Scottish teams have played many matches in Canada.

For laws of curling and general remarks, see *The Channel-stane* (four series, 1883-84, the last with ample bibliography); *Descriptive and Historical Sketch of Curling* (1828), reprinted as *The Kilmarnock Treatise* (1883); *Curling, Ye Glorious Pastime* (1882), a reprint of the *Account of the Game of Curling* (1811); Dr James Taylor, *Curling* (1884); Rev. J. Kerr, *History of Curling* (1888); J. G. Grant, *The Complete Curler* (1914); and the annuals of the Royal Caledonian Curling Club from 1839.

**Curll**, EDMUND (1675-1747), a notorious London bookseller of the first half of the 18th century. His connection with *Court Poems* (1716) led to his first quarrel with Pope, who afterwards made the bookseller figure in the *Dunciad*. He earned an unenviable reputation for the publication of indecent literature, which afterwards received the brand of Curlicism. He was twice (1716 and 1721) at the bar of the House of Lords for publishing matter regarding its members; was tried and convicted for publishing obscene books (1725), fined (1728) for the issue of *Nun in Her Smock* and *De Usu Flagrorum*, and spent an hour in the pillory for his *Memoirs of John Ker of Kersland*. His announcement of *Mr Pope's Literary Correspondence* (1735) led to the seizure of the stock, and furnished Pope (who has been proved to have instigated its publication) with a sufficient excuse for the issue of an authentic edition (1737-41). Curll did not deal solely in garbage, as is shown in a list of his containing 167 standard works, including Swift's *Meditation on a Broomstick* (1710), Dr South's works, &c. His *Curliad* (1729) is styled a 'hypercritic upon the Dunciad Variorum.' It was of Curll's biographies that Arbuthnot wittily said they had added a new terror to death.

**Currach**. See CORACLE.

**Curragh**, a large undulating down in the centre of County Kildare in Ireland, 2 miles E. of Kildare town. It is the property of the crown, and in it is a large camp of exercise, established in 1855, with accommodation for 12,000 troops (see CAMP). The Curragh of Kildare is even better known as a famous racecourse.

**Curran**, JOHN PHILPOT, Irish orator, was born at Newmarket in County Cork, son of the seneschal of the Manor Court there, July 24, 1750. At Trinity College, Dublin, he was as idle and reckless as he had been at school, but spite of his dissipations he contrived to learn something of law, and the boisterous taproom debates of his life in Dublin

and London shaped him into an orator. After two years at the Middle Temple, London, he was called to the Irish bar in 1775. Here his conviviality, his wit, and his vehement eloquence, soon made him a prominent figure, and led to his being employed in many of the greatest causes of the time. In 1782 he became King's Counsel, and next year was returned to the Irish parliament for Kilbeggan. He became a strong supporter of Grattan, but his eloquence proved less effective on the floor of the House than before an Irish jury. His sarcastic retorts led him into several duels, of which, in the course of his career, he fought no less than five, all fortunately without serious harm. Although a staunch Protestant like so many great Irish patriots, Curran had a warm sympathy with his suffering Catholic countrymen, and was eloquent and constant in his unavailing appeals to the government to change a policy which was driving the Irish into rebellion. With his defence of Archibald Hamilton Rowan in August 1792 commenced the long series of defences in state-trials which have shed such a lustre on his name. The insurrection at length broke out in 1798, but was speedily suppressed, whereupon the prosecutions of its leaders at once began. Curran flung himself into their defence with a heroic energy that rose above the brow-beatings of the bench and insured him an immortality of affection in the hearts of his fellow-countrymen. The last of his defences was that of Napper Tandy in May 1800. Then came the Union, which Curran had always opposed as 'the annihilation of Ireland.' His own health was now shattered, and soon domestic troubles followed to darken his later years. His wife eloped with a clergyman, and his youngest daughter, Sarah, pined away and died in Sicily, a few months after the hapless fate of her bright young lover, Robert Emmett (1803). Her story is immortalised in Moore's well-known lines, 'She is far from the land where her young hero sleeps.' After the death of Pitt (1806) and the accession to power of the Whigs, Curran was appointed Master of the Rolls in Ireland, an office which he held till his retirement in 1814. He died in London, 14th October 1817. His remains were re-interred in Glasnevin Cemetery, Dublin, in 1834. Curran's little figure, ugly face, bright black eyes, and intense vivacity, formed a sufficiently unique personality; but his brilliant wit, his quickness in repartee, and the felicity of his ready language were unparalleled. MacDonagh puts an unpleasant complexion on his servility to the government, and in his relation to his daughter calls him 'an inhuman scoundrel.'

See his *Speeches*, edited, with a Life, by Thomas Davis in 1855; *Lives* by his son, W. H. Curran (1819), A. Stephens (1817), and O'Regan (1817); Ch. Phillips, *Curran and his Contemporaries* (1850); and MacDonagh, *The Viceroys Postbag* (1904).

**Currant**, a name originally belonging to a small kind of grape (see CURRANTS), and transferred, in consequence of the similar size of the fruit, to many species of Ribes (order Saxifragaceæ, sub-order Grossulariaceæ). The species known as *currants* are destitute of spines, and have the flowers in racemes: the spiny species are known by the name Gooseberry (q.v.). Among the fruit-shrubs most generally cultivated in our gardens is the Red Currant (*R. rubrum*), *Groseille* of the French, a native of woods and thickets in the south of Europe, found also in some parts of Asia and of North America, perhaps rather a naturalised than a truly native plant in Britain. It has long been cultivated, although it does not appear that it had a place in the gardens of the ancient Greeks or Romans. The berries, besides being used for dessert, and to a much greater extent for pies, and for making jelly (eaten with mutton and hare), are used

also for making an agreeable and refreshing beverage, called in France *Eau de Groseilles* (made of the juice of the fruit, water and sugar, strained and iced), and a well-known fermented liquor called *Currant Wine* (q.v.).—The White Currant is a mere variety of the red, the result of cultivation, with fruit less acid, and more fit for



Red Currant.

dessert, generally also rather larger. There are many sub-varieties, and many intermediate shades of colour. Both the red and the white currants are either trained as standard bushes, or against walls, the latter treatment producing larger and finer fruit, and both are sometimes trained on a north wall, to retard their ripening till after the ordinary season. They grow readily, like the shrubs of this genus in general, from cuttings. Unlike the black currant, the red and the white grow in clustered bunches.—The Black Currant (*R. nigrum*), *Cassis* of the French, grows in moist woods, and on the banks of streams in Europe and the north of Asia. The fruit is much larger than the red currant, and cultivation has lately produced varieties remarkable for size.

There is a variety found in Russia with yellow berries. The jelly and preserve made from it are very useful for sore throats, as is also *black currant vinegar*, made in the same manner as raspberry vinegar. In Russia, the berries are gathered in large quantities in the woods, and dried in ovens, to be used in pies. They are tonic, and also slightly diuretic and sudorific. A liqueur, called *Liqueur de Cassis*, is prepared in France from the black currant. Those who are fond of the flavour of green tea may gratify their taste by dropping one or two black currant leaves or buds into the teapot during infusion. The 'big bud disease' is caused by the black currant gall-mite (*Eriophyes ribis*), and is only mitigated by soap and sulphur-spray; affected bushes should simply be burnt.—Many other species, some of them probably deserving of cultivation, are found in temperate and cold climates in almost all parts of the world. One with large beautiful red berries, occurs on the Himalaya at an elevation of 13,000 feet.—*R. oxyacanthoides*, a native of North America, is much like the common gooseberry in flavour, and the colour is red or green in different varieties.—*R. lacustre*, also a North American species, produces its fruit in bunches, a fruit like that of the black currant.—The fruit of *R. fragrans* is sweet, but the species is more remarkable for the production of a pleasant balsamic resin which exudes from the under side of the leaves in yellow drops and has the smell of black currants.—The Red-flowered Currant (*R. sanguineum*), now so common as an ornamental bush in shrubberies, and trained on walls, producing in April a profusion of deep-red flowers in large drooping racemes,

is a native of the north-west of America, and was introduced into Britain in 1826. Its bluish-black, mucilaginous, insipid berries are not, as is popularly believed, poisonous.—The Golden Currant (*R. aureum*), also a very ornamental shrub, from the same regions, has a tubular calyx and long golden-yellow flowers. Its fruit, which is either yellow or black, and of fine flavour, is not freely produced in Britain.—The name Native Currant, or Australian Currant, is given in Australia to the berries of different shrubs, particularly the white berries of *Leucopogon Richii* (order Epacridaceæ). Other fruits bearing the same name are produced by species of *Coprosma* (order Rubiaceæ), but they are very inferior.

**Currant**, a small kind of raisin, is the dried red or blue berry of a small-fruited seedless variety of the common vine, which is cultivated in the East, and especially the Ionian Islands and in Greece. The name, originally *Raisin de Corinthe*, is derived from the city of Corinth, in the neighbourhood of which currants were first cultivated. They are very small, round, with a thin skin, without seeds, and very sweet. Those brought from the island of Zante are most esteemed. The grafting, pruning, trimming, and irrigating of the vine-stocks, which of late have suffered from the phylloxera, involve much labour. As the grapes ripen, the bunches are dusted with sulphur, to keep off the dreaded *Oidium* (q.v.); rain at this period always injures and sometimes ruins the crop. The vintage is in August. The currants when ripe are spread out on drying-grounds in layers half an inch thick, and frequently turned. The currants, now loosened from the grape-stick, are tightly packed in barrels for exportation, and are an important Greek export. In a few districts of Greece, a very sweet wine is made from currants.

**Currant Gall**, an oak-gall resembling a currant, due to *Spathogaster baccarum*. See GALL-FLY.

**Currant Moth**, or MAGPIE MOTH (*Abraaxas grossulariata*). See GOOSEBERRY CATERPILLAR.

**Currant Wine** is made of the juice of red or white currants, to which is added about one pint of water for every four pints of berries employed. About a pound and a half of sugar is afterwards added to each pint of the liquor, a little spirits being generally also added, before it is set aside to ferment. A larger quantity of sugar is sometimes employed, and no water, and a stronger and sweeter currant wine is thus produced. Fermentation requires several weeks, and the wine is not fit for use for at least some months afterwards. Black currant wine is made in the same way from black currants, but the fruit is put on the fire in as small a quantity of water as possible, and heated to the boiling-point before it is bruised.

**Currency** means originally the capacity of being current, or, as Johnson defines it, 'the power of passing from hand to hand.' It is applied in practice to the thing that is so current, and generally to whatever, by being current among any nation or class of persons, serves as the money with which they buy commodities or pay their debts. It is necessary to be content with a practical explanation, without venturing on a scientific definition of the term, because, among the many disputed points in political economy, there is none productive of more exciting controversy than the proper regulation of the currency; and the advocate of each theory is apt to define the term according to the view he takes of the functions of government regarding currency. Whether correctly or not, it is applied in practice to everything that is received for payment. It differs from the word money, in its popular acceptance, in as far as it includes various

substitutes for the metallic money of a country, especially bank-notes. The leading question among political economists regarding currency is, how far it should be restrained. The most effectual method of restraining it is by confining it to the precious metals. If it were law that none but a gold currency should be used in any country, and if, at the same time, there were no effort to tamper with this gold currency, and give it an artificial value, the currency of that country would always be adjusted to the general level of prices throughout the commercial world, and if it were redundant would be at once exported, and if deficient at once imported in exchange for commodities.

A country which does not produce gold must pay for its gold with commodities, and consequently it is a very expensive currency, and therefore, ever since man's ingenuity was turned to trade, methods have been devised for superseding gold or the other precious metals by something cheaper. Unless, however, law or custom intervenes to give it efficiency, this cheaper material will only be worth its own (so-called) intrinsic value. A five-pound Bank of England note is worth so little in its intrinsic value as a picture upon thin paper, that such a value can hardly be expressed. It derives its power as currency from the obligation it fixes on a great rich corporation to make good its professed amount to the holder. We thus pass from a purely bullion currency to the next step of restraint, which is generally called a mixed currency. Here some maintain that no note should be issued unless the banker or other person issuing it has in his possession as much bullion as will pay it. Others say it is sufficient that he is bound to pay its amount in bullion on demand without his actually possessing the bullion throughout the whole period of the currency of the note. A third party, again, are for a currency entirely free of a metallic basis; they hold that naturally paper money, passing from hand to hand, will represent transactions, and will therefore come in the end to be made good in some shape or other; and they further hold, that if some losses should thus occur, these will be more than compensated by the rapid increase of trade and enterprise, caused by a free trade in currency, as it is termed—that is to say, by every man issuing his own notes or promises to pay to whoever will take them. As a matter of fact, every nation beyond the first stage of civilisation has always regulated its currency, and Adam Smith carefully points out that this is no real infringement of natural liberty and free trade. Through a succession of practical measures, reached with considerable caution, the English have come to a mixed currency, resting on a compromise between the two classes of mixed currency above referred to. In the theory of the measures brought to completion under Sir Robert Peel in 1844, it is admitted that, to a certain extent, a currency can be based on transactions and the property of those concerned in them, but that a limit must be drawn, to prevent the power of creating such a currency from running to excess, by the issue of notes which cannot be immediately made good by those who issue them. Accordingly, the several banks in existence were allowed to continue their note circulation, but they were permitted to increase it only on the condition of having bullion in their coffers to pay the additional notes issued by them.

A currency which is not worth its nominal value in bullion is called a 'depreciated currency.' After 1914, owing to the excessive issue of paper money, the currency of all belligerent countries greatly depreciated. By the end of 1919 the British paper pound had depreciated 21 per cent., the French paper franc 66 per cent., the Italian paper lira

69 per cent. The Russian currency, and subsequently the German mark, have equalled the French revolutionary 'assignats' in becoming practically worthless. A depreciated currency may be created by a government calling notes or any other form of money a legal standard, and issuing a greater quantity of it than the real transactions of the country and the property passing from hand to hand require; or it may be created by private persons acting under laws by which the right of issuing a currency is not duly limited. This faculty which a currency has of becoming depreciated without being repudiated, is the real source of danger in all proposals for an unfettered currency, or a free trade in the issue of money. If the bank-notes for which bullion cannot be immediately obtained were repudiated, there might be a natural check on over-issues; but it is their nature, on account of the difficulty of getting bullion for them, or the chance that it may never be got, that they pass at a discount or reduction of their value. Hence such a currency would be ever shifting; there would be no permanent standard, and the person incurring a debt before a depreciation which he pays afterwards would, in reality, be paying his creditor a dividend only. A 'token' currency, the material of which is avowedly overvalued, and which is issued in limited quantities for use in small payments, must be distinguished from a depreciated currency. In the silver currency of Britain, before the war period, a pound was worth little more than four-fifths of a sovereign, even at the old valuation of silver, at about 60d. per oz. If a person due £100 could pay it in silver, he would get off with a dividend of from 16s. to 18s. in the pound; but by law, silver is not a legal tender for more than 40s. The copper currency is so far below its real value that it has not been thought worth while to give it a permanent weight—the pence and halfpence now issued are little more than half the weight of those of former mintages; but they are only a medium for small sums, and the royal stamp establishes reliance. See **BANKING, BIMETALLISM, BULLION, MONEY**; *Hawtrey's Currency and Credit* (1919); and *Reports of the Commission on Currency* (1918 and 1919).

**Currents.** See ATLANTIC, PACIFIC, &c., GULF STREAM, SEA.

**Currie, JAMES**, the earliest editor of Burns, was born at Kirkpatrick Fleming manse, in Dumfriesshire, 31st May 1756. He spent five years at Cabin Point, Virginia, in a mercantile situation (1771–76), then studied medicine at Edinburgh and Glasgow; and settling in Liverpool in 1780, soon obtained a good practice. His chief medical work was the able *Reports on the Effects of Water in Febrile Disease* (1797); but he is best remembered by his edition of Burns (1800; 7th ed. 1813), with a life and criticism of the poet's writings, which he undertook solely for the benefit of Burns's family, and which was long the basis of all subsequent editions. Dr Currie died at Sidmouth, 31st August 1805. See the Life by his son (2 vols. 1831).

**Currying.** See LEATHER.

**Curry Powder**, or CURRY PASTE, is a compound of turmeric, coriander, pepper, ginger, and various spices; it is used to a large extent in India and elsewhere as a seasoning for a variety of dishes.

**Curse of Scotland**, a term popularly applied to the *nine of diamonds* in a pack of playing-cards. Perhaps the least worthless of the many explanations offered is that it involves a reference to the detestation entertained in Scotland towards John Dalrymple, first Earl of Stair, on account of his activity in promoting the Union, and especially for his share in the Massacre of Glencoe. His heraldic

bearings, 'or, on a saltire azure, nine lozenges of the field,' bore a fanciful resemblance to the nine of diamonds.

**Cursing.** See SWEARING.

**Cursitor**, an old name for clerks of the Court of Chancery who made out writs. The *Cursitor Baron* used to administer oaths to sheriffs, bailiffs, &c.

**Curtain**, in Fortification, is the portion of rampart connecting one Bastion (q.v.) with another.

**Curtesy.** See COURTESY; HUSBAND AND WIFE.

**Curtis**, GEORGE WILLIAM, American author, born in Providence, Rhode Island, in 1824; in 1850 joined the staff of the New York *Tribune*, and was one of the editors of *Putnam's Monthly* from 1852 to 1869. He commenced the 'Editor's Easy Chair' papers in *Harper's Monthly* in 1853, and became principal leader-writer for *Harper's Weekly* on its establishment in 1857. A novel, *Trumps* (1862), and most of his books appeared first in these journals. Until 1884 he was a Republican; then he supported Cleveland. He died at New York, 31st August 1892. See Life by E. Cary (1894).

**Curtius**, ERNST, a distinguished German classical archæologist and historian, born September 2, 1814, at Lubeck. He studied philology at Bonn, Göttingen, and Berlin, visited Athens with Brandis in 1837, and next accompanied his teacher, Otfried Müller, in his travels through Greece. For some time he taught in two Berlin gymnasiums, next became extraordinary professor at the university there, and (1844-49) tutor to the Crown Prince of Prussia. In 1856 he succeeded Heimann as professor at Göttingen, whence he was recalled in 1868 to become ordinary professor at Berlin. Since 1853 a member of the Royal Academy of Sciences, he was in 1871-93 one of its permanent secretaries. His earlier works were *Klassische Studien* (1840), *Anecdota Delphica* (1843), *Inscriptiones Atticæ Duodecim* (1843), and *Die Akropolis von Athen* (1844). The fruits of his repeated visits to Greece and Asia Minor—last in the spring of 1874, to make preparations for the intended excavations at Olympia at the instance of the German government—appear partly in the memoirs of the Göttingen Society of Sciences and of the Berlin Academy, and partly in his books, *Naxos* (1846), *Olympia* (1852), *die Ioniæ* (1855), *Die Topographie Kleinasiens* (1872), and *Ephesos* (1874). His orations, delivered at Göttingen in the capacity of 'Professor Eloquentiæ,' were collected in 1864; those at Berlin, under the title, *Altertum und Gegenwart* (2 vols. 1875-82). Besides these and numerous papers in the special archæological and philological journals, Curtius published *Peloponnesos* (2 vols. 1851-52), a luminous description of that part of Greece, and *Griechische Geschichte* (3 vols. 1857-61; 6th ed. 1887-89; trans. by A. W. Ward, 1868-76), a work unequalled for its insight into the artistic growth and development of the Greek race. With Kaupert he prepared the *Atlas von Athen* (1878); earlier, with Adler and Hirschfeld, *Die Ausgrabungen zu Olympia*, the official account of the excavations at Olympia (3 vols. 1877-78). He died 11th July 1896.

**Curtius**, GEORG, a distinguished classical scholar, the brother of the preceding, was born at Lubeck, April 16, 1820, and studied at Bonn and Berlin. After teaching some time at Dresden and Berlin, he became in 1849 extraordinary, in 1851 ordinary, professor of Classical Philology at Prague, and settled as such at Kiel in 1854, at Leipzig in 1862. He died August 12, 1885. One of the soundest Greek scholars in Germany, Curtius was the first philologist of the generation that succeeded the giants Bopp and Benfey. His most important

works were *Griechische Schulgrammatik* (1852; 20th ed. 1890), translated into many languages (into English in Dr Smith's series in 1863); next the *Erläuterungen* to the foregoing (1863; 3d ed. 1875), translated into English by Abbott in 1870; *Grundzüge der Griechischen Etymologie* (1858; 5th ed., with the collaboration of A. Windisch, 1879), translated into English by A. S. Wilkins and E. B. England, 1875-76; and *Das Verbum der Griechischen Sprache* (1873-76; 2d ed. 1877-80), translated by Wilkins and England, 1880. Other works were *De Nominum Græcorum Formatione* (1842), *Die Sprachvergleichung in ihrem Verhältniss zur Klassischen Philologie* (1845), *Sprachvergleichende Beiträge zur Griechischen und Lateinischen Grammatik* (1846), *Philologie und Sprachwissenschaft* (1862), *Zur Chronologie der Indogermanischen Sprachforschung* (1867; 2d ed. 1873), and *Zur Kritik der neuesten Sprachforschung* (1885), his last work, in which he vigorously assails the theories of the 'new grammarians,' and to explain the word-changes in a language maintains the necessity of a third principle of varying or sporadic change, in addition to invariable phonetic law and the operation of analogy. In the famous *Studien zur Griech. und Lat. Grammatik* (10 vols. Leip. 1868-77) Curtius united his own papers with those of his pupils and others, including Brugmann, Fick, G. Meyer, and Windisch. The ninth volume contained Brugmann's famous paper on the 'nasalis sonans,' which first marked the revolt of the 'neogrammatici' against the master and traditional philology. Curtius founded in 1878, with L. Lange, O. Ribbeck, and H. Lipsius, the *Leipziger Studien zur Klassischen Philologie*.

**Curtius**, METTUS or METTIUS, a noble Roman youth who heroically sacrificed his life for the welfare of his country, 362 B.C. A yawning chasm had opened in the forum, and the soothsayers declared it could only be filled by throwing into it the most precious treasure of Rome; whereupon Curtius appeared on horseback in full armour, and exclaiming: 'Rome has no greater riches than courage and arms,' leaped into the abyss, which at once closed over him.

**Curtius**, QUINTUS (Quintus Curtius Rufus), author of the work *De Rebus Gestis Alexandri Magni*, in ten books, of which the first two have been lost, and the text of the remainder has come down to us in an imperfect condition. Some critics have placed him in the reign of Augustus against the evidence of his style, which is moulded on that of Seneca, and would naturally suggest a writer contemporary with Claudius and Nero; others, as Niebuhr, under Severus; and others again much later. Curtius was poorly equipped as a historian, and his book has but little value as history; but its style, if mannered and declamatory, is elegant and pleasing. The *editio princeps* was published at Venice about 1471. Modern editions are those of Müttzell (1841), Zumpt (1849), and Vogel (1875-80).

**Curule Chair** (*sella curulis*), the chair of honour of the old Roman kings, and later of consuls, prætors, 'curule ædiles,' and some of the other higher magistrates of the republic having senatorial rank. It was a folding-stool originally of ivory, then of metal, with curved legs crossing.

**Curvature.** For Curvature of Strata, see ANTICLINE, GEOLOGY, MOUNTAINS; for Curvature of Spine, see SPINE.

**Curve**, a line described by a point moving so that the direction changes at every instant; and in mathematics the term curvature is restricted to lines that follow some law in their change of direction. Thus, the law of the circle is, that all points of it are equally distant from a fixed point, called the centre. The law of a plane curve is generally

expressed by an equation between the co-ordinates of any point in it referred to a fixed point; and thus the doctrine of curves becomes matter of algebra (see CO-ORDINATES). When the equation of a curve contains only powers of  $x$  and  $y$ , the curve is algebraic; when the equation contains other functions, logarithms for instance, of  $x$  and  $y$ , the curve is called transcendental. The cycloid, e.g., is a transcendental curve.

There are also curves, like some spirals, that do not continue in one plane; these are called curves of double curvature, and require, in analysis, three co-ordinates and two equations.—Curves are said to be of the first, second, third, &c. order, according as their equations involve the first, second, third powers of  $x$  or  $y$ . The circle, ellipse, parabola, and hyperbola are of the second order of curves. There is only one line of the first order—viz. the straight line, which is also reckoned among the curves.—The higher geometry investigates the amount of curvature of curves, their length, the surface they inclose, their tangents, normals, asymptotes, evolutes and involutes, &c.

The number of curves that might be drawn is of course infinite. A large number have received names, and are objects of great interest to the mathematician; see CONE, CIRCLE, ELLIPSE, PARABOLA, HYPERBOLA, CUSPID, CONCHOID, CYCLOID, CATENARY, EVOLUTE.

**Curwen, JOHN** (1816–80), the apostle of the Tonic Sol-fa System, was born at Heckmondwike. In 1843 his *Grammar of Vocal Music* appeared, and in 1864, to push his system, he resigned his charge as Independent minister at Plaistow. See Memorials by his son (1882).

**Curzola** (Croatian *Korčula*), a Dalmatian island, 25 miles long; pop. 20,000 (7000 in the town of Curzola).

**Curzon, GEORGE NATHANIEL**, Marquis Curzon of Kedleston (1859–1925), son of Lord Scarsdale, was educated at Eton and Oxford. He was private secretary to the Marquis of Salisbury (1885), Under-secretary for India (1891–92), and for Foreign Affairs (1895–98). In 1898 as Viceroy of India, with an Irish peerage, he undertook important administrative changes (including the partition of Bengal). During his second term of office he resigned (1905), disapproving the co-ordinate authority given to the Commander-in-chief. In 1911 he was made an earl of the United Kingdom, in 1921 a marquis. He was Lord Privy Seal (1915), Lord President (1916 and 1924–25), and Foreign Secretary (1919) in Coalition and Conservative Governments. He wrote on Russia in Asia (1889), Persia (1892), the Far East (1894), university reform (1909); also *War Poems* (1915) and *Tales of Travel* (1923); *British Government in India* (1925).

**Cusa, NICOLAUS OF** (1401–64), born at Cusa on Kues on the Moselle, studied at Deventer with the Brothers of the Common Life and at Padua. As archdeacon of Liège he took the anti-papal side at the Council of Basel, but was ultimately Bishop of Bixen in Tyrol, cardinal, and papal legate to Constantinople. He exposed the false Isidorian decretals, denounced perverted scholasticism in *De Docta Ignorantia*, taught that the earth went round the sun, and in pantheistic tendencies and otherwise was a precursor of Giordano Bruno.

**Cuscus**, a marsupial akin to the Phalanger (q.v.).

**Cushing, CALEB**, American statesman, born in Salisbury, Massachusetts, in 1800, was admitted to the bar in 1821, sat in the state legislature and senate, and was elected to congress in 1835–43. He arranged the first treaty between China and the United States in 1844; raised and commanded a regiment in the war with Mexico; and was United

States attorney-general in 1853–57, counsel for the United States at the Geneva Conference in 1872, and minister to Spain in 1874–77. He died in 1879.

**Cushman, CHARLOTTE SAUNDERS**, a distinguished American actress, born in Boston in 1816, appeared first in opera in 1834, and as Lady Macbeth in 1835. Miss Cushman played sometimes in high comedy, but her name is identified with tragic parts. In 1844 she accompanied Macready on a tour through the northern states, and afterwards appeared in London, where she was well received in a range of characters that included Lady Macbeth, Rosalind, Meg Merrilees, and Romeo—her sister Susan (1822–59) playing Juliet. Miss Cushman retired from the stage in 1875, and died in Boston, 18th February 1876.

**Cusk.** See TORSK.

**Cusp** (Lat. *cusps*, 'a lance-point'). If we conceive a curve to be generated by a moving point, then a cusp is where the point suddenly stops and

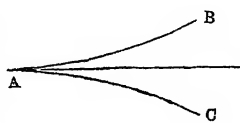


Fig. 1.

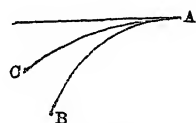
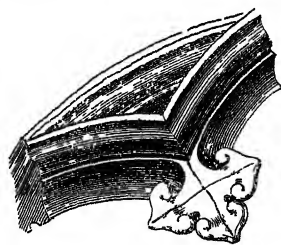


Fig. 2.

returns for a time in the same general direction as that in which it was moving when it reached the cusp point. A later name is 'spinode.' When two branches (as BA, CA) meet a common tangent without extending further, the point of contact is a cusp. Fig. 1 is an example of the first species, and 2 of the second.

**Cusparia.** See ANGOSTURA BARK.

**Cusps**, curved projections or featherings in Gothic tracery, arches, panels, &c. They began in the Early English period, when they projected from the flat soffit of the arch; but they were soon comprised in the mouldings, and generally spring from the inner splay or cavetto. In Decorated and Perpendicular work the points were lengthened, and were frequently ornamented with flowers, heads, &c.



Cusp.

**Cusset**, a small town in the French department of Allier, 2 miles NE. of Vichy, with two mineral springs; pop. 6000.

**Cusso, KUSSO**, or CABOTZ (*Brayera anthelmintica*), a small Abyssinian tree of the order Rosaceae, the dried flowers of which have been long infused in Abyssinia as an anthelmintic. As *Flores Kusso* they were introduced in 1874 into European pharmacy, owing to their efficacy in the removal of tapeworm; but being inferior in this regard to male fern, the drug is now little used.

**Cust, ROBERT NEEDHAM**, was born in 1821, at Cockayne-Hatley, Bedfordshire, studied at Eton, and entered the Indian civil service. He held various important administrative and judicial posts in North India, in 1864–65 was a member of the legislative council, and returned to England in 1869. He was a member of many learned societies at home and abroad, contributed extensively to their Transactions, and published some sixty works on the

modern languages of the East Indies (1878), of Africa (1882), and of Oceania, as well as *Linguistic and Oriental Essays and Sketches of Anglo-Indian Life*. He died 28th October 1909.

**Custard**, a composition of milk or cream, eggs, &c., sweetened with sugar, and flavoured according to taste. Custards are of various kinds, such as plain, baked, lemon, orange, almond, coffee custards, &c. For a plain custard, take four eggs and beat them well with two tablespoonfuls of flour and a little cold milk. Season this with sugar, ground cinnamon, grated lemon-peel, and pour on a pint of boiling milk, stirring all the time. It may be either baked or boiled. If more eggs are used, the flour may be omitted. Flavouring ingredients may be added according to taste.

**Custard Apple**, the name commonly given in the West Indies and other tropical countries to the fruits of certain species of Anona (order Anonaceae, allied to Ranunculaceae). Some of the fruits of this genus are among the most delicious produced in tropical countries, as the Cherimoya (*A. cherimolia*), and even the sweet sop (*A. squamosa*) and the Common Custard Apple (*A. reticulata*), which is a native of America, but is now very common throughout the East Indies. It is a large, greenish, or dark-brown, roundish fruit, sometimes from its size and appearance called Bullock's Heart in the West Indies; the tree is of considerable size. Some other American species and varieties are sometimes called custard apples, and two or three which are natives of Western Africa. *A. muricata*, the sour sop, *A. (Asimina) triloba*, the papaw-tree of the warmer parts of North America, and *A. palustris*, the dog or alligator apple of the West Indies, may also be mentioned. *A. laurifolia* grows in Florida and the West Indies; its large fruit is hardly eatable.

**Custer**, GEORGE ARMSTRONG, American soldier, born in Ohio in 1839, graduated at West Point in 1861, and served with distinction through the civil war, retiring with the rank of major-general. He afterwards held various cavalry commands in the west, and several times defeated the hostile Indians. On 15th May 1876, with a force of 1100 men, he attacked a body of Sioux, afterwards found to number some 9000, encamped on the Little Big Horn, in Montana, and he and his entire command were destroyed. See his *Life* by Whittaker (New York, 1878), and McLaughlin's *My Friend the Indian* (1910).

**Custom**, in law, is either general or particular. For general customs, see COMMON LAW. In order to establish particular customs as law, they must be proved by verdict of a jury, except the custom of the city of London, which is proved by certificate by the lord mayor, aldermen, and recorder. A particular custom must, like a general custom, be established as in force for a time whereof the memory of man runneth not to the contrary. A custom must have been uninterrupted and peaceable, reasonable, and certain; compulsory—i.e. not in the option of every person whether he will use it or not—and consistent with other customs.

The customs and usages of England were adopted by the United States government at its foundation as far as applicable to the condition of the country, and have the effect of positive law. They cannot be set aside by implication, but only by statutes. Customs and usages are frequently invoked in the interpretation of positive law, particularly when a conservative interpretation is required. A marked instance of this is found in the interpretation of generic words used in the federal and state constitutions and laws, so as to deprive women citizens of the right to the elective franchise in a government founded upon equality of citizenship, and to

restrict their industrial sphere. See CUSTOMS DUTIES.

**Customs Duties**, the portion of the revenue derived from a tax on imports. In some countries, customs duties are imposed on certain exports also. The origin of the term is connected with the long conflict between the crown and parliament as to the right of taxation, although the practice it signifies is as old as the Roman empire, and is even to be traced among the ancient Greeks. To meet the claims made by the House of Commons to the exclusive right to vote all supplies, it used to be maintained that there were certain duties on exportation and on importation to which the crown had acquired a right by *custom* (although it is certain that customs duties existed in England prior to the Norman Conquest), and after the power of parliament over this branch of taxation had been fully established it retained its old name. This tax, which originally was a sort of premium of insurance for protection from robbery, after the excise came in force was always applicable distinctively to goods changing place. There were customs not only upon things leaving and things coming to the British dominions, but also upon commodities transferred from one part to another. In Scotland the duty on commodities imported into any town from a foreign country was called the great custom; and the duty charged by a burghal corporation on commodities coming within its walls from the country districts was called the small or petty customs. After 1707 the Scottish customs duties became the same as those of England. At present the term customs duties applies in the United Kingdom solely to the tax levied on commodities imported from abroad.

The tax on imports was of old a simple percentage, familiarly known to the readers of English history as 'tunnage and poundage,' from the method in which it was levied on the tun of wine, or the pound *ad valorem* of other merchandise. These were subsidies granted first to the crown, and then for the maintenance of the authority and dignity of the state. That is to say, they were forms of public revenue; and many complications arose by the additions and alterations of successive governments. Out of this confusion, no doubt, arose the belief that customs duties might be utilised for fostering domestic industries and discouraging foreign competition. When it came to be held as an established principle, with regard to any trade, that the customs should be adjusted in such a manner as either to aid or to impede it, the regulations regarding that trade alone would have complexity enough for a whole code of customs laws, the original object of which was mere revenue. The more complex the arrangements, the more open were they to the operations of the smuggler or defrauder, and, consequently, regulation had to be added to regulation, till the whole became a chaos. Frequently the duties were such as to act as a prohibition to importation, and they always added a heavy increase to the price. Sometimes there would be relaxations in favour of the produce of British colonies, and sometimes of some favoured country with which Britain had a treaty of reciprocity. Then, to encourage trade and manufactures, it was considered politic to allow goods to be imported for re-exportation abroad, or to be imported for the purpose of being worked up into a manufacture, and there would be a difference between the extent of encouragement granted to that manufacture if it were for home consumption or for exportation. The method in which such relaxation was accomplished was at first by charging the duty on the importation, and afterwards repaying it by what was called a 'drawback;' and this was subse-

quently accomplished in an easier method for the importer, by allowing him to 'bond' the goods in the government warehouses until the duty was paid, or the conditions which dispensed with it fulfilled. An ordinary importer was also allowed to 'bond' his goods, instead of being compelled, as in the old times, to pay duty on arrival of the vessel whether he had sold his cargo or not. See **BONDED WAREHOUSES**.

In the year 1825 the laws of the British customs were consolidated into some half-dozen statutes. It will give a conception of the confused and cumbersome condition into which the system had merged, to note that the number of acts repealed on the occasion of the consolidation was 443, and it was afterwards discovered that several had been omitted. There was still a long list of customs duties; but the free-trade legislation of 1846 cleared away a great mass of this burden on the commerce of the country, and there has been steady abbreviation of the list of duties or Tariff (q.v.). One by one, articles of food have been exempted; and nearly the whole customs revenue is now derived from spirits, wine, tobacco, tea, sugar, coffee, cocoa, and dried fruits. The tendency has for some time been to concentrate the customs duties on a few articles, and yet they supply an enormous amount of revenue. The British revenue for the financial year 1921-22 was £1,124,900,000, and to this amount the customs contributed £129,100,000. Down to 1845 the tariff included some 1200 articles.

The defects which, according to the doctrines now prevalent in Great Britain, are to be avoided in a code of customs, are—1. The prohibition or discouragement of the importation of useful commodities; 2. Encouragement to the smuggler; and 3. Loss of revenue by raising the duty to the height which discourages importation. Under the first head, see **CORN LAWS**, and **FREE TRADE**. The second is connected with the view that on stimulants the duty cannot be too high, even though it should greatly impede their importation; but on the other hand, if the smuggling trade be encouraged, the stimulant is not only obtained without any contribution to the revenue, but the people become demoralised and trained to crime. Under the third head a memorable example was furnished by the old sugar-duties of France, which were so high that the native agriculturists could make sugar from beet-root cheaper than the duty-paid foreign sugar.

The collection and general management of British customs duties is under one great central department of the government in London. The office of receiver-general was in 1871 united with that of the comptroller-general, and in 1909 the Excise Department, formerly under the Inland Revenue Department, was united with the Customs Department. The Board of Customs and Excise is under a chairman, deputy-chairman, and commissioners. The annual cost of administration of the Board of Customs and Excise is £2,600,000. See **Atton** and **Holland**, *The King's Customs* (1909).

In the United States the number of dutiable articles is large. Of the total imports the dutiable have nearly half the value of the free goods. In the years 1880-1921 the total imports had a value of from \$668,000,000 to \$3,654,000,000, and the customs duties varied from \$186,500,000 to \$308,600,000, being, next to internal revenue, the largest item in the total national revenue. See also **TAX, EXCISE**.

**CUSTOM HOUSE** (Fr. *douane*, Ger. *Zollamt*), the office at a seaport or frontier where the customs duties are paid, vessels entered and cleared, &c. In England the custom-house officer has the right of personal search only when he has good cause to suspect that contraband goods are concealed about the person. See **SMUGGLING**.

**Custos Rotulorum** (Lat., 'keeper of the *rotuli* or rolls') is the person appointed by the crown to keep the records of the county sessions. The office is an ancient one, and can only be held by a justice of peace. In fact it is usually held by the lord-lieutenant. In practice the rolls are kept by the clerk of the peace, an officer appointed by the *Custos Rotulorum*.

**Custoza**, a village 10 miles SW. of Verona, where the Italians have twice been utterly defeated by the Austrians. On 23d-25th July 1848 Charles Albert was routed by Radetzky with a smaller force, and retreated behind the Mincio; and on 24th June 1866, Victor Emmanuel with 130,000 men was defeated by the Archduke Albert with 75,000 men.

**Cüstrin**. See **KUSTRIN**.

**Cutch** (*Kachchh*), an Indian state within the boundary of Bombay, stretches along the Gulf of Cutch and the Indian Ocean between Gujarat and Sind. Excluding the Rann of Cutch, it is 160 miles long from E. to W., and 30 to 70 broad from N. to S. The state, exclusive of the Rann, consists of 7600 sq. m., is the belt on the seashore, touching Sind, of which it may be regarded as a physical continuation, on the north-west, and being separated by a detached portion of the Rann from Gujarat on the south-east. While the southern edge of this belt is merely a sandy desert, the northern section, traversed lengthwise by two parallel ranges of hills, presents, amid much sterility, many fertile tracts, which yield cotton, rice, &c., and feed a large stock of horses, kine, buffaloes, and camels. The grand defect of the country is the scarcity of water. The mineral productions are coal, iron, and alum. The traces of volcanic action are numerous, and earthquakes also have recently occurred, as in 1819, 1844, 1845, 1864; that of 1819, besides shaking every fortified city to its foundations, and destroying many hundred lives, changed the level of part of the Rann. Pop. (1891) 558,415; (1901) 488,022, the reduction being due to the famine of 1899; (1911) 513,529; (1921) 484,547. The ruler is styled the Maharao (since 1918); about 200 feudatory chieftains are under him. The capital is Bhuj.

The *Rann* or *Runn* of *Cutch*—subdivided into two parts, the smaller, of nearly 2000 sq. m., on the east, and the larger, of 7000 sq. m., on the north—is a desert, being mainly caked, hard ground during the dry season, and then in turn a sort of shallow lake formed by the heavy rains and pent-up tides of the south-west monsoon. It is supposed to have been originally a permanent inlet of the ocean, and to have had its level raised by some such convulsion of nature as that which marked the year 1819. The periodical disappearance of the waters leaves behind it one continuous crust of salt. This dreary waste has a few elevated spots on which a little vegetation grows. Herds of wild asses and clouds of flies are its only inhabitants. A scheme for reclaiming much of this area was approved by the authorities in 1906.

**Cutch**. See **CATECHU**.

**Cuthbert**, ST. OF DURHAM, was one of the three great saints of England in the middle ages, the other two being St Edmund of Edmundsbury, and St Thomas-a-Becket of Canterbury. St Cuthbert was born about 635. A legend, which was long generally believed, tells that he was born in Ireland, and drew his lineage from one of the petty kings of that country; but another tradition fixes his birth in what is now Berwickshire. When the light of record first falls upon him, he was a shepherd boy in the kingdom of Northumbria, which then stretched northwards to the Forth. In 651, while watching his flock by night on the heights of Lauderdale, he believed that he saw the heavens

open, and a company of angels descend upon the earth, and again ascend to heaven, carrying with them the soul of St Aidan, the pious Bishop of Lindisfarne, or Holy Island. The vision determined him to become a monk, and in the same year he entered the monastery of Old Melrose, of which St Boisil was then provost or prior, and St Eata abbot. When the latter removed to the newly-founded monastery of Ripon, Cuthbert accompanied him, and was appointed to the office of superintendent of the guests. In consequence of the dispute as to the keeping of Easter, which was then raging, Eata returned to Melrose, and Cuthbert, having accompanied him, was on the death of St Boisil in 661 elected prior of the monastery. While in this office, he distinguished himself by his assiduity in visiting the surrounding country, and especially the remoter mountain hamlets, sometimes on horseback, but oftener on foot, and labouring by his teaching and example to reclaim the people from the superstitious or pagan rites into which they had fallen. After a few years spent in this way, he left Melrose for the island monastery of Lindisfarne, of which he became prior, his old master, St Eata, being abbot. Longing for an austere life even than the monastic, he quitted Lindisfarne in 676, to become an anchorite, or solitary recluse, in a hut which he built with his own hands on House Island, one of the Farne group. Here, in 684, he was visited by Ecgfrid, king of Northumbria, Trumwin, then bishop of the Picts, and other great men of the north, who came at the request of the synod of Twyford to entreat that he would accept the bishopric of Hexham. He reluctantly complied with their wishes, but shortly after exchanged the see of Hexham for that of Lindisfarne. Still thirsting after solitude, at the end of two years he resigned his bishopric, and returned to his hut, where he died on the 20th of March 687. The anniversary of his death was a great festival in the early English Church, which commemorated also the 4th of September, as the anniversary of the day on which his body was translated to Durham. The influence which St Cuthbert exercised upon his age seems to have been due chiefly to his fervent piety and extraordinary asceticism. The gift of a persuasive tongue is ascribed to him, and he would seem to have had skill and prudence in the management of affairs, but nowhere is there any trace of his learning.

The fame of St Cuthbert had been great during his life; it became far greater after his death. Churches were dedicated to him throughout all the wide country between the Trent and Mersey on the south, and the Forth and Clyde on the north. It is stated that when his tomb was opened at the end of eleven years, his body was found incorrupt, and so, for more than 800 years, it was believed still to continue. It remained at Lindisfarne till 875, when the monks, bearing it on their shoulders, fled inland from the fury of the Danes. After many wanderings it found a resting-place at Chester-le-Street in 883. It was transferred to Ripon in 995, and in the same year it was removed to Durham. Here, inclosed in a costly shrine, and believed to work daily miracles, it remained till the Reformation. The grave was opened in 1826, when a coffin was found to inclose another, which there was reason to suppose had been made in 1104; and this again inclosed a third, which answered the description of one made in 698, when the saint was raised from his first grave. This innermost case contained, not, indeed, the incorruptible body of St Cuthbert, but his skeleton, still entire, wrapped in five robes of embroidered silk. Fragments of these, and of the episcopal vestments, together with a comb and other relics, found beside the bones, are to be seen in the cathedral library.

The asceticism which distinguished St Cuthbert in life, long lingered round his tomb. Until the Reformation, no woman was suffered to approach his shrine. His wrath, it was believed, was equally prompt to avenge every injury to the honour or possessions of his church. A cloth said to have been used by St Cuthbert in celebrating mass was fashioned into a standard, which was believed to insure victory to the army in whose ranks it was carried. Flodden was only one of many fields in which the defeat of the Scots was ascribed to the banner of St Cuthbert.

The Life of St Cuthbert was twice written by the Venerable Bede. Other ancient authorities are Symeon of Durham, and Reginald of Durham. See Raine's *St Cuthbert* (1828), Archbishop Eyre's *History of St Cuthbert* (1849; 3d ed. 1887), and Fryer's *Cuthbert of Lindisfarne* (1880).

The name *St Cuthbert's Beads* has been popularly given to single joints of the stems of fossil Crinoidea (q.v.), which being hollow could be strung on thread, and so made into a rosary.

**Cuticle**, a sheath formed outside a layer of cells, either by their secretory activity or by a modification of their external portions. In the strict sense, a cuticle is not in itself cellular, but consists of the products or of the modified portions of underlying cells. The thin envelope which may be readily stripped off a leech or earthworm when killed in spirit supplies a convenient example. A cuticle is usually formed outside relatively passive cells, but even ciliated Epithelium (q.v.) may have its cuticular outer layer through the pores of which the cilia emerge. By continuous modifications of the cells considerable thickness of cuticle may be developed—as e.g. the hard lining of the gizzard in many birds. By chemical modification of a well-developed cuticular formation very varied protective and offensive skin-structures often result. Thus the peculiar gelatinous, cellulose-containing tunic of Ascidians is for the most part a cuticle; the shells of molluscs are cuticular formations plus lime; the rasps of snails are formed from cuticle; the hard armour of Arthropods is a cuticle associated with the formation of Chitin (q.v.); the bristles, jaws, and firm sheaths of many worms are also cuticular, and so on. For the use of the term in special connections—e.g. the cuticle of the hair or of the teeth, see special articles. The term must not be confused with *cutis*, one of the names for the under skin or *dermis*; nor should it ever be used as equivalent to skin. See CELL, EPITHELIUM, SKIN.

**Cutlass**, a sword nearly 3 feet long, broad and nearly straight, mostly used by seamen of the royal navy. The word, from French *coute-las*, Latin *cultellus*, is also found in the form *curtal-axe*, which is not connected with *curtal* or with *axe*. See SWORD.

**Cutlery**, the general name given to such cutting instruments as knives, scissors, razors, as well as forks. The making of axes, chisels, and saws is rather the business of the tool-maker than of the cutler. Shells, flints, and other sharp-edged stones formed the rudest and most ancient cutting instruments, and early traces of human existence in Britain and elsewhere are associated with stone 'celts' and other weapons and cutting implements. These were followed by bronze weapons and other articles, including reaping-hooks. In the museum of Bologna there are ancient Etruscan bronze knives carved in form somewhat like modern reaping-hooks, and in the great Naples collection of objects from Pompeii and Herculaneum, there are sickles, bill-hooks, knives, lancets, and spring-shears, some of which are made of iron or steel, as well as of bronze. These are of course ancient Roman.

Bronze, like steel, can be hardened, but by opposite means, since it is softened by sudden and hardened by slow cooling. The ancients appear to have been great experts in the tempering of bronze.

The Anglo-Saxons had knives somewhat resembling a razor-blade. They had forks also; but it would appear that these were employed for serving, not for use in feeding. The custom of using forks for eating with came from Italy, and was not known in England till the reign of James I. Before that, people fed themselves with their fingers, as is still the practice in the East. The Persians so much prefer this custom that they contemptuously call a fork a claw. Up to the end of the 15th century knives do not appear to have been much used at table, but as in those days everybody carried a knife in his girdle, it probably served to cut meat with as one of its applications. Spring-shears of the ancient Roman form were the only kind known up to Norman times, and probably even till the 15th or 16th century.

The London cutlers obtained a charter of incorporation in 1417 from Henry V.; but long before that knives were made at Sheffield, as the 'whittle' of that town, or village, as it would then be, is incidentally mentioned by Chaucer. Knives, sickles, shears, and scissors are named as being made in Sheffield, when the Hallamshire cutlers were incorporated in 1624. Cutlery was not then however an English specialty; and England still imported iron and steel goods largely from the Continent; and in England, Birmingham was in the 17th century regarded as the home of smiths and cutlers. The vast increase in the size of Sheffield since 1800 shows that it is chiefly during this century that its cutlery wares have expanded from being a mere inland into that of a world-wide commerce.

*Table-knives.*—Of these the best kinds are made by hand, and have the blade of steel, while the shoulder and tang, to which the haft is fitted, is of malleable iron. From the end of a thin bar of steel, which has been carefully brought to a proper heat, the blade is roughly forged, cut off, and welded to a piece of iron for the tang and shoulder. The latter, usually called the 'bolster,' is formed by crushing the hot iron between a pair of dies, and the tang drawn out by some strokes of the hammer. After reheating, the blade is again hammered and the maker's name stamped upon it. The next stage, that of hardening and tempering, is all-important in every kind of steel cutting instrument. Raising the blade to a dull red heat and then plunging it in cold water hardens it, but at the same time makes it brittle. The brittleness is removed and the steel made flexible by the process of tempering, which consists in again heating the blade till it acquires a bluish colour, and at this moment putting it back into the water. After tempering, the knife passes to the grinder, who smooths the bolster and works the blade a little on the grindstone. But the blade still requires to be made quite straight in the smithy, and again ground. The finishing processes of lapping, glazing, and polishing follow, in which different wheels are used along with emery and polishing-powder. The lap is covered with an alloy of tin and lead, and the glazing and polishing wheels with leather. Bone, ivory, horn, and other materials are employed for the hafts, but these are prepared by a different set of workmen.

Machinery is now used for the manufacture of blades of common table-knives, in which case blade, bolster, and tang are made of one piece of steel. A few strokes of a steam-hammer shape the blade, and without reheating the shoulder is formed, but it requires to be heated again for drawing out the tang. The blade is next reheated and hammered

thin, and then the whole of the metal portion of the knife is pressed into dies to give it the exact shape and size. Grinding and the finishing processes now follow.

Very cheap knives are made by simply 'flying' (i.e. pressing into dies) the blade and tang out of a cold sheet of steel at one operation, and dispensing with a shoulder.

*Forks.*—These are made from a bar of steel three-eighths of an inch square. The forger begins by forming the tang, shoulder, and shank. He then beats out flat a square piece left at the end for the prongs. In the next stage the whole is heated till it is soft, and pressed with some force between two halves of a die, which roughly form the prongs. The fork is afterwards filed, ground, brightened, and hafted. Forks of an inferior kind are cast.

*Spring-knives.*—Pocket-knives are of much more modern date than those used at the table. The earliest piece of cutlery made at Sheffield, or perhaps in England, was called a *thwytel* or *whittle*, and served for a weapon as well as for other purposes. At a later time the jack-knife appeared, which was made to shut into a groove in the handle, but had no spring. Some spring-knives are believed to have been made as far back as the beginning of the 17th century; but it was not till about 1820 that a spring-knife of the type now so much in use was invented by the first Lord Wharnclyffe, or at least was named after him. The process of making the blade of a spring-knife does not differ much from that already described for a table-knife. Sometimes the springs are forged, but others are 'fied'—i.e. formed at a single blow out of a piece of steel. The inner scales of the haft are made of brass or iron, and sometimes of a more expensive metal; while a still greater variety of material, such as hard wood, horn of various kinds, ivory, bone, and tortoise-shell, is used for the outer scales.

*Razors.*—The use of the razor goes back to a very remote period. It is referred to in the book of Numbers, and was used by the ancient Egyptians as well as by the Greeks and Romans. The blade of a razor is forged from a piece of steel of the thickness of its back, and half an inch wide, the concave sides being formed on the rounded edge of the anvil. In the smithing process which follows, the workman hammers it to make it compact, and at the same time shapes it into proper form. It is next ground, hardened, and tempered; after which it is once more ground, and then lapped, glazed, and polished. The best qualities of razors are made of the finest cast steel, and are manipulated with great care in every stage of their manufacture. But there is always some uncertainty about the quality of a razor even when made with the utmost skill and care and from the best material. Perhaps this explains why high-priced razors are not in great demand, at least in Great Britain.

*Scissors.*—A blade is forged from a flat bar of steel, and this, including a bit for the shank and bow, is then cut off. Next a hole is punched for the bow to admit of its receiving the point of a small anvil upon which it is roughly shaped. After reheating, the bow is further shaped, the shank formed, and both filed. The joint is now squared, and the hole bored for the rivet or screw. Grinding and smoothing of the blade follow, and then the two are screwed together. If they work smoothly, they are ready for hardening and tempering, but the screw is first removed and the two halves wired together. Afterwards the scissors are ground and passed through the finishing processes already described.

Only the more important processes have been mentioned. The subdivision of labour is very fully

carried out in the cutlery trade, so much so that the man who forges the pen-blades does not forge the larger blades for the same knife. It is the same with those who grind the blades. Including those of a comparatively trivial nature, an ordinary three-bladed pocket-knife goes through more than a hundred processes. Moreover, the use of machinery is extending. Cutting, punching, grinding, and so on can be done much more rapidly and accurately by machines than by hand. Especially is this so since the introduction of stainless steel (containing chromium) and of stainless iron.

The grinders in former years suffered so much from the fine particles of stone and metal which pervaded the atmosphere of the workshops that their average age did not exceed twenty-nine. This was especially the case with those engaged in dry-grinding, which, for example, was that used for forks. In wet-grinding, the water on the stone prevented the escape of particles of matter through the room. The evils of dry-grinding it has been sought to remove by the application of a fan with a properly constructed flue, which withdraws the grit and steel dust as it is produced.

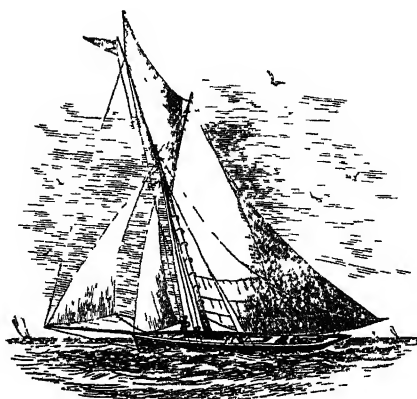
The manufacture of 'scales,' or hafts, or handles, is to a large extent a separate trade. Ivory, wood, bone, &c. are all employed for the purpose. Ivory was long so popular a material for knife-handles that Sheffield has in some years consumed the tusks of 20,000 elephants; but owing to its increasing scarcity and price, various substitutes are now employed. In trading with savage people it is curious how they will sometimes unexpectedly reject a useful article on account of its colour. For example, the Fiji Islanders a few years ago, if not now, would on no account accept in baiter a white-handled knife, but would readily take one with a black handle.

In cutlery France and Germany are now competing with England in many foreign markets; but the trade has again shown a tendency to increase in Sheffield. The manufacture is now also extensively carried on in the United States. In France the headquarters of cutlery are at Thiers, Langres, Nogent, Châtellerauld, and Paris, where the finest surgical instruments are made. Solingen is called 'the German Sheffield;' but Remscheid, Suhl, Schmalkalden, and many other towns produce knives and the like. Swedish razors are famous. See also SWORD, STONE AGE, &c.

**Cuttack** (*Kataka*, 'the fort'), the capital of a district in Bihar and Orissa, stands immediately below the bifurcation of the Mahanadi, thus occupying the apex of the delta of that river, a position advantageous both in military and commercial respects. The city, which is 220 miles SW. of Calcutta, is chiefly notable for its filigree-work in gold and silver. Ravenshaw College is an external college of Patna University. Pop. 53,000.—The district is the central one of the Orissa division, and has an area of 3654 sq. m., and a pop. of 2,000,000.

**Cutter** is a name given to two kinds of small vessels. The cutters used by yachtsmen and revenue cruisers, which are built with especial reference to speed, have a single mast, and a straight running bowsprit that can be run in on board occasionally. They are much like sloops in rig, but have larger sails. Such small vessels occasionally venture on long voyages. In 1857 the *Charter Oak*, a cutter of 23 tons, crossed the Atlantic from New York to Liverpool. In 1865 the *Alert*, a cutter of 56 tons yacht measurement, made the voyage from England to Sydney (Australia) in 108 days, including 5 days' detention at the Cape of Good Hope. From that time to this, long voyages with vessels of this class, especially across the Atlantic, have been matters of common

occurrence. See YACHT; for the other kind of



Cutter.

cutters, see BOAT.—In the United States, very long sleds, for coasting, are called *cutters*.

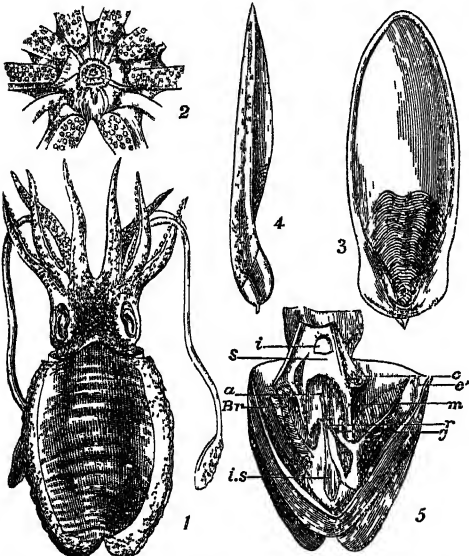
**Cuttings** are branches or portions of branches of trees or shrubs, employed to produce new plants, by burying the lower end in the earth so that new roots may arise from the nodes. Nothing is more easy than to propagate willows, fuchsias, pinks, geraniums, currants, gooseberries, &c. in this way; but many other plants, commonly propagated by cuttings, require greater attention on the part of the gardener, warmth, a uniform damp atmosphere, and shade. The term cutting is, however, usefully extended by most horticultural writers to any part of a plant which can be separated to become an individual similar to its parent; thus some plants may be propagated most readily from simple leaves or portions of leaves, others from a segment of stem bearing a single leaf with a bud at its base, others from offshoots at the base of the parent plant, some again from the younger shoots, and others from partially ripened wood, and so on. Hence there is room for considerable experience and skill, and detailed instructions should be sought by the amateur florist in works on horticulture (e.g. Johnson's *Dictionary of Gardening*). The most convenient general method, however, is to strike cuttings in well-drained shallow pots or boxes of silver sand overlying a little sandy peat or loam; shade and water being applied with discretion, and bottom heat only in special cases, which of course include the majority of stove plants. Hardy fruit-trees may be best propagated by cuttings taken after the fall of the leaf, and planted on the north side of a wall, but not so close as to be constantly in shade.

**Cuttle-fish** (O.E. *cuðele*), strictly speaking, a member of the genus *Sepia*, more generally applied to any Cephalopod (q.v.). A brief account is here given of the structure, life-history, and habits of the common British species (*Sepia officinalis*, Linn.), with a tabular indication of its relationships.

The *Sepia* (fig. 1) measures from six to ten inches in length, and its colour varies from pale gray to dark brown or neutral tint. The body is oval, flattened from above downwards, and contained in a tough muscular sac (mantle), which expands along the whole of either margin into a narrow fin. The integument consists of a single layer of cells, lying upon connective tissue, in which are imbedded 'chromatophores,' or cells charged with variously coloured pigment-granules. By expansion of the cell the pigment is diffused, and by its contraction concentrated, hence the rapid flashes of changing

colour for which the cephalopoda as a whole are so remarkable.

The head is broad, and contains a cartilage of complex shape which protects the central nervous system, and forms a socket on either side for the large eye; this has a bright green lustre during life, the black pupil is shaped like the Greek letter  $\omega$ , and there are two eyelids, the upper coloured, the lower white. The front of the head is occupied entirely by the bases of the arms and the mouth. The former are ten in number, eight of



1, *Sepia officinalis* from the dorsal aspect; 2, view of the Mouth, showing its Lip and the bases of the Arms and Tentacles; 3, the Shell seen from the ventral surface; 4, the same in lateral view; 5, the Animal with the Mantle divided in the middle line to expose the Branchial Cavity:

*s*, siphon; *i*, its valve; *c*, pit in the base of the siphon; *c'*, prominence on the mantle which fits into it; *m*, muscle passing backwards from the siphon to the mantle; *a*, termination of the intestine. *Br*, gill; *r*, renal opening; *g*, genital opening; *u. s.*, ink sac. At the base of the right gill a portion of the membrane has been removed to show the branchial heart.

them being alike, oblong in transverse section and tapering off to slender extremities; they have the surface which is turned towards the mouth covered with suckers in four longitudinal rows. The suckers consist of a muscular periphery, strengthened by a horny ring; a fleshy pad acts like a piston in the base of this latter. Each sucker is mounted on a short flexible stalk. The two remaining arms, known as 'tentacles,' occupy the interspaces between the ventral arms and those next to them. They are twice as long as the others, and have a cylindrical stem, slightly expanded at the extremity into a club furnished with larger and smaller suckers. They can be withdrawn into pockets situated beneath the eyes, and are carried in this position when not in use. The mouth (fig. 2), situated in the centre of the roots of the arms, is surrounded by a lip with seven prominent angles, which bear small suckers in some species, and have been compared to rudimentary arms. Projecting from it may be seen the two black horny mandibles, shaped like those of a parrot, but with the lower overlapping the upper.

On the lower aspect of the animal, between the muscular sac and the body proper which contains the viscera, is a hollow space, the 'branchial' or

'mantle-cavity.' When this is opened by a longitudinal incision it is seen to contain the following structures (fig. 5). Anteriorly is the base of the 'siphon,' or 'funnel,' *s*, a conical tube containing a valve, *i*, through which water can be forcibly expelled by the contraction of the mantle. At its posterior margin on either side is an almond-shaped depression, lined with cartilage, *c*, into which fits a prominence on the inner surface of the mantle, *c'*, an arrangement which largely contributes to the solidarity of the body as a whole. Lying along the middle line is the terminal portion of the intestine, *a*, furnished with two small flap-like appendages of uncertain function, and on either side, a little farther back, is a small papilla, *r*, upon which the kidney opens, and on the left side only, the genital orifice, *g*. Two large gills, *Br*, are situated in the lateral recesses of the mantle-cavity, each consisting of an arterial stem running up the attached side, and a venous stem passing down the other aspect, the bulk of the organ being made up of a series of folds passing transversely from one to the other, and richly supplied with vessels containing the blood to be aerated. Respiration is carried on by rhythmic contractions of the mantle, in consequence of which water enters at either side, passes over the gills, and is expelled by the siphon; this takes place about seventy times in a minute.

On the dorsal side of the animal, immediately beneath the integument, is a closed sac which contains the internal shell (cuttle-bone, sepistostere, figs. 3, 4). Speaking generally, this may be said to be of an elongated spoon or boat shape; it consists of a horny lamina, which gives it its characteristic outline, extending also into the small cone at the back, which in many species is much larger than in the one now under consideration, and has been compared with the guard of the Belemnite (q.v.). On the dorsal surface is a granular calcareous deposit; while the concave ventral aspect of the spoon is occupied by a series of layers of calcareous matter, which are deposited in succession and do not entirely cover each other, so that the hinder portion of this surface presents a striated appearance due to their parallel margins. This part of the shell is porous and extremely light, the interstices being filled with air. These shells are imported into Liverpool in some quantity, and ground into fine powder to form a dentifrice.

**The Digestive Organs.**—Within the beak above alluded to is a solid muscular mass (buccal cone), part of which is devoted to its movements. Through its centre passes the gullet, the lower wall of which bears a most remarkable organ, the tooth-strap or 'radula'; this consists of seven longitudinal rows of horny teeth, which are secreted by certain special cells of the epithelium, and whose apices are directed backwards. They can be moved to and fro by appropriate muscles. Behind the buccal cone the oesophagus bears the salivary glands, and still farther back it opens into a round saccular stomach with muscular walls. A large bilobed gland, commonly called 'liver,' but having the functions of a pancreas, is situated on the oesophagus. Lying parallel to the terminal portion of the intestine is the 'ink-bag,' *u. s.*, a hollow gland opening near the anus, and furnishing a deep-brown fluid, which is ejected by the animal when alarmed in order to conceal its retreat. When genuine, the pigment known as 'sepia' is prepared from it.

**The Circulatory Organs.**—The heart is situated posteriorly, and consists of a pear-shaped sac which receives on either side a vein from the gills, dilated just before its termination into a muscular contractile antechamber or auricle. It gives off an artery anteriorly to supply the head and arms, and one posteriorly to the abdominal organs. The

blood, after being distributed throughout the body, is collected in veins which traverse the walls of the kidneys and pericardium, and eventually pass to the gills, at the base of which a muscular dilatation (branchial heart) is situated, serving to effect the circulation of the blood through the gills.

The *Nervous System* consists of the three pairs of ganglia common to the Mollusca concentrated round the oesophagus. One pair (pedal) supplies the arms and siphon; a second (plemo-visceral) the gills, viscera, and mantle; a third (cerebral) the head and eyes. In the mantle on either side is a large nervous mass (ganglion stellatum) situated on the pleural nerve, and supplying the mantle. In addition to these parts, and connected with them, there is a system of so-called 'enteric' nerves, springing from the buccal ganglia, which lie on the oesophagus just in front of the cerebral ganglia.

Of the *Organs of Sense* the eyes are the most conspicuous. They occupy depressions in the head cartilage, the hinder part of which is occupied by the optic ganglia, ocular muscles, and a white glandular substance of unknown function. The retina consists of an inner layer of rods with swollen bases, and an outer layer of nucleated cells with a limiting membrane between them. The retinal chamber is closed in front by a spheroidal lens, made up of an inner and outer portion, which are secreted separately by an epithelial structure occupying a groove round its equator. In front of the lens is the iris, supported by a cartilage and containing a sphincter muscle; the outer surface of the whole is formed by the transparent cornea, which, though continuous in the Sepia, is perforated in a large group of Cephalopoda (Cegopsida).

The so-called *ears* are a pair of small closed vesicles, imbedded in the head-cartilage, and supplied by nerves which, though apparently springing from the pedal ganglia, really have their origin in the cerebral. The function of these organs is almost certainly to maintain the equilibrium of the body. A ciliated pit, usually considered to be *olfactory* in function, lies behind each eye.

*Generative Organs.*—The sexes are separate. The testis and ovary are both single and situated in the hinder part of the body; the latter lies in the visceral sac or pericardium above described, the former in an almost closed diverticulum of it. The eggs have a tough capsule, with a projection at one end and a kind of handle at the other by which they are attached in bunches to a twig of seaweed or other similar substance. As in the hen's egg, the proportion of nutritive to formative yolk is very large, and the embryo, as it develops, comes to stand head downwards on the former.

*Habits.*—The animals are found in littoral regions or in moderately deep water; ordinarily they rest horizontally on or near the bottom, the fins gently undulating, the tentacles retracted, and the arms depressed (see cut at CEPHALOPODA). Progression may take place by means of the fins with considerable rapidity in either direction, the funnel being turned so that the stream of water issuing from it assists in propulsion; rapid darts backwards when the animal is alarmed are brought about either by the sudden ejection of water through the siphon, or by spreading out and reuniting the arms. When feeding, the Sepia remains motionless till its prey is within striking distance; then the dorsal arms are raised, the others open out sideways, the tentacles are shot forth with the rapidity of lightning, and the victim seized between their terminal clubs (see cut at CEPHALOPODA).

*Distribution.*—Over seventy recent species of Sepia have been described, of which about sixty may be regarded as valid. By far the greatest number belong to the Indo-Malayan region, whilst,

with one exception, none occur on the shores of the New World. About a dozen fossil forms have been recorded from Tertiary deposits. For large and fabulous Cephalopods, see OCTOPUS, SEA-SERPENT.

**Cutty Stool.** See STOOL OF REPENTANCE.

**Cutworm,** a term used loosely of worms or grubs destructive to cabbage, beans, &c.

**Cuvier, LÉOPOLD CHRÉTIEN FRÉDÉRIC DAGOBERT,** better known as GEORGES, a great comparative anatomist, the first to unite the palæontology of extinct forms with the anatomy of the extant, important also as an educationist, was born on the 24th August 1769, in the town of Montbéliard, at that time belonging to Wurtemberg. His ancestors were Protestant refugees from the Jura. He was destined by his parents for the church, but early exhibited a predisposition for natural history. In his education at Stuttgart, he came under the happy influence of the botanist Kerner and the zoologist Kielmeyer. At the age of eighteen he became tutor in a family living near Caen, in Normandy. There the abundant fossil Terebratulæ of the shore, the cuttle-fish and other molluscs landed by the waves, excited his eager interest, and became subjects of close study. There too he was introduced to Geoffroy St-Hilaire and other Parisian savants. Geoffroy at once recognised his abilities, and invited him to Paris. Cuvier accepted the invitation, became first assistant, and then professor of Comparative Anatomy in the Jardin des Plantes. Elected a member of the French Institute in 1795, he became in 1803 permanent secretary of the Academy of Sciences. In 1808 he undertook the reorganisation of public instruction, and shortly before the fall of Napoleon was admitted into the Council of State. After the Restoration he was made Chancellor of the University of Paris. After a visit to England in 1818, where he was received with great honour, he was, in 1819, admitted into the cabinet by Louis XVIII., and in 1826 was made grand-officer of the Legion of Honour. His decided opposition to the royal measures for restricting the freedom of the press lost him the favour of Charles X. Under Louis-Philippe he was made a peer of France (Baron Cuvier) in 1831, and in the following year he was nominated Minister of the Interior. Then his career was terminated suddenly from an attack of paralysis of which he died, May 13, 1832.

Cuvier's life was characterised by extraordinary activity. In his plans for the extension and improvement of national education, in his efforts for the welfare of the French Protestant Church, and in his scientific work, he was alike zealous and indefatigable. On every hand he gave evidence of gigantic intellect, and of honest, resolute character. He was conspicuous for an unsurpassed grasp of concrete facts, rather than for originality of suggestion or power of generalisation, and remained a vigorous and formidable opponent of the Theory of Descent.

In several departments of zoology, Cuvier's indefatigable industry and giant intelligence achieved great progress. (1) By marvellous energy in collecting, examining, and dissecting, he vastly increased the circle of accurately known forms, both living and extinct. (2) This was done, however, in a way which combined depth of insight with increasing breadth of view. He penetrated below external form to the internal structure, and not content with empirical dissection, rationalised his results in the first systematic comparative anatomy. His profound anatomical studies led him further to appreciate more clearly than heretofore the unity of the organism and the mutual dependence of its parts. In clearly defining the principle of the

correlation of organs, he recognised, to quote his memorable words, that 'the organism forms a connected unity, in which the single parts cannot change without bringing about modifications in the other parts.' (3) In his hands classification became more natural, being more thoroughly based on real similarities of structure, and less on superficial resemblances. He recognised the existence of four great types—Vertebrate, Mollusc, Articulate, and Radiate, a classification independently confirmed by the embryological researches of Von Baer. Although his four types are now known to give a false simplicity to nature, the establishing of structural classification, followed out in his subdivisions, introduced a new order in the animal kingdom. (4) Before his work, fossil forms had been very scantily known, and still less understood. His researches, however, especially among vertebrate remains, not only revealed an undreamt-of wealth of entombed forms, but disclosed to some extent the relation between the living and the dead. For the first time palæontology was linked to comparative anatomy, and the new contact brought fresh light. Yet it must be remembered that to him the Linnean dogma of the constancy of species seemed unassailable. Clear as he was in regard to the existence of fundamental and recurrent types, he was as determinedly opposed to the suggestion of Buffon, Lamarck, and others, that animals were connected by common descent.

Among Cuvier's more important works are the following: *Leçons d'Anatomie Comparée* (1801-5); *L'Anatomie des Mollusques* (1816); *Recherches sur les Ossements Fossiles des Quadrupèdes* (1812); *Discours sur les Révolutions de la Surface du Globe* (introduction to the last); *Histoire naturelle des Poissons* (1828-49), written in concert with Valenciennes. Better known perhaps than any of these is the work which has passed through so many editors' hands—*Le Règne Animal distribué d'après son Organisation* (1817), more familiar in the enlarged and elaborated form which it received under the editorship of Cuvier's school. Important too for the history of zoology are numerous éloges and historic reports delivered on various occasions throughout Cuvier's life.

See Mrs. R. Lee's *Memoirs of Baron Cuvier* (1833); Pasquier's *Éloge de Cuvier* (1833); Carus's *Geschichte der Zoologie* (1872); Haeckel's *History of Creation* (1876); Ducrotay de Blainville's *Cuvier et St Hilaire* (1890).

**Cuxhaven**, a port and watering-place, on the southern bank of the Elbe, at its mouth in the German Ocean, 72 miles NW. of Hamburg by rail. The port whence the Hamburg steamers ply when in winter the Elbe is frozen over, Cuxhaven has an old castle and a free port. Its fish trade has greatly developed. Cuxhaven belongs to Hamburg. Population, 15,000—in summer doubled by visitors.

**Cuyabá**, the capital of the Brazilian state of Matto Grosso, occupies pretty nearly the centre of South America. It stands on the left bank of the Cuyabá River, 980 miles NW. of Rio de Janeiro. Founded by gold-diggers in 1719, and wrecked by an earthquake in 1746, it is now a well-built place, with a cathedral and 34,000 inhabitants. It can be reached by the rivers Paraná and Paraguay, a voyage of 2500 miles from Buenos Aires.

**Cuyp**, or **KUYP**, **JACOB GERRITSE**, commonly called the Old Cuyp, was born at Dordrecht in 1575. Jacob Cuyp's representation of cows and sheep, battles and encampments, are clever, but his fame rests principally upon his excellent portraits. His colouring is warm and transparent; his manner, free, and spirited. Cuyp was one of the four founders of the Guild of St Luke at Dordrecht, and died after 1649.—**ALBERT CUYP**, Jacob's son, was also born at Dordrecht, in 1620.

He excelled in the painting of cattle grazing or reposing, moonlights, wintry landscapes, still waters with ships, horse-markets, hunts, camps, and cavalry-fights; and in rendering effects of warm golden sunlight he is without a rival. During his lifetime and long after, Albert's pictures, although in many respects equal to those of Claude, were held in little estimation. Opinion, however, has now changed regarding them, and a fine example of his art has realised over £5000. England is particularly rich in his works, the National Gallery possessing eight of his subjects. He died at Dordrecht, 1691.—**BENJAMIN CUYP**, a nephew of Albert, was born at Dordrecht in 1608, and became a member of the guild there in 1631. He painted biblical pieces in Rembrandt's style, and familiar scenes of country life. His best works are in the manner of Teniers. His seashores have less repute.

**Cuzco**, a city of Peru, stands 11,440 feet above sea-level, in a valley of the Andes, 345 miles ESE. of Lima. It was the ancient capital of the Incas (in whose language, says Garcilaso, Cuzco signifies 'navel'), and at the time of its conquest by Pizarro (1533) had 200,000 inhabitants. Now it has 10,000 to 15,000, but it is one of the finest cities in the republic, with a cathedral (1572-1654), a so-called university (1598), and some remnants of Cyclopean architecture.—Cuzco gives name to a department, with about 440,000 inhabitants. See **PERU**.

**Cyanamide**. See **MANURES**.

**Cyanate**. See **CYANOGEN**.

**Cyanide**. See **CYANOGEN**, **HYDROCYANIC ACID**. Gold is extracted by dissolving it in a solution of potassium cyanide, from which it is precipitated by zinc or by electrolysis. See **GOLD**.

**Cyanite**. See **KYANITE**.

**Cyanogen** (**CN**)<sub>2</sub>, although intrinsically of little importance, is one of the most interesting compounds of carbon. It was the first known compound body which was proved to be able to unite with elements in the same way as these substances unite with each other. Thus hydrogen, H, unites with chlorine, Cl, to form hydrochloric acid, and sodium, Na, unites with chlorine to form chloride of sodium, NaCl. Like these elements, H, Cl, or Na, each a single substance, the group CN, consisting of 12 parts of carbon and 14 of nitrogen, enters into combination, acting as if it also were for the time being an element; thus it forms cyanide of sodium, NaCN, or NaCy, and hydrocyanic acid, HCN, or HCy.

Cyanogen is a colourless, poisonous gas, which burns with a purplish flame. It is soluble in water, and can be condensed to a liquid, under a pressure of about four atmospheres (60 lb. per sq. inch). It may be obtained by heating the cyanide of mercury, HgCy<sub>2</sub>, when the cyanogen passes off in the gaseous state.

Cyanogen forms poisonous compounds with metals called *cyanides*, of which *cyanide of potassium* (see **POTASSIUM**) is important in photography, metallurgy, and electroplating. With hydrogen it forms the deadly prussic acid or Hydrocyanic Acid (q.v.), while it is united with oxygen in cyanic acid. When air is passed over fused barium or calcium carbide in an electric furnace, barium or calcium cyanide is formed from which the alkali salts may be prepared.

*Cyanic Acid* is a compound of cyanogen which can hardly be prepared in the free state, owing to its great tendency to decompose. It forms a class of salts called *cyanates*, of which the chief is the cyanate of potash. This salt is produced when cyanogen gas is passed into solution of potash. The formula of cyanic acid is HCNO, or HCyO.

**Cyanophyceæ**, or blue-green algae, a class of unicellular or filamentous plants, often found united together in colonies by the gelatinous swelling of the cell-wall. They are found in water, on damp surfaces of earth, rocks, trees, &c., and in symbiotic union with other plants such as fungi (see LICHENS), Azolla, and Cycads. There is a chromatophore in the form of a hollow cylinder or sphere, containing chlorophyll, phycocyan (a blue-green pigment), and sometimes phycoerythrin (a red pigment). Reproduction is always vegetative. The mass of cells formed by division may remain together in a colony. Some form resting-spores, enlarged cells with thickened walls. Modified cells, called heterocysts, are found in some filaments. These are not understood. See NOSTOC.

**Cyanophyll**, the bluish-green constituent of Chlorophyll (q.v.).

**Cyano'sis** (Gr. *kyanos*, 'blue'), lividity of complexion, with fullness of the capillaries and minute veins, especially of the face and lips. A name characteristically applied to the colour in certain cases of congenital disease or malformation of the heart. See HEART.

**Cyanotype** is a photograph obtained by the use of a cyanide. See PHOTOGRAPHY.

**Cyathea**. See TREE-FERNS.

**Cyathium**, a very curious inflorescence hardly to be distinguished from a single flower, found in some Euphorbiaceæ (q.v.). If a Spurge (q.v.) be examined, there will be found in the middle a female flower, consisting of a three-capped ovary, borne on a long stalk. It may have a perianth. Around it in five groups are male flowers, each reduced to one stamen, and marked off from its stalk by a joint, the oldest flowers being nearest the centre. Opposite these, five bracts enclosing the whole give the appearance of a perianth. Between the bracts are four horn-shaped glands which secrete nectar. The fifth gland is wanting, and the female flower dangles over in the gap. The cyathia are grouped in dichasia. In some the female flower remains rudimentary. In *Anthostema* each male flower has a perianth at the joint, and the female has also a perianth.

**Cybele** (called also *Agdistis* and *Dindymene*), an ancient goddess whose worship was universal in Phrygia, and widely spread in Western Asia as that of 'the great mother' or 'the mother of the gods.' She seems to have been a nature divinity, whose worship was attended with wild orgiastic rites, many of which were adopted by the Greeks from the eastern nations. The Greeks, moreover, identified the oriental Cybele with their ancient earth goddess Rhea, whose worship seems to have originated in Crete, where she is associated with the Curetes. Among the Romans she was considered as identical with Ops, the wife of Saturn, and mother of Jupiter. In Phrygia her priests were the Corybantes, who worshipped her noisily with drums, cymbals, and horns, dressed in full armour. The Roman priests of Cybele were often called Galli. In art Cybele is usually represented seated on a throne, adorned with a mural crown, with lions crouching to the right and left, or sitting in a car drawn by lions. See RHEA.

**Cycads**, or CYCADACEÆ, an order allied to Coniferae (see GYMNOSPERMES), and to ferns, in vegetative appearance resembling ferns and palms. The stem, which is externally covered with leaf-bases, may be so short that the crown of leaves arises little above the surface of the ground; more frequently, however, it rises to a height of a few feet, then resembling a tree-fern; and in exceptional cases (e.g. *Macrozamia Hopei* of northern Queensland) may attain a height of 50 or 60 feet. The armour of leaf-bases may be poorly

developed or wanting where the stem, as in some cycads, is entirely underground. The

foliage-leaves, which develop under the protection of reduced bud-leaves, are usually pinnate, and mostly parallel-veined, or, rather, fork-veined; but in *Cycas* we have a middle vein only, and in the curiously fern-like *Stangeria* a mid-vein with reticulated lateral branches. The leaves become more or less leathery, and sometimes very hard and spiny at the tips and on the edge. In *Cycas* the pinnæ are circinate in bud as in ferns, although the midrib is straight; conversely in *Zamia*, the leaf itself is inrolled, although the pinnæ are straight; in others, however, where both are straight, the pinnæ overlap each other from above downwards, as in the moonwort fern (*Botrychium*). A new crown is developed at intervals of a year, two years, or more. The old leaves droop, lose their pinnæ, and finally drop off, leaving the base attached. The stem is of complex internal structure, but is thickened by permanent cambium. Growth-rings answer to periods of growth and rest. It may bear lateral buds on the axils of old leaves, especially in unhealthy plants; and these may fall off and propagate the plant. Except in the female plant of *Cycas* the stem is really a sympodium, and the cone is thrust aside by a branch which looks like a continuation of the axis. Dichotomy of the roots occurs; this, however, not as a normal development, but due simply to irritation by 'bacterioids'

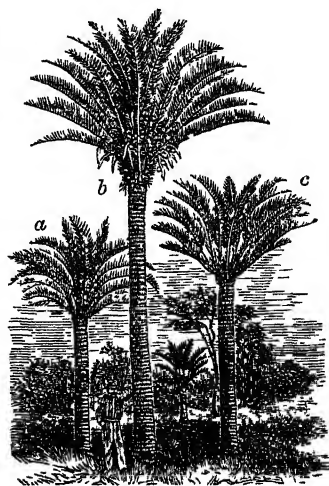


Fig. 1.

a, *Cycas Normanbyana*; b, c, *Cycas metul*

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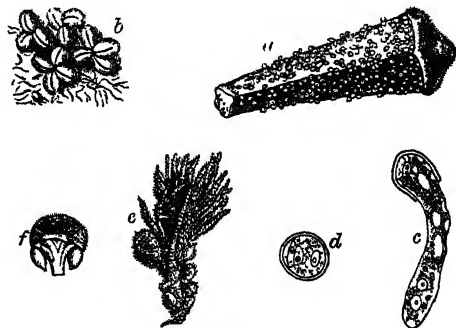


Fig. 2.

a, Stamen of *Cycas circinalis*, under surface; b, group of pollen sacs (Microsporangia); c, pollen-grain of *Ceratozamia*; d, the same germinating; e, carpellary leaf of *Cycas revoluta*, with lower pinnæ reduced and bearing ovules; f, stamen of *Zamia integrifolia*.

and a blue-green alga (*Anabæna*), which commonly invest the root, and inhabit the cortex, causing the root to grow upward and appear above the ground as a coralloid mass (see SYMBIOSIS).

The exceedingly primitive male and female flowers are found on separate plants, and are respectively composed simply of stamens and of carpels, in both cases usually spirally aggregated as cones. The stamens are reduced and undivided leaves bearing on their dorsal surfaces a usually indefinite number of pollen-sacs, so furnishing a perfectly intermediate form between the sporangium-bearing fronds of a fern and the stamens of higher plants. The pollen-grains show a very distinct remnant of the male prothallium. Spermatogenesis is very complex.

Passing to the female flowers, we find the carpels of *Cycas* to be arranged like the foliage-leaves as a crown on the axis, which after flowering resumes vegetative growth, a condition which occurs only as an anomaly or reversion in higher plants (e.g. piliferous roses). The separate carpellary leaves retain more or less distinct traces of vegetative character; thus in *Cycas*, though they are brown, the pinnate form is preserved, two to eight ovules (megasporengia) occupying the place of the lower pinnae. In the other genera, however, the carpels are considerably modified, and only two ovules are ordinarily developed; but the carpellary leaf is always open, and shows no trace of that still more precocious development of its ovules and arrest of its opening altogether, which would give us the ovary of the higher flowering-plants (see OVARY). On ripening, the cone may fall to pieces, liberating the ovules; in the simpler *Cycas* the separate naked seeds become modified and enlarged into large fruit-like bodies, with an outer fleshy and an inner stony wall. The nucellus is crushed into little space by the growth of the endosperm (female gametophyte or prothallium), which contains the straight embryo with its one (Ceratozamia) or two, often unequal (*Cycas*, *Zamia*), cotyledons.

The more vegetative character, both of the flowering axis and of the carpellary leaves, which distinguishes *Cycas* from all the other genera, explains the separation of the order by systematists into Cycadeæ and Zamieæ. Among the latter, *Stangeria* of South-eastern Africa is at once distinguished by its pinnate venation, and *Bowenia* of Queensland by its bipinnate leaves. *Dioon* (Mexico) is characterised by the origin of its ovules on cushion-like modifications of the two parent pinnae, instead of being simply sessile as in the remaining genera, which are merely distinguished by slight differences in the shape of their cone-leaves. The thirty or forty species of *Zamia* range from Florida and Mexico into the Antilles and far into South America. The cones are sometimes nearly as large as the turnip-like underground stem. *Ceratozamia* is Mexican, and the unfortunately named *Microcycas* Cuban, while *Macrozamia* is distributed over Queensland and Western Australia, and *Encephalartos* is characteristically South-east African. But the widest distribution is that of *Cycas* itself. The best-known species, *C. revoluta* of Japan, is widely found both wild and in cultivation in many parts of the Old and New World. *C. circinalis* of the East Indies, *C. media* and *C. Normanbyana* of Australia, *C. Seemant* of the Fijis, may also be mentioned as of importance.

The cycads seem to be descended from ferns through the Palaeozoic Cycadofilicales. Whether some yet unknown members of the Mesozoic Bennettitales were the intermediate ancestors is doubtful. The known fossils of that class stand aside from the direct line.

The stem of many cycads contains an abundant starchy deposit, which is used as food in many countries. It resembles Sago (q.v.) and so has frequently led to the confusion of cycads with the true sago-palms. *C. revoluta* yields a coarse sago in Japan and elsewhere; from *Dioon edule* a kind of

arrowroot is prepared in Mexico, and from *Zamia pumila*, &c., in the Antilles and Florida; while *Encephalartos* is often called Kafir Bread. Owing to their extremely slow growth, cycads are of little commercial value. Moreover, many contain a poison which must be washed out before they are fit for food. *Macrozamia* proved so fatal to cattle in Queensland that the government tried to stamp it out by introducing arsenic into the stem. See Chamberlain, *The Living Cycads* (Chicago, 1919).

**Cyclades.** See ARCHIPELAGO.

**Cyclamen**, a genus of Primulaceæ, including about eight highly variable species, mostly natives of southern Europe. Their thickened and compressed perennial stem half immersed in the ground, their heart-shaped leaves, peculiarly twisted and reflexed corolla-lobes, and spirally reverted fruit-stalks give the genus a peculiar and highly characteristic appearance. They are commonly cultivated on account of the beauty of their flowers, which mostly appear in spring. *C. persicum* is the



*Cyclamen persicum*.

one chiefly grown in our conservatories; *C. europæum*, not uncommon in gardens, flowers in autumn. The turnip-like stem, despite an extreme acidity which long gave it medicinal repute, is largely eaten by swine in southern Europe, especially Sicily; hence the English name of *Sowbread*.

**Cyclanthaceæ**, a characteristic tropical American family of monocotyledons, akin to sciæpines, arums, and palms. Palm-like in general appearance, they are often climbing plants and epiphytes. The inflorescence is a spadix, in which male and female flowers are arranged in various patterns. In *Cyclanthus* large forked leaves rise from the rhizome. The long-stalked spadix is composed of a series of sharp-edged discs or of two spirals, bearing male and female flowers on alternate edges. The female flowers are embedded in the disc, with their ovaries and perianths united all round. The male flowers have no perianth. *Carludovica* is palm-like in form, some species being climbers. The leaves are very large. The young leaves of *C. palmata* are cut into strips, bleached, and made into Panamá hats.

**Cyclanthera**, a tropical American genus of Cucurbitaceæ, in which the union of the stamens found in some other genera of the family is carried to extremity, even the anthers being united to form two ring-shaped loculi running around the column.

**Cycle** (Gr., a 'circle'), in Astronomy and Mathematical Chronology, a period or interval of time in which certain phenomena always recur in the same order. There are two great natural cycles, that of the sun and that of the moon. The solar cycle is a period of twenty-eight Julian years, after which the same days of the week recur on the same days of the year. The lunar or Metonic cycle consists of nineteen years or 235 lunations (see CHRONOLOGY),

after which the successive new moons happen on the same days of the year as during the previous cycle. The number of the year in the cycle of the moon is called the Golden Number (q.v.). The cycle of Indictions (q.v.) is purely arbitrary, its years being fifteen, a conventional number; and the Julian Period, which combines and harmonises all the three others, might be termed the cycle of cycles. The term 'cycle of eclipses' is an instance of the more general use of the word, meaning the period of 223 lunations, within which seventy eclipses recur in the same order and magnitude—viz. twenty-nine of the moon and forty-one of the sun.

**Cycling.** The bicycle is the embodiment of the principle, applied to individual personal locomotion, that weight is more easily wheeled than carried. The credit of its invention can be ascribed to no one in particular, the machine, as it exists to-day, being the result of a long series of inventions and improvements introduced for the most part during the last thirty years of the 19th century. The progenitor of the bicycle was the 'Dandy-horse,' which had a vogue some hundred years ago, for it contained the fundamental principle of the bicycle. It demonstrated the fact that as long as a machine of unstable equilibrium continued in motion it could be balanced and guided by its rider without effort by manipulation of a steering-wheel. The 'Dandy-horse' was what may be called a mechanical freak, and it only assumed a practical form in the 'sixties, when the first material advance was made in its construction by the addition of cranks and pedals to the front wheel for propulsion. The possibilities of the bicycle became recognised about 1870, when its development began in earnest. Wire suspension wheels supplanted those of wood, and metal was employed for the framework. Rubber was first used in strips on the tyres to give silent running, but soon gave place to solid rubber tyres embedded in hollow rims. The size of the front wheel steadily increased to the limits of the rider's reach, while the diameter of the rear wheel diminished to some 20 inches. Meanwhile steel tubes came into use for backbone, forks, and handle-bar; and rollers, superseded later by balls, replaced the plain parallel bearings. Such was the tall, graceful machine of the 'eighties, when, to provide for those who hesitated to trust themselves in so high a seat, the tricycle was developed in a great variety of forms, and enjoyed considerable vogue until the present type of rear-driver appeared, and in course of time became supreme. It was the advent of the pneumatic tyre, for which we are indebted to the late J. B. Dunlop, that expedited the rise into favour of the modern bicycle, as it was better adapted to the small wheels of the 'Safety' than to those of the high machine. Its value became acknowledged about 1890, and it soon came to be regarded as an indispensable accessory to the bicycle. Lever-action mechanisms were introduced from time to time, but the public never took to them, while the small geared front-driver enjoyed some popularity. The two and three speed gears now prevalent constitute the only later inventions worthy of note.

When the bicycle first came to be used on the roads it encountered the bitterest hostility from a section of the public, but chiefly from those who regarded the highway as sacred to the horse, to the exclusion of every form of locomotion to which this useful quadruped objected. Persecution continued for many years, and attempts were made to deprive the bicycle of the use of the highway, but an accident on Muswell Hill in 1878 led to these machines being recognised as 'carriages.' Legislation followed which upheld this view, accorded them rights as such, and provided by laws

for their regulation. Then, horses having become accustomed to them, there was a cessation of the conflicts brought about by the intolerance of their opponents. The animosity they engendered, however, was long-lived, and even now there is a lamentable want of consideration for the bicyclist and of regard for his safety, which is exhibited in the covering of town roads with small flints, which cut his costly tyres to pieces, and the watering of the treacherous tramway lines, practices which go unchecked in spite of the fact that the bicycles in daily use largely outnumber all other carriages.

From the earliest days it was recognised that bicycling was an unrivalled exercise of an independent and vigorous character that appealed to Englishmen; and even on the old high machine many extraordinary rides were accomplished—100 miles a day being quite a common performance, for it is well within the mark to say that a man can ride three times as far as he can walk. The pioneers were very enthusiastic, and vied with one another in making long and exhausting rides. This emulation continued for many years, finally taking the form of road-races and place-to-place records, until the latter became so difficult of attainment that attempts to reduce them were abandoned. One of the most coveted bones of contention was the Land's End to John o' Groat's record. This originated in a holiday jaunt by H. Blackwell and C. Harman, who averaged nearly 70 miles a day from 12th to 24th July 1880, and culminated in the performance of H. Green, who, in 1908, covered the distance—about 870 miles—in 2 days 19 hr. 50 min. Green holds the following road records, which prove him to be the fastest road-rider we have ever had: 50 miles, 2 hr. 1. min. 2 sec.; 100 miles, 4 hr. 36 min. 22 sec.; London to York, 10 hr. 19 min.; London to Liverpool, 11 hr.; 226½ miles in 12 hours, and 394 miles in 24 hours. E. Hale is credited with riding 32,479 miles in the year on the road, or over 100 miles a day, Sundays excepted. The practical character of the high bicycle was shown by Thomas Stevens, who, in 1884, rode across the continent of North America, and, during the next two years, through Europe and Asia back to San Francisco.

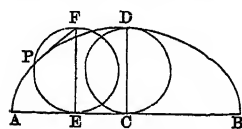
Racing on the track is a form of sport that has been cultivated from the earliest days, and was at its zenith during the period when the graceful and attractive high machine was used by such able exponents of racing as H. L. Cortis, C. E. Liles, G. L. Hillier, and P. Fumivall, and a true sporting spirit pervaded the competitions. Racing subsequently declined in popularity, as far as the public was concerned, from various causes. Partly owing to a broadening of the amateur definition, an undesirable class of riders began to predominate, men who were suborned by the makers of machines and accessories to race for advertising purposes; and the spectacular effect was lost when the high bicycle was supplanted by the rear-driver, which proved the faster machine. Another element in the decadence of racing was the fact that a competitor who rode close behind a rather speedier man throughout a race, and so sheltered himself from the wind, could almost always beat his opponent at the finish. No effective remedy was ever devised to prevent riders from taking this unfair advantage, which robbed racing of much of its interest. On the perfect surface of a race-track almost all the rider's energy is expended in overcoming wind or air-resistance. This is illustrated by the records for one hour of 63 miles 256 yards behind a motor, and 25 miles 1568 yards unaided. Performances in which the aid of 'pacemakers' is employed are therefore illusory, and are of little or no interest from a sporting point of view. The one-mile record of 2 min. 41½ sec. which Cortis made in 1882

has undergone innumerable reductions, and now stands to the credit of V. L. Johnson at 2 min.  $3\frac{1}{2}$  sec., made in 1907.

At first the bicycle promised to be nothing more than a means of obtaining vigorous physical exercise and recreation, but as it developed, its utilitarian character became more manifest. The facility with which distances of 70 or 80 miles a day could be made comfortably has caused it to be used largely for touring purposes, whilst its luggage-carrying capacity is limited in practice only by the difficulty of stowing the various receptacles. Of late years its use has extended largely amongst tradesmen and for other business purposes. In 1896 the bicycle was taken up by the dilettanti, and machines attained their highest prices, £25 being paid for the best makes. Since then severe competition has brought the price down to about £10, and serviceable bicycles are now sold in large numbers at £4 each.

The Cyclists' Touring Club was established in 1878 for the encouragement of road-riding and touring. Its subscription is but five shillings a year, and it has over 20,000 members. It has done much to uphold the rights and privileges of bicyclists on the road, but nothing to what it might have accomplished had the support accorded to it been commensurate with the number of riders in the country, as is the case with the Touring Club de France. It organised a system of uniform hotel tariffs for its members in all the chief towns, and has done a good deal of useful work for bicyclists generally. The National Cyclists' Union is another valuable institution. It derives its support chiefly from the clubs, and devotes its attention principally to the control and organisation of racing. For the past twenty-five years it has fought strenuously and continuously to keep amateur sport passably free from abuses, in addition to which it has done some good work for the general body of riders in upholding their rights on the road. The Roads Improvement Association is another institution in connection with bicycling, whose influence is to be seen in the greatly improved character of our roads. The Stanley Show was an exhibition at which all the novelties in construction were annually displayed. Starting in a small way in 1877, it afterwards enjoyed much prosperity, but was ultimately given up in 1910.

**Cycloid** (Gr., 'circle-like'). If a circle roll along a straight line in its own plane, any point on the circumference describes a curve which is called a cycloid. This is the most interesting of what are called the transcendental curves, both from its geometrical properties and its numerous applications in mechanics. In dynamics, for example, we find that a heavy particle descends from rest from any point in the arc of an inverted cycloid to the lowest point in the same time exactly, from whatever point of the curve it starts. This is sometimes expressed by saying that the cycloid is the *isochronous* (Gr., 'equal-time') curve. The body having



The Cycloid.

reached the lowest point, will, through the impetus received in the fall, ascend the opposite branch of the curve to a height equal to that from which it fell, and it will employ precisely the same time in ascending as it did in descending. It is clear that if a surface could be procured that would be perfectly smooth and hard, the cycloid would thus present a solution of the perpetual motion. The line AB, which is called the base of the cycloid, is equal to the circumference of the generating circle; the length of the curve ADB is four times CD, the

diameter; the evolute of any cycloid is a similar curve of equal length; and the surface between the curve and its base is three times the area of the circle CD. In any position EPF of the generating circle, AE is equal to the arc EP; PE is the normal at P and = half the radius of curvature; PF is the tangent to the curve at P.

**Cycloid-scales.** See SCALES, FISHES.

**Cyclone**, a system of winds blowing inwards towards a centre of low barometric pressure, but deflected into spiral paths in consequence of the earth's rotation. The particles of air retain their moments of inertia about the earth's axis, and therefore in moving into higher or lower latitudes, where their distance from the axis is less or greater, must increase or diminish their velocity. Thus a clockwise movement is found in the southern, a counter-clockwise in the northern, hemisphere. The whole system may itself travel rapidly. An anticyclone is a similar system blowing outwards from a centre of high pressure. See also STORMS.

**Cyclopædia.** See ENCYCLOPÆDIA.

**Cyclopes** fall into three groups. (1) The Homeric Cyclopes, a wild, lawless, and impious race of giants, inhabiting the sea-coasts of Sicily, the most prominent of whom is Polyphemus (q.v.). Although Homer does not directly call them one-eyed, yet he expressly terms Polyphemus such, and the later poets attribute his peculiarity to the rest. (2) The three Cyclopes mentioned by Hesiod: Brontes, Steropes, and Arges, each having one eye in the middle of his forehead; these were sons of Uranus and Gæa, belonged to the race of Titans, and forged thunderbolts for Zeus. Hurlled into Tartarus by their father, but delivered by their mother, they helped Kronos to usurp the government of heaven. Kronos, however, in his turn, threw them back to Tartarus, from which they were again released by Zeus, whose servants they now became. Finally, they were slain by Apollo, because they forged the thunderbolt with which Zeus killed Æsculapius. Later tradition placed their workshop in Mount Etna, or in the volcanoes of Lemnos and Lipari, and made them the slaves of Hephestus. (3) The Cyclopes mentioned by Strabo as a people who had come from Thrace or Lycia to Argolis, and were distinguished for their skill as builders.

**CYCLOPEAN WALLS** is a name given to masonry built of large, irregular stones, closely fitting, but unhewn and uncemented. They were attributed to Strabo's Cyclopes, who were probably mythical, and many of them still exist in Greece (as at Mycenæ and Tiryns), Italy, and elsewhere. It has been customary to suppose that the Cyclopean walls were built by the Pelasgians (q.v.). See CRETE. Peru also has its Cyclopean walls, as at Cuzco.

**Cyclops**, a genus of small fresh-water crustaceans, type of a family (Cyclopidae) in the order Copepoda. They are popularly included under the wide title of 'water-fleas.' Various species are common as active swimmers in fresh-water pools or slow-flowing brooks, and a few forms have been recorded from the sea. Like other copepods, cyclops has an elongated body, without a shell, with four forked thoracic feet and a five-jointed abdomen. The head-region is not distinct from the first ring of the thorax; there is a pear-shaped segmented body and a long abdomen; both pairs of antennæ are long, and in the male the anterior pair form claspers; the mandibular and maxillary palps are degenerate; and a heart is said to be absent. The average length of the commonest species is from 2 to 3 millimetres; the males are generally smaller than the females. A very marked feature, to which the name refers, is the single median eye, usually bright crimson and sparkling like a gem;

and not less noticeable are the two large egg-bags carried by the females. They eat both animal and vegetable matter, and are very prolific. See CRUSTACEA, WATER-FLEA.

**Cyclopteris**, name given to certain leaflets occurring on fern-like fronds which are common Devonian and Carboniferous fossils. Somewhat rounded or wedge-shaped, they have no midrib, the nerves spreading from the point of attachment.

**Cyclorama**. See PANORAMA.

**Cyclosis** (Gr., 'circulation'), the name employed to designate certain movements of the contents of cells in plants. See VEGETABLE PHYSIOLOGY.

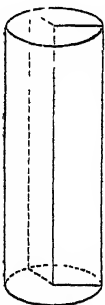
**Cyclostomata** (literally, 'round mouths'), a class of vertebrates often included along with fishes, but separated from them by some fundamental divergences. Hag-fish (Myxine) and Lamprey (Petromyzon) are the two most familiar examples, and are types of the two orders into which the Cyclostomata (or Marsipobranchii) are divided.

**Cydnus**, a river of Cilicia, rising on the south side of the Taurus range, and flowing through a rich and level country, past the city of Tarsus, and a broad lagoon, now choked up with sand, into the sea. Its water was famous for its clearness and coldness, and was supposed to be efficacious against gout and nervous diseases. Alexander nearly lost his life through an illness brought on by bathing in it when overheated.

**Cydonia**. See QUINCE.

**Cygnets**, a young Swan (q.v.).

**Cylinder** (Gr., 'a roller'), a well-known solid whose cross-section at any point of its length gives always the same circle; or, mathematically, a solid generated by the revolution of a rectangle about one of its sides, which line is called the axis of the cylinder. That, the typical cylinder, is frequently called *right*, and if cut by two parallel planes not perpendicular to the axis, the result is an *oblique* cylinder, with elliptical ends or sections. The term has also been generalised to include a solid generated by a line moving parallel to a fixed direction while tracing any fixed closed curve. In all cases the content of the cylinder is found by multiplying the number of square units in the base by the number of linear units in the altitude, which is



the perpendicular distance between the two ends. The area of the convex surface is equal to the product of the circumference of the end, and the length of the generating line. To this must be added the areas of the two ends, to get the whole surface of the cylinder.

**Cyma**. See MOULDING.

**Cymbals** are a pair of thin round metal plates, with a hollow part in the centre, in which a leather strap is fastened for holding in the hand. They are instruments of percussion, which, when struck one against the other, produce a loud harsh sound of no fixed pitch. They are of very ancient origin, and were used by the Greeks in the worship of Cybele. The best cymbals are those made in Turkey and in China. Attempts to discover and imitate the composition of the metal have all failed, the nearest approach to it hitherto discovered being an alloy of 80 parts of copper to 20 of tin. The cymbals sometimes play the same part as the bass drum, and in orchestras they are played by the same performer. One cymbal may be fixed on the drum, the other held in one hand, while the other hand wields a drumstick. Cymbals are, however, essentially military instruments.

**Cymbeline**, an ancient king of Britain in a well-known play of Shakespeare called by his name. By his first wife he had a daughter, Imogen, who married Posthumus Leonatus. His second wife had, by a former husband, a son named Cloten. Shakespeare borrowed the name from the half-historical Cunobelinus in Holinshed's *Chronicle*, of whom several coins are extant.

**Cyme**, a term employed in Botany to designate those forms of inflorescence which are *definite* or *centrifugal*—i.e. in which the main axis ends in a flower, but bears one or more lateral branches which again terminate in flowers, but not before producing secondary branches which continue the same process as far as growth permits. The various forms and varieties of cyme, which are not only of great morphological interest, but frequently also of systematic importance—e.g. Caryophyllaceæ, Labiate, &c., are described under Inflorescence (q.v.).

**Cymry**. See CELTS and WALES.

**Cynanchum**, a genus of Asclepiadaceæ, of which some species have been used medicinally—e.g. *C. monspeliacum* as a violent purgative, the so-called Montpellier Scammony, and *C. vincetori-cum*, formerly in repute as an antidote to other poisons. The Indian *C. extensum* yields fibre, and *C. ovalifolium* of Penang, rubber.

**Cynwulf**, an Old English poet of whom almost nothing is known. He has handed down his name wrapped up in runes in his poems *Christ*, *Juliana*, *Elene*, and *The Fates of the Apostles*. It seems most probable that he was a Northumbrian. Some, following Dietrich, identify him with Cynwulf, the Bishop of Lindisfarne (737–80); Professor A. S. Cook suggests Cynwulf, priest of Dunwich (fl. 803). Cynwulf's principal works may be referred with some degree of confidence to the second half of the 8th or the beginning of the 9th century. He possessed some learning, and was popular with his contemporaries. His poems are aglow with fervid Christian feeling, and show rich imagination and power of language. The chief works ascribed to him with any probability are the *Christ*, a subject borrowed from the old Latin homilies, in which his birth, his ascension, and the judgment are described, the last being particularly effective, but only the second undoubtedly Cynwulf's; *Andreas* and *Elene*, religious epics; *Guthlac* and *Juliana*, versified lives of those saints; and the *Phoenix*; possibly *The Dream of the Rood*. See Kennedy's *The Poems of Cynwulf* (1910; a translation, &c.).

**Cynics**, the name applied to a school of Greek philosophers, who were distinguished mainly for their morose and snarling ethics, and their ostentatious contempt of the ordinary pleasures of life. The name is due either to *Cynosarges*, the place where Antisthenes (q.v.), the founder, taught; or to their dog-like (*kynikos*) contempt for conventional manners. See also DIOGENES. MENIPPUS, &c.

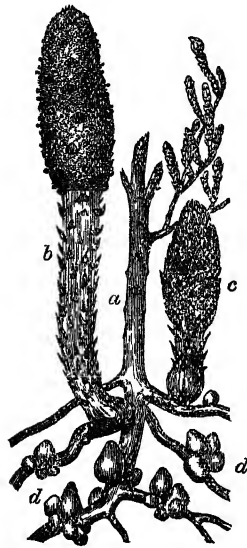
**Cynictis**. See MEERKAT.

**Cynips**. See GALL-FLY.

**Cynodon**, a genus of grasses of which one species, *C. dactylon*, is of peculiarly wide distribution, not only ranging from its British habitat on the sandy shores of Cornwall to fringe those of North America and the West Indies, where it is known as Bermuda grass, but also forming (on account of its great power of resisting drought) the most important fodder and pasture grass of India, where it is known as *Dhob*, *Doorba*, &c. Its creeping roots, and those of its congener, *C. lineare*, have medicinal virtues, and are sometimes used as a substitute for sarsaparilla.

**Cynomorium**, a genus of flowering plants of the order Cynomoriaceæ, consisting of one species,

*C. coccineum*, a plant of a strange fungus-like appearance, found in Malta and other Mediterranean lands. It was long known as *Fungus Melitensis*, and enjoyed the highest reputation as a styptic, besides being used as an astringent in dysentery and other maladies. These uses, however, depended on the doctrine of signatures alone, its scarlet colour and blood-like juice being interpreted as providential indications of its curative destination for all injuries or diseases accompanied by bleeding. So high a value was set upon this plant, that the knights of Malta took it under their particular care as one of their choicest possessions; it was carefully gathered and deposited in a government office, from which the grand-master sent it to friendly sovereigns, and to the hospitals of the island. *C. coccineum* is a parasite on the roots of shrubs, to which it attaches



*Cynomorium coccineum*, growing upon the roots of (a) its phanerogamous host; b, c, d, different stages of development.

itself by suckers; see PARASITIC PLANTS. The Cynomoriaceæ are allied to the Balanophoraceæ.

**Cynomorpha** (literally, 'dog-shaped'), the lower division of Old-World or Catarrhine monkeys. Baboon (*Cynocephalus*) and Magot (*Macacus*) are good examples. See MONKEYS.

**Cynoscephalæ** ('dog's heads'), two hills near Scotussa, in Thessaly, where Flaminius defeated Philip of Macedon, 197 B.C.

**Cynosure** (Gr. *kynosoura*, literally, 'the tail of the dog'), the Greek name for the constellation of the Little Bear, which contains the pole star, by which the Phœnician mariners steered their course, while the Greeks steered by the Great Bear. The name is metaphorically applied to anything that attracts attention, or to which all eyes are turned. Its use, with this meaning in reference to a lady, in Milton's classic poems *L'Allegro* and *Comus*, will be remembered. In the Greek mythology, Callisto, daughter of Lycaon, king of Arcadia, was changed into the Greater Bear (called also *Helice*), and her son, Arcas, into the Lesser (called also *Cynosura*).—The Dog's-tail Grass is called *Cynosurus*.

**Cyperaceæ**, the order of reeds and sedges, are nearly akin to grasses, but easily distinguished by their solid, unjointed, generally triangular stems, undivided leaf-sheaths, and absence of paleæ. There are about 2500 species, widely distributed throughout all climates, but more especially in temperate and cold regions, and in marshy soils, of which they often take almost entire possession. Dry and rough in texture, they furnish only the very poorest constituent of fodder or hay, nor with few exceptions (see BULRUSH, CYPERUS, PAPYRUS, CAREX, REED, COTTON-GRASS) have they any other use.

**Cyperus**, a large genus of Cyperaceæ, chiefly tropical. The tubers or root-stocks of some species are edible, notably *C. esculentus*, cultivated in southern Europe for its *amandes de terre*. *C. longus* and others are used in medicine and perfumery. *C. textilis* of South Africa yields fibre. In America,

*C. hydra*, a tuberous species, is an exceedingly troublesome weed in cultivated lands, such as cotton-fields. See PAPYRUS.

**Cy-près**, which, roughly translated, means 'as near as possible,' is applied to a well-known doctrine in the law of charitable trusts in England. This doctrine is to the effect that where a trust mentions a general purpose to which money is to be applied—e.g. higher education, and also some particular method—e.g. payment to an institution which ceases to exist, the court will direct the application of the money in some other particular method, as near as possible to the one mentioned, and consistent with the general purpose. The doctrine is closely connected with another—viz. that where only a general charitable intention is expressed—e.g. relief of the poor, the court will devise some particular scheme, and will not hold the trust void for uncertainty. These doctrines also exist in Scots law, though not under the name of cy-près. The expression is also applied to a principle on which the court acts, so as to avoid illegality in settlements of property. In the United States it is held that the equity courts cannot make valid charities which are uncertain, but where charitable trusts have once been set agoing, they will prevent the trust from being defeated by change of circumstances.

**Cypress** (*Cupressus*), a genus of evergreen trees or shrubs of the natural order Conifere, with small appressed, imbricated leaves and globular cones, the peltate woody scales of which bear numerous hard winged seeds. The cypresses are indigenous to southern Europe, North America, Mexico, Guatemala, Asia Minor, India, and China. One of the most widespread species is the Common Cypress (*C. sempervirens*), a native of Greece, Asia Minor, Persia, and Afghanistan, which was introduced into Britain in 1548, and is now acclimatised throughout southern Europe. In southern France and in Italy it is now one of the most frequent and characteristic trees, especially near the coast. One variety has spreading or drooping branches, while another is of a fastigate habit; and this latter is the more



Branch of Cypress.

frequent. Being of sombre aspect like our yew, it has been largely planted in churchyards and cemeteries. The ancient Greeks and Romans employed cypress twigs and branches as symbols of mourning, and planted cypress-trees around tombs. The vast Turkish cemeteries, of which European and American cemeteries may be regarded as imitations, are thickly planted with the fastigate variety, and are often growing into sombre forests. The wood of the cypress is yellow or reddish, and has a pleasant smell. It is very hard, compact, and durable; the ancients reckoned it indestructible; and the resin which it contains gives it the property of resisting for a long time the action of water. It is not liable to the attacks of insects, and being also of beautiful

colour and easy polish, was formerly much esteemed for the finest kinds of work in wood, even Cupid's arrows being traditionally made of cypress-wood. Some believe that the cypress is the true cedar-wood of Scripture, and it has also been identified by commentators as the *gopher wood* of Noah's ark. In any case, cypress and cedar have been prized for their timber in the East from the earliest times. The doors of St Peter's at Rome, made of cypress, lasted from the time of Constantine the Great to that of Pope Eugene IV., above 1100 years, and were perfectly sound when at last removed, that brazen ones might be substituted. Medicinal virtues were formerly ascribed to the wood and seeds of the cypress, and Oriental physicians have long been wont to send patients suffering from chest-diseases to breathe the air of cypress-woods, thus curiously anticipating the Western practitioner. The resin has had medicinal repute from classic times, while the Turks still use also the fruit and bark. The ethereal oil of cypress-wood was used by the ancients for embalming, and the coffins of mummies were made of the wood.

Three kinds of cypress are now commonly grown in Britain in ornamental grounds, and sometimes even in woodlands, viz. the Monterey or Large-coned Cypress (*C. macrocarpa*), introduced from California into Britain in 1838; the Lawson's Cypress (*C. Lawsoniana*), also from California, introduced in 1854; and the Nootka Sound or Alaska Cypress (*C. nothaensis*), introduced from the north-west coast of North America in 1850. These two last have been classed by some botanists as a separate genus (*Chamaecyparis*), to which also the Japan or Obtuse-leaved Cypress (*C. obtusa*) belongs. They grow well in the milder and damper parts of Britain, and yield good timber. They can all be easily raised from slips or cuttings, but are far better raised from seed if desired to grow into large trees. There are numerous gardener's varieties, which are propagated by cuttings.

**Cyprian**, St. Thascius Cæcilius Cyprianus, one of the most illustrious Fathers of the church, was born about 200 A.D., probably at Carthage, of heathen parents. After being a teacher of rhetoric at Carthage, he became a Christian, and was baptised probably in 245 or 246. Immediately afterwards he gave to the poor the greater part of his considerable fortune, and devoted himself assiduously to the study of Scripture and the writings of the church's teachers, especially Tertullian. After being successively a deacon and presbyter, he was made a bishop in 248. His zealous efforts for the restoration of strict discipline soon brought him a host of enemies. In the Decian persecution, which at Carthage was especially severe, the heathen people cried incessantly '*Cyprianum ad leonem!*' but Cyprian sought safety in flight, in his retirement still caring for his flock with the help of two *vicars*, and distributing large sums of money among the poor. He returned to Carthage in 251, and the rest of his life was a constant struggle to hold the balance between the two extreme parties—the adherents of Felicissimus and Privatus on the one hand, who favoured laxity in the treatment of the *Lapsed* (q.v.), and those who would exercise the utmost severity, such as the followers of Novatianus, on the other. Cyprian was excommunicated by the Roman bishop Stephanus for his opposition to the Roman view of the validity of heretic baptism. He rejected this doctrine as making the sacrament merely mechanical, and laid stress on the personal piety of the priesthood and their special authority for its administration, asserting that baptism could only be a reality when accompanied 'with the full and entire faith both of the giver and receiver. At a synod at Carthage in 256,

he maintained that the Roman bishop, spite of the primacy of Peter, could not claim a judicial authority over other bishops. His principle, that 'a priest of God, holding the gospel and keeping the commandments of Christ, may be put to death, but cannot be overcome,' Cyprian himself illustrated, on the 14th September 258, when he suffered martyrdom under the Emperor Valerian.

His character and conduct have been very variously judged. Both in his own and later times he has been accused of cowardice and pride. His zeal, fidelity, and self-denial were undeniable, and his courageous martyrdom frees him from the reproach of cowardice. His writings are all directed to practical ends. The earliest complete editions of his works are by Erasmus (Basel, 1520), Pamelius (Antwerp, 1568), and Bishop Fell (Oxford, 1682); and the best is that of Hartel (3 vols. Vienna, 1868-71). They consist of a collection of *Epistles*, and a series of treatises, which are themselves pastoral epistles of a bishop to his flock (see the translation by Wallis, 2 vols. 1869). His best-known work, *De Catholica Ecclesie Unitate*, laid the foundation of the hierarchical conception of the church. Cyprian holds that the unity of the church is founded upon the episcopate, not of Rome, but of the universal Church. In the Church alone can salvation be obtained ('he cannot have God for his Father, who has not the church as his mother'). See the Lives by Poole (Oxford, 1840), Peters (Ratisbon, 1877), and Fechtrop (Munich, 1878); and Archbishop Benson's *Cyprian: his Life, his Times, his Work* (1897).

**Cyprinidæ** ('carps'), a large family of fresh-water bony fishes in the order Physostomi, with open swim-bladders. Babel, Bream, Carp, Chub, Dace, Gold-fish, Gudgeon, Minnow, Roach, Tench, are familiar examples. They are distinguished from their neighbours by their small toothless mouths, naked head, usually scaled body, and by the absence of the adipose fin. The family includes about two hundred genera and a thousand species. They are widely distributed, most abundant in north temperate regions, absent from Australia and South America. They are voracious, very fertile, and frequently hibernates. See CARP, &c.

**Cyprinodontidæ** ('toothed carps'), a family of small bony fishes in the order Physostomi, with open swim-bladders. They are allied to the pike. The mouth bears teeth, the head and body are scaled, and there are never barbules. The family includes twenty genera and about two hundred species, widely distributed in the warm and tropical zones, both fresh-water and marine. They are in most cases ovo-viviparous, and the males are generally smaller than the females. The majority are carnivorous, but several forms are known as mud-eaters. Cyprinodon, Fundulus, Anableps (q.v.), and Pécilia are the more important genera.

**Cypripedium**, or SLIPPER-ORCHIS. See ORCHIDS.

**Cypris**, a very common small fresh-water crustacean, type of a family (Cypridæ) in the order Ostracoda. Like other ostracods, this small 'Water-flea' (q.v.) has an unsegmented body, seven pairs of appendages, a rudimentary abdomen, and a bivalve mollusc-like shell inclosing all. The shell of cypris is dainty and elastic; the posterior antennæ bear a long tuft of bristles on their second joint; the second pair of maxillæ have a small gill-appendage; the posterior limbs are very irregular. Various species of cypris are readily found in fresh-water pools, in which they swim very actively; the largest form (*C. pubera*) measures 2.7 millimetres in length. The reproductive relations are of some general interest. Some species—e.g. *C.*

*fusca* and *C. pubera*, reproduce parthenogenically in summer and autumn, the males being rare and transient; while in others—e.g. *C. ovum*, the males are found throughout the year, and parthenogenesis seems not to occur. The eggs are usually laid in masses on stones and water-plants; in *C. pubera* the egg remains as such throughout the winter. The males are remarkable for a peculiarly long and complex syringe-like modification of the reproductive duct. The adults are said to be able to survive desiccation, and this is certainly true of the eggs. Some species are very abundant as fossils in fresh-water strata—e.g. *C. waldensis*, in the English Wealden. See CRUSTACEA.

**Cyprus** (Gr. *Kypros*, Turk. *Gibris*, Fr. *Chypre*, Ital. *Cipro*) is situated in the north-east of the eastern basin of the Mediterranean, S. of Asia Minor, and W. of Syria, between 34° 30' and 35° 41' N. lat., and 32° 15' and 34° 36' E. long. The distance from Cape St Andreas, the north-easternmost point of the island, to the mainland of Syria near Latakia is about 52 geographical miles, while Cape Kormakiti on the north of the island is only 35 miles from Cape Anamúr in Cilicia. The familiar shape of the island was likened by the ancient Greeks to that of a deer's skin, of which the long and narrow peninsula of Carpas represented the tail. The extreme length is about 140 miles, of which 40 consist of this Carpas peninsula; the extreme breadth is 60 miles; and the area is 3584 sq. m., or a little larger than Norfolk and Suffolk together; it is the largest island of the Mediterranean. There are two principal ranges of mountains, which form the most remarkable natural feature of the country. The northern range, called the Kyrenia Mountains, extends from Cape St Andreas, at the extreme east of the island, almost as far as Cape Kormakiti, some 20 miles to the west of Kyrenia. The highest mountain of this range is Akromandra (3343 feet), lying to the north of Larnaca tes Lapethou; Buffavento (3135 feet), St Hilarion (3340), and Pentadaktylon (2405), are situated almost immediately north of Nicosia, and appear, owing to the extreme clearness of the atmosphere, to rise almost from the outskirts of the town, from which they are distant fully 12 miles. To the south of this range, and extending from Salamis to Morphu Bay, is the great Mesaorian plain, once famous for its crops of cereals. It produces good yields still, but suffers much from drought. In 1901 government irrigation works were set in operation, but these have hardly proved successful, and consideration continues to be given to the question of their extension and improvement. The western range occupies the greater part of the western and south-western districts of Cyprus, and extends to the east as far as the isolated peak of Santa Croce or Stavrovouni (2260 feet), only 12 miles to the west of Larnaca. The highest mountain of this range is Mount Troödos (6406 feet), of which one of the peaks bears the classic name of Olympus.

On the south-eastern slopes of Troödos, under gigantic pine-trees, are the summer quarters of the garrison and of the government officials. Cyprus had for long no good harbours; the seaports of Larnaca and Limassol are open roadsteads, unprotected against all but northerly winds, with such shallow water that steamers are obliged to anchor at a considerable distance from the shore. Moreover, a dangerous surf is raised in stormy weather, which renders landing difficult. At Kyrenia there is a little harbour fit only for small craft, and poorly protected in northerly winds; there is a small harbour also at Paphos, and in days gone by there was a harbour at Salamis. Famagusta is the only harbour suitable for large ships, and that only since its restoration

in 1903-6. It has often been proposed to construct a great commercial and naval harbour there, but at present the town is little more than a collection of ruins encircled by fortifications, though it is in process of being rebuilt and opened out.

The rivers flow only after heavy rain or the melting of the snow in the hills, but then overflowing their banks they flood the surrounding country with rich alluvial earth; none are navigable. Paralimne, near Famagusta, was formerly the only lake of importance, but it has now been drained for cultivation. It was noteworthy chiefly because, though entirely dry in summer, it abounded in fish during the winter, a phenomenon which was never explained, though it certainly could not be called in question. The chief towns are Nicosia (the capital), Larnaca, Limassol, Famagusta, Ktema, and Kyrenia, each giving its name to one of the six administrative districts of the island. Until 1885, when the map of the trigonometrical survey of the island appeared, the topography of Cyprus was by no means accurately known.

A census taken by order of government in 1921 showed the population to be 310,715, of whom more than four-fifths were Christians of the Independent Cypriote Church, a branch of the Orthodox Eastern Church; the remainder were Mohammedans. The Greek-Christian inhabitants speak as their mother-tongue a form of the Romaic or modern Greek; the Moslems, Turkish. The Cypriote Greek dialect is a poor as well as a corrupt idiom, neither expressive nor harmonious; but the language of the Cypriote Moslems is remarkably pure.

**History.**—Cyprus, rich in copper, had already passed from a Neolithic to a Copper and a Bronze Age, and had adopted the late Minoan culture (see CRETE) before its conquest by Thothmes III. of Egypt. Later it was inhabited by Phoenicians and Greeks. The Cyprian or Paphian goddess, answering to the Phoenician Astarte or Ashtaroth, was worshipped by the Greeks as Aphrodite. A syllabary, perhaps of Ægean or Hittite affinities, preceded the Greek alphabet. Early in the 6th century B.C. Cyprus was conquered by the Egyptian king Amasis; and a little later by Cambyses, who annexed it to Persia, 525 B.C. After the battle of Issus, Cyprus became a part of the Macedonian empire, but on the death of Alexander it passed into the possession of the Egyptian Ptolemy. In 58 B.C. Cyprus became a Roman province, and was administered by Cato the Younger and Cicero. The Cypriotes were one of the first Gentile peoples to embrace Christianity, and Cyprus was visited not only by St Paul but by many saints of the early church. At the division of the empire Cyprus naturally passed into the hands of the Eastern or Byzantine emperors, to whom it continued subject for over seven hundred years. In consequence of the alleged discovery by a shepherd of the original copy of the gospel of St Matthew near Salamis, in the 4th century, Cyprus was constituted by the empire a separate autonomous church, and to the archbishop was accorded the privilege, enjoyed only by the emperor himself, of signing his name in red ink, a privilege which has been uninterruptedly exercised to the present day. In 646 Cyprus was taken by the Saracens, under Othman, and again in 802 by Haroun al Rashid; but on each occasion it remained but a very short period under the sway of the Moslem. In 1195 Richard I., on his way to Syria for the third crusade, took the island from Isaac Comnenus, the representative or duke of the eastern emperor, and sold it to Guy de Lusignan, king of Jerusalem, in whose family the sovereignty of the island remained until 1487, when it passed under the dominion of the republic of Venice. In 1570 the Turks under Selim II. invaded Cyprus, and after long sieges and terrible massacres at

Famagusta and Nicosia, took possession of the country and ruled it for three hundred years. On the 10th July 1878 Cyprus was occupied by the British, under the provision of the celebrated Turkish Convention, by the terms of which the island was to be occupied by Great Britain until Batum, Kars, and Erzerum should be restored to Turkey by Russia, England paying £92,800 a year to the Porte as quit-rent. By a subsequent arrangement this 'tribute' was paid by Cyprus to England, and England paid one-half to the bondholders of the British-guaranteed Turkish Loan of 1855. In 1880 the administration of Cyprus was transferred from the Foreign to the Colonial Office, and in 1882 a constitution, with a partly elected council, was granted to Cyprus. During the Great War the convention was annulled on the outbreak of hostilities between Turkey and the United Kingdom in November 1914, when the latter annexed Cyprus. Cession to Greece was sought by the islanders and by the Greeks; but annexation by Britain was confirmed on the conclusion of peace.

Although just as under the convention the English still maintain the Mohammedan religious tribunals, or *sheri* courts, an admirable judicial system has been introduced, and English barrister-judges preside over courts which are highly appreciated by the people. The fiscal system, however, is well-nigh unreformed, and is most unsatisfactory, as is the system of land tenures. The Eastern Telegraph Company have stations throughout the island, the cable connecting with Alexandria and Syria. Postal communication with England is slow and unsatisfactory; within the island it is efficient. The police, about 900 (mostly Moslems) horse and foot, under English officers, is an admirable force. The Cypriotes are peaceable, orderly, and easily ruled. There are three gymnasiums, eleven high schools, at least 500 Christian elementary schools, and over 240 Moslem schools.

Cyprus produces wheat, barley, vegetables (especially potatoes), cheese, cotton, silk, flax, carobs, madder, wool, grapes, oranges, pomegranates, linseed, aniseed, sponges, gum-mastic, spirits, and wine. Tobacco-growing, which had greatly declined, has within recent years again become an important industry. Carobs, or locust-beans, are perhaps the principal export; others of importance are potatoes, raisins, wine, tobacco. Cattle, mules, donkeys, sheep, and poultry are also exported. Oats and wheat are grown in large quantities, mostly for home consumption. Barley is used as grain for horses and cattle, and as spring fodder, in a green state, in place of grass, of which none grows in the island. Wool and silk (cocoons) are exported, but a good deal of both is spun and woven in the country. The total value of all exports in 1906-21 varied from £484,000 to £918,000.

Cyprus was once celebrated for its copper-mines, which were worked by the Phoenicians and Romans; indeed, the word copper is derived from the name of the island. The industry has recently been revived on a considerable scale. Asbestos and marble are found, and much terra-umbra is burnt. Gypsum is mined, and plaster of Paris is manufactured at Larnaca in large quantities and exported chiefly to Alexandria. Salt was produced, under the Turks, to the value of £40,000 a year, by evaporation at the salines, near Larnaca, whence that town is sometimes called Salinas. At present, owing to prohibitive duties in the neighbouring countries, no salt is exported, and only a very small amount for island consumption is made by the British authorities. Cyprus imports (to the value of from £290,000 to £1,450,000) wheat-flour, barley, olive-oil, sugar, textile fabrics, iron and copper goods, rice, dried fish, coal, timber, cotton-yarn and piece-goods, tobacco, petroleum, leather, &c.

The annual revenue is about £660,000, of which nearly an eighth is produced by excise, and about a fifth by customs; while of the remainder, part is derived from land-tax, but by much the greater portion from the tithe on produce, an oppressive, antiquated, and expensive form of taxation. The tithe on grapes was abolished in 1884. The expenditure in the island amounts now to about £680,000. Since 1910 a fixed annual sum of £50,000 has been paid from imperial funds as a grant-in-aid of Cyprus revenues. The climate of Cyprus has been unduly vilified. Except on the seashore in summer, it is healthy, dry, and pleasant, and the death-rate is low. In the plains the summer heat is intense and exhausting, but the bracing cold of the winter months is sufficient to repair waste and restore vital energy. Previous to the British occupation malaria was prevalent, but prophylactic measures introduced since then by the government have done much to minimise the extent of the disease, which is now almost confined to the native population. Ophthalmia and intermittent fever of a mild type are the commonest forms of disease. Throat, chest, and lung complaints are exceedingly rare, but leprosy is not uncommon. The people are healthy and well grown; the men, as a rule, handsome, the women rarely so.

The *flora* and *fauna* are with few exceptions the same as those of the neighbouring coasts of Syria and Asia Minor. Among wild animals the moufflon or Cyprian sheep is the most interesting, but is becoming very scarce. Mules of peculiar excellence are bred in Cyprus, and command large prices. Goats are amongst the pests of the island. The forests (for which Cyprus was once famous) have well-nigh disappeared, and the climate and fertility of the country have greatly suffered in consequence. Under government protection, however, recovery has begun, though, notwithstanding the law of 1913, goats still do much damage by biting off the tops of the young shoots as fast as they appear. A still greater scourge earlier commanded the attention of the authorities, and the Locusts (q.v.) are now almost exterminated. The work of destruction has been thoroughly as well as economically performed (especially 1880-84), on the 'screen and pit' system invented by Richard Mattei, of Cyprus.

Since the English occupation the prosperity of the island has greatly increased. Roads have been improved, and an efficient system of motor transport introduced; the breeding of horses, mules, and other live-stock greatly encouraged; and under the Colonial Loans Act of 1899, £314,000 has been advanced by the home government for general improvements, irrigation, &c. Silk-culture has been revived. There are 240 miles of telegraph lines. There is a railway from Famagusta to Nicosia, Morphu, and Evrykhon.

See works on Cyprus by Cesnola, J. Thomson, Lang, Hepworth Dixon, Sir S. Baker, Mrs Scott Stevenson, Miss Agnes Smith, W. H. Mallock (1889 and 1916), Mrs Lewis (1894), Ohnefalsch-Richter (1894, 1914; and with Myres, 1899), Luke and Jardine (1920), Orr (1918), Luke (1919); Macheras, *Chronique de Chypre* (Paris, 1891), and Cobham, *Excerpta Cypria* (1908), and *Bibliography* (1908); vol. iii. of Perrot and Chipiez's *History of Ancient Art* (trans. 1885); Jeffery (for ancient monuments, 1910); church histories by Duckworth (1900) and Hackett (1901).

**Cyrano.** See BERGERAC.

**Cyrenaica**, the name of the district in northern Africa whose capital was Cyrene (q.v.). In its widest limits it stretched from the borders of Carthage to the Chersonesus Magna or northern headland of the Gulf of Platea (Gulf of Bomba). The productions of Cyrenaica mentioned by ancient writers are corn, oil, wine, honey, fruits of all kinds, cucumbers, truffles, cabbage; flowers yielding the richest perfumes; a rare plant called

*silphium* (not identified), from which was obtained a famous medicinal gum-resin; and its horses. The first settlements in Cyrenaica were made by a Spartan colony in 631 B.C. The earliest cities were Teuchira and Hesperis, then Barca, a colony from Cyrene; and these, with Cyrene itself, and its port Apollonia, formed the original Libyan *Pentapolis*; subsequently, Hesperis became Berenice; Teuchira, Arsinoë; while Barca was eclipsed by its port, Ptolemais. Cyrenaica at length became Roman, and was called Libya Superior. In the 7th century it was conquered by the Arabs, in the 16th by the Turks, but was ceded by them as part of Tripoli (q.v.) to Italy in 1912, and now forms one of the two independent administrative and military districts of Italian Libya.

**Cyrené**, the capital of Cyrenaica (q.v.), founded in 631 B.C. by a colony of Spartans under Battus, whose dynasty ruled for nearly two centuries, and was replaced by a republic, which was far from prosperous, until the advent of Roman rule. Cyrene carried on a great commerce with Greece and Egypt, and to a less extent with Carthage. Its extensive ruins, the scene of important archaeological discoveries, still attest its former magnificence. It is repeatedly mentioned in the New Testament. Here were born the philosophers Aistippus (q.v.), Anniceris, and Carneades, the poet Callimachus, the astronomer Eratosthenes, and the Christian rhetorician and bishop, Synesius.

**Cyrenius**, a Grecised form of Publius Sulpicius Quirinus, named in Luke ii. as governor of Syria. He received his appointment as governor in 6 A.D., but the difficulty in harmonising this with Luke is got over by admitting that he had been governor also at an earlier date—according to Zumpt, from 4 B.C. to 1 B.C.

**Cyril and Methodius**, apostles of the Slavs, were brothers, and natives of Thessalonica. Cyril was the name adopted as a monk by Constantine, born in 827. He had been a disciple of Photius, and for his learning was surnamed 'the philosopher.' The Khazars, a Tatar people who inhabited the country from the north-east of the Black Sea to the lower Volga, having about the year 860 asked the Emperor Michael III. to send them Christian missionaries, Cyril was sent in answer to their appeal, and made many converts. The Bulgarians of Thrace and Moesia were evangelised by Methodius, who baptised their king Bogoris in 861. At the request of Ratislav, Duke of Moravia, the brothers then turned to the countries on the March and Danube. They prepared a Slav translation of the Scriptures and chief liturgical books (which became the foundation of the literature of the Slavs), and by their services in the mother-tongue won the hearts of the people from the Roman missionaries. The two brothers were summoned to Rome to explain their conduct, and Cyril died there in 869. Methodius, who in the same year was consecrated at Rome Bishop of the Moravians, completed the evangelisation of the Slavs. Called to Rome a second time in 879 to justify his celebration of the mass in the native tongue, he succeeded in gaining the approval of Pope John VIII., returned to his diocese in 880, and (according to the most probable account) died at Hradisch on the March, 6th April 885. Bohemia and Moravia celebrated the millenary festival of their two apostles on the 5th July 1863. Both brothers are recognised as saints by the Roman Catholic Church, after having been condemned as Arians by several popes (including Gregory VII.). Their festival falls in the Roman Catholic Church on the 9th of March, in the Greek Church on the 11th of May. The Cyrillic alphabet, modified out of the Greek by Cyril, superseded the

more ancient Slavonic alphabet over a wide area. The history of Cyril and Methodius is still very obscure. The sources are collected by Schafarik in vol. ii. of his *Slavische Alterthümer*, and more completely by Ginzler in his *Cyril und Method* (1857). See also works by Dummmler and Miklosich (1870), Bonwelch (1885), Goetz (1897); Maclean's *Conversion of the Slavs* (1879); and the article in Herzog-Hauck.

**Cyril of Alexandria**, St., one of the Fathers of the church, was born at Alexandria, and brought up under the care of his uncle Theophilus, whom, after some years spent as a monk in the Nitrian desert, he succeeded as patriarch of Alexandria in 412. Cyril forthwith closed the churches of the Novatians, and in 415 expelled the Jews from the city. With the shameful murder of Hypatia (q.v.) he was at least indirectly connected. The latter part of his life was spent in his relentless persecution of Nestorius (q.v.), against whom, in the name of a synod held at Alexandria in 430, he hurled twelve anathemas for his refusal to apply to the Virgin Mary the epithet *Theotokos* ('Mother of God'). The œcumenical council of Ephesus in 431 condemned Nestorius, with his doctrine of the two natures in Christ. After this, John of Antioch, with his adherents (numbering from 30 to 40 bishops), who had arrived at Ephesus too late to take part in the discussion, constituted a synod of their own, which condemned Cyril. The emperor confirmed both of these depositions, but Cyril, notwithstanding, kept his patriarchate till his death in 444. On hearing of his death, Theodoret wrote, 'Envy is dead, and heresy is buried with her.' Among the extant works of Cyril are a defence of Christianity, in 10 books, written against the Emperor Julian in 433; a series of homilies and dogmatic treatises on the Trinity, the Incarnation, and on the Worship of God in spirit and in truth (17 books, written against the Anthropomorphites).

The standard edition of his works is that of Aubert (7 vols. Paris, 1638; closely followed in Migne's reprint). See Neander's *Church History*, Newman's *Historical Sketches* (vol. ii.), Kingsley's *Hypatia*, Hefele's *History of the Councils* (vol. ii.), Kopallik's *Cyril von Alexandria* (1881), Largent's *St Cyrille d'Alexandrie* (1892), and the article in Herzog-Hauck (1896-1909).

**Cyril of Jerusalem**, St., was born probably about 315, but his descent and birthplace are unknown. About 334 he was ordained a deacon, and about 345 a presbyter. During the Arian controversies he endeavoured to maintain a neutral attitude, and in 351 was ordained Bishop of Jerusalem by Acacius, Bishop of Cæsarea, who was an Arian. Cyril having repeatedly disregarded citations by Acacius, his metropolitan, was deposed by him in 358, and by a synod at Constantinople in 360; but on the accession of Julian in 361 he returned to his flock, which he ruled in peace till 367, when, by order of Valens, he was again expelled. He returned to Jerusalem on the death of Valens in 378, took part in the second œcumenical council at Constantinople, and died on the 18th (according to other accounts, on the 11th or 20th) March 386. The genuine writings of Cyril are his *Katecheseis* (or instructions to catechumens), eighteen of which are addressed to candidates for baptism, and five to the newly baptised. They are not in the form of question and answer, but are connected lectures, written in a style of great simplicity and clearness, and making constant reference to Scripture. The articles of the creed (called by Cyril *Pistis*, or the 'Faith') on which the teaching is based can be gathered with tolerable certainty from the last thirteen of the first series of the *Katecheseis*, and are distinguished from those of the Nicene Creed by the avoidance of its distinctive word *Homousios* ('of the same substance'). The best editions are

by Tontée (1720, 1844) and by Reischl and Rupp (1845-60). There is a translation by Dean Church in the *Oxford Library of the Fathers*, and by Gifford in *The Nicene and Post-Nicene Fathers*. See work by Delacroix (1865), and Herzog-Hauck (1896-1909).

**CYRUS THE GREAT** (*Kurus*, perhaps from *kur*, 'a mountain'), the founder of the Persian empire. He was the fourth in a line of kings of Anzan or Susiana (called by the Hebrews *Elam*) who formed a branch of the royal dynasty of the Achæmenides. According to Herodotus, Cyrus was the son of Mandane, daughter of Astyages, king of Media, and the Persian Cambyses. Moved by superstitious fears, Astyages attempted to destroy him in his infancy, but the child was saved by a herdsman, who brought him up as his own son. Being recognised in his boyhood by Astyages, he was sent to his parents in Persia. Cyrus in course of time rose against Astyages and conquered him. This narrative and the greatly varying accounts of Xenophon, Ctesias, Nicolaus of Damascus, Diodorus, and Trogus Pompeius, formerly regarded as the authorities for the life of Cyrus, have been superseded by the evidence of monuments discovered in modern times. Thus a new light has been thrown on his history by the discovery of his own cuneiform records on a clay tablet and cylinder which were brought from Babylon to England. Cyrus was the son of Cambyses I., grandson of Cyrus I., and great-grandson of Teispes, conqueror of Elam, who was also the great-grandfather of Hystaspes, the rather of Darius (q.v.). From the tablet-inscription we learn that in the sixth year of Nabonidus, king of Babylon (549 B.C.), Cyrus, 'king of Elam,' conquered Astyages, king of Media, made him a prisoner, and took his capital, Ecbatana. By the year 546 he had become 'king of Persia.' Year after year was idly spent by Nabonidus at Tema, a suburb of Babylon, while his son (doubtless Belshazzar) was with his army in Akkad (Northern Babylonia). In 539 Cyrus, favoured by a revolt of the tribes on 'the Lower Sea,' or Persian Gulf, advanced on Babylon from the south-east, and, after giving battle to the army of Akkad, took Sippara (Sépharvaim) and Babylon itself 'without fighting.' The account of the siege of Babylon by Cyrus recorded by Herodotus must therefore be erroneous. The Greek historian seems to have transferred to the reign of Cyrus events which took place in the reign of Darius. On the eighth day after Cyrus entered Babylon in person, he appointed Gobryas its governor, and that very day Nabonidus died. Nabonidus in his distress had brought the images of many local gods to Babylon, so as to protect it from the invader; and the cylinder-inscription shows very clearly that Cyrus was a polytheist and an idolater, for he there says, 'the gods dwelling within them left their shrines in anger when [Nabonidus] brought them to Babylon,' and, after telling how he had restored them all to their sanctuaries, prays them to intercede before Nebo and 'Merodach my lord,' for himself and Cambyses his son. Cyrus at once began a policy of religious conciliation. The nations who had been carried into captivity in Babylon along with the Jews were restored to their native countries, and allowed to take their gods with them. The empire of Lydia had fallen before the army of Cyrus eight years before (in 546), and after the conquest of Babylonia he was master of all Asia from the Mediterranean to the Hindu Kush. The conqueror's hold over Asia Minor and Syria was much strengthened by his friendly relations with the Phœnicians and also with the Jews, who received the news of his triumphs with enthusiastic sympathy as the confirmation of the prophetic aspirations for their national deliverance. In the

Old Testament he is called the Shepherd and the Anointed of Jehovah, because in 538 he gave the Jews who were living in captivity in Babylon permission to return; yet it is expressly said of him: 'For Jacob My servant's sake, and Israel My chosen . . . I (Jehovah) have surname (or *called*) thee, though thou hast not known Me . . . I will gird thee, though thou hast not known Me' (Isa. xlv. 4, 5). The favour which he showed to the Jewish people awoke the hope that he might be won over to faith in Jehovah as the one true God; but doubtless he was less moved by religious than by political motives to allow the Jews to return to their own land. After the great king had extended the boundaries of his empire from the Arabian desert and the Persian Gulf in the south, to the Black Sea, the Caucasus, and the Caspian in the north, he died in 528—according to Herodotus and Diodorus, during an unsuccessful struggle with Tomyris, queen of the Massagete, on the Jaxartes; according to Ctesias, of a wound which he had received while conquering the Derbices on the upper Oxus. The empire of Cyrus was organised under satraps and minor governors, after the manner of the second empire of Assyria. Three years before his death, Cyrus made his son and successor Cambyses 'king of Babylon.' His own title was 'king of the world.' The chief seat of his court was Ecbatana; during the spring months it was held at his old capital, Susa, or Shushan, in Elam. Cyrus takes a high rank among Asiatic conquerors; he was a wise and considerate ruler, whose aim was to soften by his clemency the despotism which he was continually extending by the sword. But he did little to consolidate the empire which he founded, contenting himself with a declaration of allegiance, and leaving the government nearly everywhere in the hands of native rulers. He brought the greater part of the Old World (Egypt excepted) under his sway, but left the organisation of his conquests to his successors. The *Cyropædia* of Xenophon is obviously an historical romance. See Professor Sayce's *Introduction to Ezra, Nehemiah, and Esther* (2d ed. Lond. 1887); also his *Fresh Light from the Ancient Monuments* (1883).

**CYRUS THE YOUNGER**, the second of the sons of Darius Nothus (or Ochus) and Parysatis, was born in 424 B.C. He conspired against his brother Artaxerxes Mnemon, who had succeeded to the throne (404 B.C.). The plot, however, being discovered, he was at first sentenced to death, but afterwards pardoned, and even restored to his dignity as satrap of Asia Minor. Here he employed himself in making arrangements for war against his brother, although he concealed his purposes to the very last. In the spring of 401 B.C. he left Sardis at the head of 100,000 Asiatics and 13,000 Greek mercenaries, under pretence of chastising the robbers of Pisidia. Artaxerxes being warned of Cyrus's perfidy, made preparations to oppose him, and the two armies encountered each other in the plains of Cunaxa, 500 stadia from Babylon. Cyrus was defeated and slain, although the Greeks fought with the greatest courage, and even routed that portion of Artaxerxes' troops immediately opposed to them. The fortunes of the Greeks, on their retreat through the highlands of Armenia, in severe winter-weather, are recorded by Xenophon in his *Anabasis* (q.v.).

**Cyst** (*kystis*, 'a bladder'), a word sometimes used in the original sense as applied to hollow organs with thin walls, as the urinary bladder and gall-bladder; but commonly reserved for the designation of pathological structures or new formations within the body having the bladder form. Cysts may arise in two different ways: (1) either

by the accumulation or products within cavities normally present, or (2) by the independent formation of a cavity. Of the first, wens, collections of secretion in a sebaceous gland of the skin, are the commonest example; instances of the second are cystic tumours of the Ovary (q.v.) and the sacs developed in connection with certain parasites ('bladder-worms'; see HYDATIDS, ENTOZOA). The structure of their walls is still more variable than their mode of origin; sometimes they are thin and transparent, sometimes dense and fibrous. They are either simple or compound, unilocular or multilocular; they are sometimes small, numerous, and separate; in other cases they grow to an enormous size, and are very complex. Some cysts are present at birth, and remain through life almost unchanged; some increase rapidly in size, and form large and dangerous tumours. For Cystic Worms, Cysticercus, see BLADDER-WORM, CESTOID WORMS, TAPEWORM.

**Cystin**, or CYSTIC OXIDE, forms a rare variety of urinary Calculus (q.v.). Its chemical composition is  $C_3H_7NSO_2$ , and it forms a whitish or dirty yellow deposit of six-sided crystalline tablets. It is soluble in ammonia, and is thereby distinguished from the similar crystals of uric acid.

**Cystitis**, inflammation of the Bladder (q.v.).

**Cystoidea** (Gr. *kystis*, 'a bladder'), a group of fossil echinoderms, so called from their spherical or bladder-like form. The spherical body was inclosed by calcareous plates, and resembled that of the crinoids in general form. It was borne on a short stalk, or was sessile. See CRINOIDEA.

**Cythera**. See CERIGO.

**Cytisus**, a large genus of Leguminosæ, sub-order Papilionaceæ, small trees or shrubs, with ternate leaves, and yellow, white, or purple flowers, natives chiefly of the warmer temperate parts of the Old World, but frequently introduced on account of the beauty of their flowers; see BROOM. In its widest sense the genus may include the Laburnum (q.v.).

**Cytology**. See CELL.

**Cyzicus**, the ancient name of a peninsula of Asia Minor, projecting into the Sea of Marmora, which lies immediately to the SE. of the island of Marmora, and is about 9 miles in length. It was at one time an island. In early times Cyzicus was a Milesian colony, and the city of Cyzicus, which was not finally ruined till its conquest by the Arabs in 675, is described by Strabo as one of the first cities in Asia, alike for extent and splendour. See Hasluck, *Cyzicus* (1911).

**Czar**, better *Tsar* or *Tzar*, the title of the emperors of Russia and kings of Bulgaria. The word occurs in Old Slavonic, equivalent to king or *kaiser*, and is connected with the Latin *Cæsar*, continued in the Roman empire as a title of honour long after the imperial house itself had become extinct. In the Slavonic Bible the word *basileus* is rendered by *czar*; *Cæsar* (*kaisar*) by *Cesar*. In the Russian chronicles also the Byzantine emperors are styled czars, as are also the khans of the Mongols who ruled over Russia. The title of the Russian princes was *kniaz* ('prince') and *veliki kniaz* ('great prince'): and the princes of Moscow took the title of czar as rulers of the Mongolians. As individual subkhans made themselves independent of the kingdom of the Golden Horde, they also assumed the title of czar; thus, there were czars of Siberia, of Kasan, and of Astrakhan. The conquest of the Golden Horde by the khan of the Crimea in 1480 made the grand-princes of Moscow completely independent; and upon them devolved the absolute power which the czars had exercised over all Russia. Ivan IV. the Terrible first caused him-

self to be crowned czar in 1547; from that time the title of czar became the chief title of the Muscovite rulers, and became practically the equivalent of emperor. The wife of the czar was named *tsaritz*a (czarina); the sons, *tzarevitch*; the daughters, *tzarevna*; but after the death of Alexei—Peter I.'s son—these titles were abolished, and the imperial princes were called grand-dukes, and the imperial princesses grand-duchesses. In 1799 the Emperor Paul I. introduced the title of *cesarevitch* (not *czarevitch*) for his second son, the Grand-duke Constantine. The heir-apparent and his wife continued to be called *cesarevitch* and *cesarevna*. Among the Russian people themselves, the emperor was more frequently called *Gossudar* (Hospodar, 'Lord') than czar. The term White Czar, *belyj zar*, comes down from Mongol times, and is merely equivalent to an independent, non-tribute-paying czar. The czardom ended in the revolution of 1917. See RUSSIA.

**Czardasch**, or CSÁRDÁS, a Hungarian national dance, in two sections—a slow movement called a *lassu* or *lassan*, and a quickstep, the *friss* or *friska*. Both are always in  $\frac{3}{4}$  or  $\frac{2}{4}$  time, and in the same key. Examples on an extended scale occur in Liszt's 'Rhapsodies Hongroises.'

**Czartoryski**, ADAM GEORGE, son of Prince Adam Czartoryski (1734–1823), was born at Warsaw, 14th January 1770. Educated at Edinburgh and London, he returned to Poland, and took part against Russia in the war of 1794. Sent to St Petersburg as a hostage, he gained the friendship of the Grand-duke Alexander and the confidence of the Emperor Paul, who made him ambassador to Sardinia. When Alexander ascended the throne, he appointed Czartoryski assistant to the Minister of Foreign Affairs; and he took an active part in official life until after the peace of Tilsit. As curator of the university of Wilna (1803) he exerted all his influence to keep alive a spirit of nationality; and when some of the students were sent to Siberia on a charge of sedition, Czartoryski resigned his office. His successor reported to the emperor that the amalgamation of Russia and Lithuania had been delayed a century by Czartoryski. Russian favours could not deaden or even dull Czartoryski's pure patriotism. Into the revolution of 1830 he threw himself with all his heart. He was elected president of a provisional government, and in this capacity summoned a national diet, which in January 1831 declared the Polish throne vacant, and elected Czartoryski head of the national government. He immediately devoted half of his large estates to the public service, and adopted energetic measures to meet the power of Russia. In August he resigned his post, but continued to fight as a common soldier. After the suppression of the rising (see POLAND), Czartoryski—specially excluded from the general amnesty, and his estates in Poland confiscated—escaped to Paris, where he afterwards resided, the liberal friend of his poor expatriated countrymen, and the centre of their hope of a revived nationality. In 1848 he liberated all his serfs in Galicia, and during the Crimean war he ineffectually endeavoured to induce the allies to identify the cause of Poland with that of Turkey. He refused the amnesty offered to him by Alexander II., and died 15th July 1861. See his *Memoirs*, translated by Gielgud (1888), and Morfill's *Poland* (1893).

**Czaslau** (Bohemian *Cáslav*), a town of Bohemia, 40 miles ESE. of Prague by rail, with manufactures of beet-sugar and alcohol. Its church, in which the Hussite leader Ziska was buried, is surmounted by the highest steeple in Bohemia (290 feet). The place was the scene of

an important victory gained over the Austrians by Frederick the Great, 17th May 1742. Population, 10,500.

**Czechoslovakia**, a republic of central Europe, established in 1918 out of the ruins of the Austro-Hungarian monarchy. It consists of the Czech territories (Bohemia, Moravia, Silesia) of former Austria, together with the Slovak territory (Slovakia), and the Little Russian territory (Carpathian Ruthenia) of former Hungary. In shape and size not unlike Great Britain, it lies from west to east, and, situated at the heart of Europe, borders on Germany, Austria, Hungary, Rumania, and Poland. It is some 600 miles in length, and about 55,000 square miles in area (Bohemia, 20,333 sq. m., Moravia, 8580 sq. m., Silesia, 2026 sq. m., Slovakia, 19,148 sq. m., Ruthenia, 4958 sq. m.). Geographically the country may be divided into two main sections, separated roughly by the valley of the March (Morava): the first comprises the whole of Bohemia, the western and north-western part of Moravia, and the Silesian district of Troppau (Opava); the second includes Slovakia, the adjoining portion of Moravia, the Silesian district of Teschen (Těšín), together with Carpathian Ruthenia. The first part, sloping downwards from south to north, forms the basin of the upper Elbe, and is a network of waterways drained by the Moldau (Vltava) and the Elbe (Labe), both of which are navigable far inland. On the south and south-west this region is enclosed by the Sumava and the Bohemian Forest, on the north-west by the Ore Mountains (Krušné Hory, Erzgebirge), in the north and north-east by the Giant Mountains (Krkonoše, Riesengebirge) and the Sudetic Mountains; in the east the Czecho-Moravian plateau allows of easy communication with the second geographical section of the country. This section consists of the western and northern range of the Carpathians, and slopes not northwards but southwards from the heights of the High Tatras to the Danube and the plain of Hungary; the March of Moravia and Slovakia, and the Vah, Nitra, Hron, and Ipola of Slovakia flow southwards to the Danube; while the rivers of Carpathian Ruthenia, mostly of small importance, run mainly south-westwards to the Theiss (Tisza). The principal lakes of Czechoslovakia are the Lagenbrücher Teich of Bohemia and Lake Csorba of Slovakia. The climate of the republic is a mean between the maritime and the continental, its continental character increasing from west to east. Rainfall is generally even, and temperature varies with altitude, the warmest part being the large plain crossed by the tributaries of the Danube in their lower reaches. The winter in Bohemia, Moravia, and Silesia lasts only two and a half months, but in Slovakia and Carpathian Ruthenia winter is severe and summer hot, while spring and autumn are short.

**Agriculture.**—In Slovakia is to be found some of the richest soil in Europe, and throughout Czechoslovakia agriculture is highly developed, the country being almost self-supporting. Wheat, rye, barley, oats, maize, sugar-beet, and potatoes are the principal crops, while the Saaz (Žatec) district of Bohemia is famous for its hops. Much live-stock (cattle, horses, pigs, sheep, and goats) is raised. In many districts fruit-growing, especially the culture of the vine, is largely carried on. The forest wealth of the country is great. The question of land reform was tackled early by the republic, and by an act of 1919 the state was empowered to expropriate and break up large estates, many of which for almost three centuries had lain in the hands of German nobles.

**Manufactures.**—Despite its agricultural importance Czechoslovakia is, however, essentially an

industrial country, and at that one of the richest in Europe, about 80 per cent. of the mines and industrial enterprises of the former Austro-Hungarian monarchy now lying within the republic. Sugar, alcohol, beer malt, textiles (cotton, wool, flax, jute, &c.), porcelain, pottery, glass (window, mirror, bottle, lamp chimney, electrical globe, cut and crystal, chemical, watch, fancy), chemicals (manures, dyes, soap, candles, glue, &c.), timber, leather (gloves, boots), furniture, fancy goods, paper, machinery (agricultural, sugar, brewery), steel, iron, and other manufactures in metals are the principal industries. The sugar industry is very great, Czechoslovakia being among the first beet-sugar producing countries of the world, and the only European sugar exporter. The industry centres chiefly in Bohemia and Moravia, as does also the famous (Pilsner) beer-brewing industry. The important distilling-industry is pretty generally distributed. The textile industries are highly developed; cotton, the most important, is concentrated chiefly in north-eastern Bohemia and in Slovakia; the woollen industry centres in Bohemia and Moravia, and the flax and jute industries in these provinces and also in Silesia. Silk, hemp, lace, embroidery, and hosiery are also manufactured. The great glass and porcelain industries are localised mainly in Bohemia, the first in the sandy districts near the coalfields of the north-west, the second round Carlsbad and in the smaller towns and villages of the west. The iron and steel industry, with its principal centres in Bohemia, Moravia, Silesia, and Slovakia, is greatly hampered by insufficient native supplies of iron ore. Czechoslovakia abounds in water power, and since the establishment of the republic the state has undertaken the systematic utilisation of that power for the industrial electrification of the country.

**Minerals.**—The minerals of Czechoslovakia are as varied as they are extensive. Coal is the chief, and, though not exported, forms a most important source of supply for native industry. The great field is in Silesia (Ostrava-Karvin), but large supplies are got also from Bohemia (Kladno, north of Prague) and to a lesser extent from Moravia. Lignite in large quantities is mined mainly in Bohemia, but also in Slovakia and Carpathian Ruthenia. Bohemia and Slovakia are the principal sources of iron ore, while in the first of these provinces and in Moravia graphite is an important industry. Apart from these minerals, gold, silver, wolfram, uranium, radium, copper, tin, antimony, lead, zinc, sulphur, manganese, aluminium, kaolin, and quartz are all found in different parts of the country, but mostly in Bohemia. In some parts mineral oils are worked, while in Carpathian Ruthenia there are great mines of salt. Garnets are obtained in Bohemia and opals in Slovakia. Round the many mineral springs of the country numerous health-resorts have arisen, the most famous Carlsbad (Karlov Vary), Marienbad (Mariánské Lázně), Franzensbad (Františkovy Lázně), Teplitz-Schönau (Teplíce-Sanov), Luhačovice, Priesnitz, Gräfenberg, Postyén (Píšťany), Vyhne, and Sliač.

**Commerce.**—As an essentially industrial state, Czechoslovakia imports chiefly raw materials and foodstuffs, and exports finished manufactured goods. Corn, flour, wool, cotton, ores, oils, &c., are the principal imports; and sugar, glass, timber and wooden goods, beer, iron, machinery, paper, leather and leather goods, textiles, &c., the leading exports. Though hampered commercially by lack of seaboard, Czechoslovakia's position at the heart of Europe, and in close proximity to the agricultural states of Poland, Hungary, and Rumania, is economically advantageous. With most of the countries

of Europe commercial treaties were concluded soon after the emergence of the republic.

*Communications.*—An inland state, Czechoslovakia is peculiarly dependent on the efficiency of her internal means of communication. The road-system generally is well developed, but that can hardly be said of the waterways, no real systematic attempt having been made to turn to advantage the potentialities of the country for canalisation. While the navigable rivers are few, those there are of great importance. The Elbe, with its navigable tributary the Moldau, and the Danube are the chief, while the Oder is navigable from Czechoslovakia to the Baltic. By the Elbe, Prague (Praha), the capital, is linked with Hamburg, while by the Oder the industrial regions of Silesia are joined to Stettin; in both ports Czechoslovakia by the Treaty of Versailles (1919) enjoys special commercial privileges. In Carpathian Ruthenia the Theiss provides in part a navigable highway. Operations for linking up the Elbe and the Danube by canal have been begun, while an Oder-Danube canal scheme is also to be undertaken. The railways of Czechoslovakia, owned partly by the state and partly by private enterprise, form a dense network, more especially in the western provinces of the republic. As an integral part, however, of the former system of Austria-Hungary they run mainly from north to south, whereas the circumstances of the new state demand rather a system with connections from west to east. For the improvement of railway communications along those lines national funds have been allocated. Internationally Czechoslovakia may be regarded as the railway centre of Europe; thus Prague, standing on the great trans-continental routes, is joined by rail to the capitals of almost every European state.

*Population.*—The population of Czechoslovakia in 1921 was about 13,610,405, including 8,761,834 Czechs and Slovaks, 3,122,892 Germans, 746,809 Magyars, 459,349 Ruthenes, 180,337 Jews, 75,705 Poles. The Czechs and Slovaks form two branches of the same Slav stem, and constitute the western vanguard of their race. The Czechs occupy central and southern Bohemia and the central districts of Moravia and Silesia. The Slovaks inhabit northern Slovakia and central Silesia. The German population centres mainly on north-western Bohemia, in western Silesia, and in a small district on the boundary of Bohemia and Moravia. The Magyars inhabit southern Slovakia and south-western Ruthenia. The Ruthenes of Little Russian (Slav) stock are to be found on the eastern border of Slovakia and in Carpathian Ruthenia, on a strip of about forty miles wide running along the Carpathians. The Jews are widely distributed, but are most numerous in the east, and are for the most part town-dwellers. The Polish population is concentrated mainly in eastern Silesia.

*Education.*—Under Austrian rule education, both general and technical, was always widespread and of a high standard in Bohemia, Moravia, and Silesia, the race rivalries of Czech and German having proved beneficial in this regard. In Slovakia, however, teaching in the national language was forbidden under the Magyars, and the percentage of illiteracy was high, while in Carpathian Ruthenia education was even more backward. From the year of its establishment, however, the furtherance of education was one of the first cares of the Czechoslovak state, and instruction became compulsory in primary, secondary, commercial, and agricultural schools. In Slovakia, in the first year of the republic, three thousand Slovak schools were opened, while educational improvement was also undertaken in Carpathian Ruthenia. Of higher learning there are numerous institutions in Czechoslovakia. Apart from a school of mines, an academy of arts,

and two high schools of agriculture and veterinary science, there are four high schools of technical studies (two Czech, two German), two academies of law, and three faculties of divinity, all of university standing. Of universities there are four, two in Prague, one Czech, one German; the former founded in 1348, the latter in 1882. A new Czech university was established at Brünn (Brno) in 1918, and a Slovak university was instituted at Pressburg (Bratislava) in 1919.

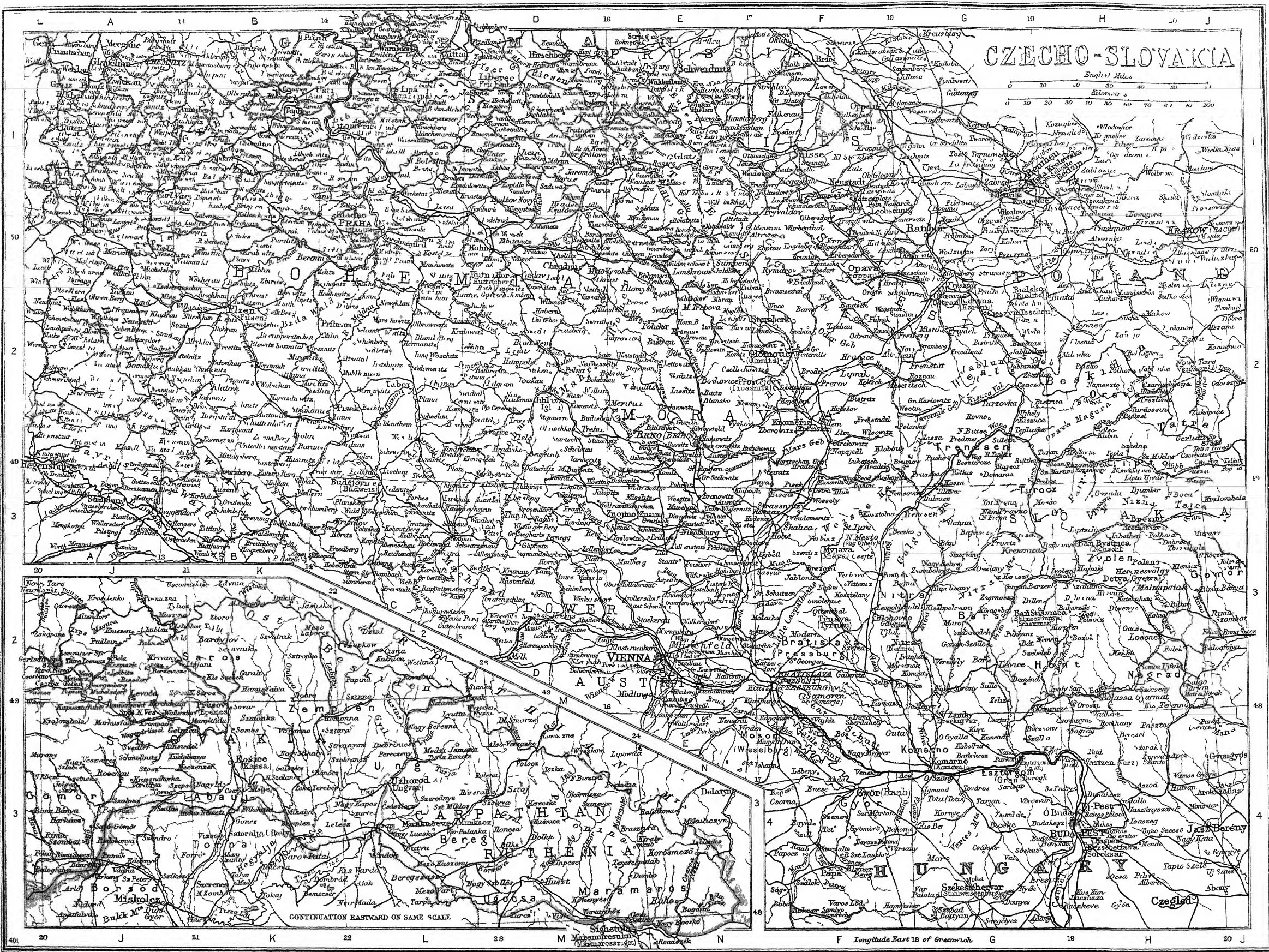
*Religion.*—By the Czechoslovak constitution liberty of conscience and of religious creed is guaranteed, while in the eyes of the law all religious confessions are equal. The state, by means of financial grants, supports the various ecclesiastical communities in their moral and educational activities, and allows the churches to organise their work freely, according to their own principles and needs. Owing to the Counter-Reformation of the Hapsburgs in the 17th century, the nation which led the Reformation in central Europe is to-day overwhelmingly Roman Catholic, the percentage of Protestants (Lutherans and Calvinists) being altogether insignificant. The adherence of the Czechs to the Roman Catholic Church is, however, often merely nominal, and in the 20th century a strong tendency to secession became manifest, more especially among the intellectual and working-classes. The republic gave strength to the movement, and in the first three years of its existence over a million persons forsook the Roman faith, the greater part joining a newly-formed National Church. This church arose out of the Holy See's rejection of a request for reform put forward by a considerable section of the Czechoslovak priesthood, the reforms demanded including the abolition of celibacy, the introduction of the vernacular into the services, and a more democratic administration of church affairs. The Ruthenes belong to the Uniat Church, to which also belong some of the Slovaks in the eastern districts of Slovakia.

*History.*—The emergence of the independent state of Czechoslovakia represents the last stage in the revolt of the Slav people of central Europe against the Germanising and Magyarising influences which surrounded them. For the first stages of that revolt one must turn to the earlier history of the various territories which came later to constitute the republic.

*Bohemia.*—The Celtic Boii, from whom the country derives its name, were the first known inhabitants of Bohemia. They were expelled about the beginning of the Christian era by the Teutonic Marcomanni, who yielded in turn to the great Slav invasion, and as early as the 5th century Bohemia was peopled by Czechs. Under Samo, a mysterious alien, their kingdom attained in the 7th century to large dimensions. During the 9th century Bohemia formed part of the great Moravian realm of Svatopluk, and was converted to Christianity by the Greek monks Cyril and Methodius. On the fall of Svatopluk's empire in the 10th century, Bohemia was ruled by a line of dukes of the Czech dynasty of Přemysl. These dukes owned the overlordship of Germany, and from 1086 their kingship was acknowledged, Bohemia being regarded as a state in the German empire. In 1306 the last of the dynasty was assassinated. Under its sway the growth of German influence, in many ways beneficial, was very marked, and the country became bilingual. Reaction came, however, with the succeeding house of Luxemburg (1310-1437), and under Charles I. of Bohemia, IV. of Germany, the Czech movement first took definite shape in both its aspects, religious and political. The great movement for church reform, inaugurated in the following reign by John Huss (q.v.) and Jerome of Prague (q.v.), became with the martyrdom of Huss









(1415), and the employment of Germany as the crusading force of the Roman Church, as much national as religious in character, and the Hussite wars (1420-36) were racial wars in large degree. Victory lay with the Hussites, but the country was grievously weakened. Many difficulties stood thereafter in the way of the erection of a permanent Slav monarchy, Bohemia became an elective kingdom, and in 1458 the Protestant noble, George of Podiebrad, ascended the throne. With his successor, the Polish prince Ladislaus (1471-1516), came association with the kingdom of Hungary, for in 1490 Ladislaus was elected to the Hungarian throne. Under him the royal residence was removed to Ofen (Hungary), where also his son and successor, Louis (1516-26), resided. After Louis's death in battle against the Turks at Mohacz, Bohemia and Hungary passed into the hands of the Hapsburgs under Ferdinand I. of Austria, who had married Louis's sister, and from that time till the rise of the Czechoslovak republic the history of Bohemia merges in that of Austria (q.v.). The Reformation was tolerated under Maximilian, and religious liberty was formally granted by Rudolf II. (1609); but under Matthias, and especially Ferdinand II., this freedom was later withdrawn. This reactionary religious policy of the Hapsburgs, joined to the centralising absolutism of their house, produced the revolution of 1618, and saw the election of Frederick V. of the Palatinate (q.v.) to the Bohemian throne (see THIRTY YEARS' WAR). With the disastrous battle of the White Mountain (1620), however, the Hapsburgs were restored. There followed the merciless extirpation of Protestantism, the triumph of Jesuitism, the ruin of the country, the suppression of Bohemia as a nation. But in the latter part of the 18th century the reforms of Josef II., and the influence of patriotic writers, stirred up a revival of national feeling, more especially in the departments of language and literature. And so in the earlier part of the century following, till in 1840 the movement became definitely political in character. A continuous demand for the restoration of political independence ensued. In 1848 a Pan-Slav congress was held at Prague, and in the same year a revolutionary rising was swiftly suppressed in that city. A return to absolutism followed, but in 1861 a more liberal constitution was granted; Bohemia enjoyed a diet (*Landtag*) of its own, while it also sent members to the imperial parliament (*Reichsrat*) at Vienna. Under the new constitution a Bohemian diet made the Czech language a compulsory subject even in German secondary schools. In 1867, however, the Czechs refused to send their complement of members to the Reichsrat, on the ground that that body encroached on the rights of the Bohemian diet. In other ways the Czechs showed their growing sympathy with Pan-Slavism. About this time the industrial revolution, which was beginning to transform Bohemia, gave a new stimulus to the national cause, in so far as Czech workmen now massed together in factories gained a new sense of racial solidarity. From 1871 a policy of conciliation was followed by the Austrian government, and in 1879 the Bohemian delegates resumed attendance at the Reichsrat, and as a section of the Right secured important concessions to the cause of nationalism. Solution by compromise was attempted in 1890, and at various later dates right up to the outbreak of the Great War, but all without success.

**Moravia.**—Moravia was anciently occupied by the Quadi, who were succeeded after the 5th century by the Rugii, the Heruli, and the Longobardi, and finally in the 6th century by the Slavs. Charlemagne brought the people under nominal subjection, and about 864 Christianity was first

introduced by Cyril and Methodius. In the late 9th century Svatopluk, king of Moravia, established a powerful empire, which fell, however, in the century following, before the onslaughts of the Magyars. In 1029 Moravia became incorporated with Bohemia, and from that time till 1849, when it was formally separated and declared a distinct province and crown-land of Austria, the history of the two countries is for all intents and purposes one. As part of Bohemia, Moravia had shared in the national aspirations of the Czechs, and even after her formal separation in 1849 her growing and active sympathy with the nationalist and anti-Teutonic movement of the Bohemians was the most outstanding feature of her history.

**Austrian Silesia.**—Austrian Silesia came into being as a result of the Treaty of Berlin (1742), confirmed by the treaties of Dresden (1745) and Hubertsburg (1763), whereby there passed from Austria to Germany 'all Silesia except Teschen and the district beyond the river Oppa and the high mountains.' In the 13th century the Slav inhabitants of Silesia (q.v.) were largely Germanised, and from 1331 to 1742, during which time the country remained almost continuously a province of Bohemia, similar forces were at work. After 1742 the portion of Silesia remaining to Austria was counted, not as a Bohemian, but as an Austrian province. In 1848, however, and in 1868, the Bohemians included Austrian Silesia in their demand for the reconstitution of the ancient kingdom of Bohemia.

**Slovakia.**—The Slovaks reached central Europe probably about the same time as the Czechs, in the 5th or 6th century A.D., and at once came into contact with German tribes, to whom they were subject for a time. Later they formed part of the great Moravian empire. After being conquered by the Magyars in the 10th century, the Slovaks, except for a brief period of connection with Poland under Boleslav the Brave (973), remained till 1918 the subjects of Hungary, their history in its main lines being contained in the history of that country (see HUNGARY). Despite the Magyar influences to which from the 10th century they had been subject, the growth of a conscious feeling of nationalism was slow amongst the Slovaks. Not till the second half of the 18th century, indeed, did a national movement arise—the response to the Magyar attempt to express their own nationalism at the expense of a Slovak minority. The wave of national feeling which, after the Treaty of Vienna (1815), began to sweep over Europe, later gave strength to the movement, and when in 1848-49 the Magyars attempted to throw off the Austrian yoke, the Slovaks took the opportunity of rising against their oppressors. Their failure resulted in their continued subjection, while the feeling of hostility between the two races was increased. The compromise of 1867 sacrificed the interests of the Slovaks, leaving them more completely at the mercy of the Hungarian government. Though the Law of Nationalities of 1868 was conciliatory in spirit, in practice the forcible suppression of the Slovaks continued—political and administrative office was closed to them, their children were reared as Magyars, their language was banished, their schools were closed. Right up to the Great War the Magyars, in defence of their own political predominance, checked Slovak nationalism at almost every point.

**Carpathian Ruthenia.**—The origin of the Ruthenes is obscure, but by the 10th century Ruthenian tribes are to be found both to the north and to the south of the Carpathians, inhabiting a country which came to be known as Red Russia. There they were ruled by a number of independent princes, whose various states soon became the battle-ground of contending Pole and Hungarian, falling in whole

on in part, now to the one, now to the other. From 1382, however, till 1918 the region on the south-western side of the Carpathians (Carpathian Ruthenia) remained continuously in the possession of the crown of Hungary, its history being the history of that country. Under Hapsburg rule, Ruthenian nationalism in Carpathian Ruthenia, as in the other Ruthene territories of the empire, was for long encouraged, partly as a means of checking the Galician Poles, partly with a view to creating a national nucleus, to which in course of time might be attracted the Little Russian subjects of the Russian empire. In the later 19th century, however, and in the first years of the 20th, this policy was in large measure reversed. Thus the imposition of the Magyar liturgy was attempted, while a general attitude of hostility to the Uniat Church was adopted. It was in these circumstances that in the decades before the Great War a strong nationalist and anti-Magyar movement arose amongst the Ruthenes. See GALICIA, POLAND, RUTHENIANS, UKRAINE.

While the tide of national feeling among the Slav peoples of central Europe continued to rise as the 20th century advanced, the outbreak of the Great War found the national aspirations of Czech, Slovak, and Ruthene still unsatisfied. It fell, however, to the war to provide the circumstances in which the realisation of national ambitions became possible. From the very outset Czechs and Slovaks were unconcealed opponents of the Austrian cause. In the field they surrendered in battalions to the Russians and the Italians, and joined with them and with the French to fight the Central Powers; at home they suffered persecution for pro-Ally sympathies; abroad, in the countries of the Allies, especially under Professor Mašaryk and Dr Beneš, they instituted a political campaign against the empire of which they formed so unwilling a part. Over three years elapsed, however, before events at home began to move directly towards the institution of an independent state. In December 1917 the Czech deputies of the Reichsrat declared that, on the conclusion of the war, the only possible terms of peace must include the recognition of the right of the Czechoslovak nation to self-determination. This announcement was followed on 6th January 1918 by a Declaration of Independence, issued at Prague by the Czech deputies of the Reichsrat, and by the deputies from the diets of Bohemia, Moravia, and Silesia. In the Declaration, amongst other things, union with Slovakia was claimed. On 13th July following, in the interests of an independent state, a National Council was instituted at Prague. Thereafter, at different times, the Czechoslovak claim to independence was virtually acknowledged by France, Italy, Great Britain, the United States, and Japan. On 14th October the National Council was constituted as a provisional government, and on the 27th, the rights of the Czechoslovaks were recognised by the Austro-Hungarian government, following the rejection of its offer of a measure of national autonomy within an Austrian federation. So it came to pass that on 28th October 1918 the National Council, without resistance, took over the government of Bohemia, Moravia, and Silesia, the ancient kingdom of Bohemia being in this way once more reconstituted. Two days later the independence of Slovakia was also proclaimed, and political union with that country accomplished. On 14th November following the first representative body of the Czechoslovak people—the National Assembly—met at Prague, where the Czechoslovak state was formally declared a republic, and Professor T. G. Mašaryk was elected as its first president. On 8th May 1919 Carpathian Ruthenia, in a National Central Council, unanimously approved of incorporation

with Czechoslovakia on special terms of autonomy, political action in this direction having previously been undertaken by emigrant Ruthenes in the United States. The request was later granted, and so, by the express will of their several peoples, the Slav territories of central Europe united to form one state, with a single government. The frontiers of Czechoslovakia were fixed by the peace treaties of Versailles (1919), St Germain (1919), and Trianon (1920), and in the case of the ancient principality of Teschen, part of which passed to the republic, part to Poland, by a decision of the Ambassadors' Conference, 28th July 1920, and not by plebiscite as originally intended.

*Constitution.*—The constitution of the Czechoslovak republic was passed by the National Assembly on 29th February 1920, and in its main provisions was largely influenced by the constitutions of France and of the United States. Thus the Czechoslovak state is declared to be a democratic republic, having an elected president at its head; the state, with the partial exception of Carpathian Ruthenia, is to be unified and not federative; the legislative body is to consist of two chambers—a chamber of deputies of 300 members and a senate of 150 members—both elected by a universal, equal, direct, and secret suffrage, according to the principles of proportional representation; complete and absolute security of life and of personal freedom are to be guaranteed to all; in respect of civic rights, no privileges of sex, birth, or vocation are to be recognised; liberty of speech, press, instruction, and religious profession are assured; all religious confessions are to be equal in the eyes of the law; all citizens are to be equal whatever their race, language, or religion, while special provisions are to be made for the protection of national, religious, and racial minorities.

*Language.*—Linguistically as racially the Czechs and Slovaks are one people, and by the constitution of Czechoslovakia, the Czechoslovak language in both its forms, the Czech and the Slovak, is declared to be the official language of the republic. Czech and Slovak as tongues are mutually intelligible, and are so similar that one might almost be said to be a dialect of the other. In reality they represent two branches of the same Slav language, but branches exposed to divergent influences. Till the 19th century Czech was the literary language not only of Bohemia, Moravia, and Silesia, but also of Slovakia. Czech is one of the most cultivated dialects of the Slavonic, and in its complicated and difficult forms reminds one of the Latin and Greek accident. Its peculiarities are the sibilated *r*, which is harsher than the *rz* of the Poles, and the distinct possession of both quantity and accent, so that Latin and Greek metres can be exactly reproduced in it, though such imitations are purely artificial, the native poetry being accentual. Its syntax resembles Latin. It has one guttural, *ch*. It has a passive participle, but no formal passive voice, and makes a very free use of reflexive verbs. In their Uniat Church the people of Ruthenia have preserved the Slav liturgy, but their language is a dialect of Little Russian.

*Literature.*—The literature of Czechoslovakia is mainly Czech, though also Slovak to some extent. There is no Ruthenian literature of importance.

*Czech.*—The Greek Church is represented by a Glagolitic (q.v.) fragment (c. 900), the Latin by a fragment of St John's Gospel with an inter-linear Czech translation of somewhat later date. Between 1240 and 1250 the Latin *Alexandreis* was freely translated into rhyme, and legends of Christ and of several saints were current towards the close of the century. A manuscript containing

an unrhymed poem, the *Judgment of Libussa*, and another containing epic and lyric poems were found by V. Hanka in 1817; the work has been ascribed to the end of the 13th century, but both manuscripts are now usually regarded as forgeries. The greater part of the Bible was translated by the end of the 13th century, and in the 14th the whole was completed, the Czechs being the first Slav nation to possess a complete translation of the Scriptures in their native language. The first half of the 14th century, important as witnessing the foundation of the university of Prague by Charles IV. in 1348, presents a rhymed chronicle called that of Dalimil, the earliest complete manuscript of which (c. 1350) was unearthed at Pembroke College, Cambridge, in 1876. In this century didactic and satirical poetry were well represented. The rhymed legend of St Catherine (discovered at Stockholm in 1850) is of considerable beauty, and that of St Prokop is amusing. The travels of Marco Polo were translated early, and those of Sir John Mandeville late in the same century. A cycle of chivalry was also current. A complete Life of Christ was written. Romances of Alexander the Great and of Troy were translated. Tkadleczeck's dialogues between 'The Complainer' and 'Misfortune' are a model of terse and elegant Czech. Thomas of Stitný (Tomáš ze Stitného, 1325-1404), one of the earliest precursors of the Reformation, wrote in order that there might be a literature of the soul as generally accessible in the Czech as in the Latin tongue. Theologian, homilist, and philosopher, his equal cannot be found in English literature before the time of Elizabeth. From Stitný, as a writer, it is impossible to separate John Huss (Jan Hus), who, though inferior in style, yet in his religious writings in the vernacular created the Czech literary language as it is written to-day. The Hussite wars were hardly favourable to any but controversial literature, though a few songs, satirical and didactic poems and ballads were produced, among them a spirited ballad on the battle of Aussig, and the marching song of the soldiers of Žižka. Žižka was the inventor of modern strategy, and his military arrangements, which still exist in writing, are in every way remarkable. In this period, too, appeared Peter Chelčický, the peasant philosopher, and probably the most original religious thinker of the time. His writings, anticipatory of Tolstoi in their doctrine of non-resistance, are an expression of the innermost spirit of the Czech people, and subsequently formed the basis on which was founded the Union of the Bohemian Brethren, a union which in the later 16th century developed a highly successful literary activity. During the Polish dynasty John Hasensteinský wrote *Travels in Palestine* (1492) and *Advice to his Son* in excellent Czech, and Nicholas Konacz a fine book on the *Plaint of Justice, the Queen and Lady of all the Virtues*. Under Ferdinand I. and Maximilian II. (1526-75) many of the Jesuits from the Jesuit academy, established at Prague in 1555, wrote in Czech with great success. Sixtus of Ottersdorf's *Memoirs of the Years 1546-47* are very valuable. But the literary glory of the period is the *Kronyka Ceska* of V. Hajek of Liboczan (1541), which in style rivals Herodotus, though its historical statements are so untrustworthy, that Palacký terms the author 'the corrupter of Bohemian history.' The time of the emperors Rudolf II. and Matthias (1576-1619), or rather of the former, marks the highest point of development of the older Czech literature. In Rudolf's time the printer, Adam of Veleslavin, was the centre of literary activity. Translations were more abundant than original works, and it was during this period that the great Kralitz (Kralická) Bible, translated by the

Bohemian Brethren, appeared at Kralitz in Moravia (6 vols. 1579-93). Matyas Gryll (1592) wrote the only good original poem, *On the Providence and Government of God*, of this era. The travels of Harant of Polzie in Palestine, Egypt, and Sinai, have been translated into German, and the adventures of Wratislav of Mitrovitz in Turkey into German, English, and Russian. Of Jirzik Zaveta's *Schola Aulica*, Balbinus said that 'if translated into Latin it need fear no criticism.' Amongst the Brethren the outstanding literary figure was Jan Amos Komenský (Comenius, 1592-1671), the great humanitarian teacher of the nations, and author of the *World in Pictures* and the *Labyrinth of the World*. From Ferdinand II. (1619) to Josef II. (1781) is a period of literary decline. The Jesuits from the school of Ferdinand I. gradually died out, and their successors, far from studying Czech, carried on a ruthless crusade against the native literature. The Jesuit Konias boasted of having burned 60,000 volumes with his own hand, and in no modern literature are so many books known to have disappeared.

But with the end of the 18th century came a period of unexampled revival. The Abbé Josef Dobrovský (1753-1829) was the pioneer; the father of Slavonic comparative philology, he devoted his life to grammatical, philological, and historical research in the interests of the Czech tongue. In 1795 Fr. V. M. Kramerus established a printing-press in Bohemia, which, till his death in 1808, was the centre of Czech literary activity. In 1818 Count Kaspar Sternberg and others succeeded in fully establishing and endowing the Bohemian Museum, which became the centre of literary and linguistic, and also scientific research and progress. In 1825 Josef Jungmann (1773-1847) published his *History of Bohemian Literature*, and in 1827 the magazine (*Czasopis*) of the Bohemian Museum appeared under the editorship of Fr. Palacký (1798-1875). In 1831 the *Matice Ceska*, the Czech Literary Society, a by-committee of the Museum, was instituted for the republication of old, and the publication of new books of value in the Czech language. By its aid Jungmann's great Czech dictionary, the work of thirty years, appeared (5 vols. 1835-39), and in 1837 the Slovak, P. J. Safarik's (1795-1861) *Slavonic Antiquities*, the first Czech work to obtain a European reputation. The first volume of Palacký's famous *History of the Czech Nation* appeared in German in 1836, in Czech in 1848; the work to 1826 was completed in German in 1867, and in Czech in 1876, and was later continued by Gindeley (1829-92). In the revival of poetry, A. J. Puchmajer (1795-1814) was an important influence, as was also V. Hanka (1791-1861) with his successful imitations of the popular songs and ballads of the peasantry (1815-16), and his publication of the *Starobyta Skladanie*, 'Ancient Collections' (1817-24)—a reproduction of the poetic stores obtained by the researches of Dobrovský. By the publication of Macpherson's *Ossian* (1761) and Percy's *Reliques* (1765) interest in folk-songs had been aroused, but the greatest impulse to Czech poetry was given by the appearance of Hanka's 13th-century manuscripts, the authenticity of these manuscripts quite apart. In 1819 Polák in his *Sublimity of Nature* produced the first great poem of the revival. Next came the Slovak, Jan Kollár (1793-1852), the poet of Pan-Slav idealism, and F. L. Čelakovský (1799-1852) and K. J. Erben (1811-70), writers of folk-songs and national ballads. K. H. Mácha (1810-36) was, however, the greatest poet of the revival; his *Máj* is a lyrical epic tinged with romantic melancholy. In Karel Havlíček (1821-56), the first great Czech publicist, Mácha's lyrical spirit had its satirical counterpart.

By the middle of the 19th century the Czech literary revival had passed far beyond its rudimentary stages, and continued to gather in strength. Jan Neruda (1834-91), in verse a Czech Heine, and in prose a Czech Dickens, is the greatest figure of the time. Both in prose and in verse the literature of these years is rich in purely popular elements. This is to be seen in the simple and delicate verses of V. Hálek (1835-74), in the strongly racial poems of A. Heyduk (b. 1835), and in the patriotic songs of J. V. Sládek (1845-1912), E. Krasnohorská (b. 1847), S. Čech (1846-1908), and F. S. Procházka (b. 1861). The progress of the novel was an outstanding feature of the time. Thus in the early fifties appeared *The Grandmother* (*Babíčka*) of B. Němcová—a rustic story and standard work of Czech literature. K. V. Rais (b. 1859), A. Stašek (b. 1843), K. Klostermann (b. 1848), the brothers Alois (b. 1861) and Vilém (1863-1912) Mrštík, and K. Světlá (1830-99), all followed in the tradition of Němcová. The social novel, generally humanitarian in purpose, also found many exponents, as G. P. Moravský (1833-75), M. Šimáček (b. 1860), J. K. Šlejhar (1864-1914), F. Herites (b. 1851), and I. Heilmann (b. 1854); while the historical novel was represented by V. B. Třebízský (1849-84), Z. Winter (b. 1846), A. Jirásek (b. 1851). J. Arbes (1840-1916) and F. X. Svoboda (b. 1860) are other novelists of note. In the poetry of the later 19th century J. Vrchlický (Emil Frida, 1853-1912), perhaps the greatest name in Czech literature, was the leading influence; a prolific writer, his many lyric, epic, and dramatic poems enriched the Czech language, and introduced almost every variety of metrical form, while his numerous translations were of great intrinsic and historical value. Vrchlický gathered round him a large group of poets, who followed him in his leanings towards perfection of form, and also in his activities as a translator; of the number are A. Klášterský (b. 1866), who completed the translation of Shakespeare begun by Sládek, J. Borecký (b. 1869), J. Kvapil (b. 1868), F. Kvapil (b. 1853), and A. Černý (b. 1864). The rallying point of the group was the *Lumír*, a literary periodical founded in the seventies, to which J. Žeyher (1841-1901), though hardly a follower of Vrchlický, was a most important contributor. Since the appearance of Vrchlický the progress of Czech poetry is associated in particular with the realist J. S. Machar (b. 1864), the impressionist A. Sova (b. 1864), and the symbolist Otakar Březina (V. Jebavý, b. 1868), three poets whose joint achievements it would be difficult to equal among modern European singers.

In the last years of the 19th century the general European revolt against prevailing artistic and moral standards made a deep impression on Czech literature. The effects of this new movement were concentrated especially in the columns of the *Modern Review*, founded in 1894. Among representatives of these modern tendencies are J. Karásek ze Lvovic (b. 1871), K. Hlaváček (1874-98), V. Dyk (b. 1877), S. K. Neumann (b. 1875), F. Srámek (b. 1877), E. Lešetický z Lešehradu (b. 1877), K. Toman (b. 1877), O. Theer (1880-1918), Jan z Wojkowicz (b. 1880), and O. Fischer (b. 1883).

The beginnings of Czech drama are to be found in the early part of the 19th century, and are associated with such names as V. Klicpera (1792-59) and J. K. Tyl (1808-56). After an interval of romanticism due to Shakespearean influences and exemplified in the plays of J. J. Kolár (1812-90), the French tradition of Scribe was followed by E. Bozděch (1841-89) and L. Stroupežnický (1850-92), the last-named introducing a more racial element in the form of village drama. By the opening of the National Theatre at Prague, 19th November 1883, a new stimulus was given

to the play. Thereafter the influence of Ibsen, together with the realism of the Russian and German stage, produced the modern social dramas of F. X. Svoboda, M. A. Šimáček, J. Hilbert (b. 1871), J. Kvapil, and K. Čapek, two of whose satirical plays, *From the Life of Insects* and *R. U. R. (Rossum's Universal Robots)* have been done in translation in London. The more recent developments of the Czech theatre have led, on the one hand, to the romantic treatment of national subjects, as in the brothers Místík, and on the other to the cultivation of historical drama, as by J. Karásek ze Lvovic, V. Dyk, J. Maria (b. 1870), A. Dvořák (b. 1880), and J. Mahen (b. 1882).

*Slovak*.—During the 15th century the spread of Hussite doctrine, from Bohemia through Moravia to Slovakia, brought with it the Czech language. Slovak at this period was still an unwritten tongue, and Czech, used at first for the new religious teaching, became, and for long continued to be, the only written language of the country. But towards the end of the 18th century tendencies became apparent making for the displacement of Czech by Slovak. It was in the work of A. Beňolák (1762-1813) that these tendencies first assumed a concrete form. Additional impetus to the use of Slovak as a literary language was given by L. Štur (1815-56) and his followers, J. Kral (1822-74) and J. Botto (1829-81). The realists Sladkoví (1822-72) and Kalinčák (1822-71) were, however, the most remarkable writers of the period. Towards the close of the 19th century closer intellectual touch with the Czechs was resumed, one of the most prominent names connected with the movement being J. Vlček, whose history of Slovak literature is a standard work. The greatest poet of Slovakia is Hviezdoslav (Pavel Oszag, 1849-1921), and the best prose writers S. Hurban-Vajanský (b. 1847), who is also a distinguished lyric poet, and M. Kukučín, famous for his realistic stories of village life. The literary renaissance of the present day is associated in particular with the names of the two poets J. Jesenský and I. Kiško.

*Painting*.—The history of Czech painting begins with the illumination of manuscripts. In the 14th century, following the founding of an artistic brotherhood, a school arose in which Dutch and Italian influences were associated under the Hapsburgs. In the reign of Rudolf II. brilliant progress was made till interruption came with the Thirty Years' War. Between 1640 and 1674 Skreta was the leader of a revival of artistic activity; together with the religious decorator Brandl, and the painter Reinier, he is the forerunner of modern Czech painting. Under Josef II. all art fell into decay. But revival came in the 19th century with the awakening of national aspirations. Hellich, Lhota, Javůrek, Maixner, and Čermák combined to arouse interest in national art, but they were no more than imitators of the school of Düsseldorf, and it remained for the great artist Joseph Manes (1820-70), whose style varies from the classic and romantic to impressionism, to lay the logical foundations of a national school. Since Manes, artists of note have been M. Aleš (1849-1913), painter of Czech popular life, Brožík, historical painter, Knupfer, marine painter, Slavíček and Chitussi, landscape painters, Mucha and Hynais, decorative painters, Preisler and Švabinský, painters of portraits and allegorical subjects, Liška, painter of sombre pictures, and Boettinger and Strejti, painters of society and fashion. In Slovakia, Úpkra and his school have devoted themselves to representation of peasant life.

*Sculpture*.—The originator of Czech sculpture was Petr Parler, architect of the 14th-century cathedral of St Vitus. In Matthias Rejsek the

Renaissance produced another remarkable artist. In the 14th century the style of the Jesuits dominated. There followed a long period of decline, till in the 19th century Czech sculpture revived and developed along similar lines to Czech painting. Joseph Myslbek (b. 1848) is the great name, but Levý (1820-70), Max, Schnirch, Sucharda, Saloun, and Bílek are also important. Of more recent sculptors the chief are Štursa, Mařatka, Beneš, and Kafka.

**Architecture.**—Prague, the Florence of central Europe, is evidence in itself of the architectural genius of the Czechs. Czech architecture was first Roman, e.g. the basilica of St George at Prague, then Gothic, e.g. the magnificent cathedral of St Vitus, also at Prague. The 14th century saw the intrusion of the Jesuit style, and witnessed the triumph of baroque architecture. Under Ladislaus (1471-1516) flamboyant Gothic rose high in favour, revealing itself in Prague, in the churches of St Mary of Týn and St Charles, in the town hall, and in the towers of the Bridge of Charles IV. There followed in the 16th century an Italian period, when the Renaissance stamped itself everywhere. The 18th century brought a return to the baroque, while the 19th witnessed the restoration of old Gothic structures, and the erection of new buildings in neo-renaissance style; of new buildings the National Theatre at Prague is the crowning example. Both in the 19th and the 20th centuries Czech architecture came under the influence of the popular art of Moravia and Slovakia.

**Music.**—From 1348, the year of its foundation, music formed part of the curriculum of the university of Prague, while at a comparatively early date the subject was taught along with reading and writing in the elementary schools of Bohemia. In these circumstances the Czechs early gained fame as musicians. It is from the 19th century, however, that the period of great development dates. Chmelenský, Tovačovský, and Křižovský were forerunners, but Bedřich Smetana (1824-84), the creator of Czech opera, was the great figure. He was succeeded by Antonín Dvořák (1841-1904), whose compositions have become classics, by Fibich (1850-1900), and by Kovařovic. Among contemporary composers are Foerster, Novák, Ošeděl, and Suk, while exponents of note are Kubelík, Stěpán, Heřman, Kocian, Ševčík, and Ondříček. On Czech music the folk-songs of Slovakia have had a powerful influence, while within that country itself great musical progress has also recently been made, as reflected in the work of Janáček, Bella, Fügus-Bystřý, Schneider-Trnavský, and Moyzes.

**Science.**—The founding of the university of Prague in 1348 marks the real beginning of scientific activity among the Czechs. In the reign of Rudolf II. (1576-1612) Prague became a centre of science with which the names of Kepler, Tycho Brahe, &c., were associated. In mathematics, in medicine and surgery, and in exploration and geography, the Czechs were also distinguished, till decline set in with loss of independence in 1621. Restoration began with the mid-18th century. Purely scientific at first, emphasis came in the 19th century to be laid on the purely national aspects of learning. Landmarks in the revival were the founding of the 'Royal Learned Society' and the Bohemian Museum, and the establishment of the scientific periodicals, *Krok* in 1821, and *Ziva* in 1849, the first by J. S. Presl, who also created a Czech terminology for chemistry and other sciences; the second by J. E. Purkyně (1787-1869), a physiologist of European reputation. To this period also belongs Mendel (1822-84). In 1882 a fresh impetus was given to the scientific movement, when the university at Prague, Germanised from 1621,

was divided into two universities, one Czech, one German. Since then there have been few departments of science in which the Czechs have not risen to distinction.

See works of Palacký, Schlesinger, and Tomek; also G. Drage, *Austria-Hungary* (1909); C. E. Maurice, *Bohemia* (2d ed. 1922); Count Lutzuw, *Bohemia; an Historical Sketch* (1909); F. Sláma, *Oesterreichisch Schlesien* (1887); T. Čapek, *The Slovaks of Hungary* (1906); H. I. Bidermann, *Die Ungarischen Ruthenen* (1862); R. W. Seton-Watson, *Racial Problems in Hungary* (1908), *German, Slav, and Magyar* (1916), *The Czechoslovak Republic* (1921); L. Niederle, *La Race Slave* (trans. from Czech, 1911); Bestiaux, *Bibliographie Tchèque* (1920); C. Peigler, *The Czechoslovak State* (1919); A. Broz, *The Rise of the Czechoslovak Republic* (1919); J. Císar and F. Pokorný, *The Czechoslovak Republic* (1922); P. Selver, *Anthology of Modern Bohemian Poetry* (1912); J. E. S. Vojan, *Modern Musical History of Bohemia* (1917); B. Matejka and Z. Wirth, *L'Art Tchèque contemporain* (1920), *Modern and Contemporary Czech Art* (1924); F. Chudoba, *Short History of Czech Literature* (1924); J. Chmelar, *Political Parties in Czechoslovakia* (1926).

**Czechs** (also spelt *Tzechs*, *Tschechs*, *Ceshs*, *Cheskians*, &c.). See CZECHOSLOVAKIA.

**Czegled**, a market-town of Hungary, 47 miles SE. of Budapest by rail. The inhabitants, 37,000 in number, follow principally agricultural pursuits, the district around yielding much grain and red wine.

**Czermak**, JOHANN NEPOMUK, physiologist, was born, 17th June 1828, in Prague; studied at Vienna, Breslau, and Würzburg; was professor successively at Cracow, Budapest, Jena, and Leipzig; and died 16th September 1873. He was the founder of laryngoscopy. His principal work is *Der Kehlkopfspiel* (2d ed. 1863), and his collected works were published in 1879.

**Czerno'witz** (Rumanian *Cernauti*), the capital of Bukovina, stands 720 feet above sea-level, near the right bank of the Pruth, 165 miles SE. of Lemberg by rail. Among its buildings are the palace of a Greek archbishop (1875); his cathedral (1864), on the model of St Isaac's at Petrograd; the Armenian church (1875); the synagogue (1877). The university was founded in 1875, refounded 1920. The manufactures and trade are steadily developing. The town changed hands repeatedly in the Great War. Pop. (1869) 33,884; (1910) 86,870; (1920) 90,000—Germans, Ruthenians, Rumanians, Poles, Jews, Armenians, and Gipsies.

**Czerny George**. See KARADJORDJE.

**Czerny**, KARL, pianoforte teacher and composer, born at Vienna in 1791, was the pupil and friend of Beethoven, and gained much from Clementi and Hummel. Besieged by pupils, he would teach only those of especial talent; among these were Liszt, Thalberg, and Döhler. Living in great retirement, he devoted much of his time to composition; a mass of MS. is preserved in the archives of Vienna; while his published works number over 900, of which his *Theoretical and Practical School* is the best known, and probably also the most valuable. He died 15th July 1857.

**Częstochowa** (Ger. *Tschenstochau*), or CZENSTOCHOWA, a town of Poland, 148 miles SW. of Warsaw by rail. A Catholic monastery, founded here about 1382, is visited yearly by fifty to sixty thousand pilgrims, as possessing the famous 'Black Virgin,' a murky painting of Byzantine origin, but ascribed by legend to St Luke himself. In 1655 the town was the only place in Poland which offered resistance to Charles Gustavus of Sweden, when 70 monks and 150 soldiers for 38 days held out against 10,000 men. The place has become the rival of Łódź for textile manufactures, and there is a great iron industry. Pop. 80,000.

# D



the fourth letter of our alphabet, descends from the fourth letter of the ancient Semitic alphabet, called in Hebrew *dāleth*, in Syriac *dōlath*; some early Semitic dialect had the name in a form which the Greeks adopted as *delta*. These forms are alterations of the Semitic word for 'door' (Assyrian *daltu*, Hebrew *dēleth*), and some have thought that the earliest known shape of the letter, Δ, represents the triangular 'door' (Gen. xviii. 2) or opening of a tent. It is unlikely that the inventors of the alphabet were tent-dwellers; but the doors of other kinds of habitation may have been triangular. In some early inscriptions the letter is written Δ; in the Aramaic variety of Semitic writing this character was opened at the top and erected, becoming 4, whence the Hebrew 7.

The Greeks adopted the letter in its original shape, which survives in the modern printed capital Δ. In some parts of the Hellenic world this form was altered to Δ, of which there was a rounded variant Δ. This was adopted by the Romans, who called the letter *dē*, on the analogy of their name for the second letter (see the article B). In rapid writing the letter was formed with a single stroke of the pen, and the curve continued backwards, producing the type Δ, whence, by rounding the outline, the Roman cursive Δ. A variant of this, with the upper stroke straightened, d, is found as early as the 1st century. All the various modern forms of the letter, script and printed, are recognisably derived from the Roman capital and cursive forms, with modifications adopted either for facility of writing or for ornament.

The normal phonetic value of the fourth letter, from the beginnings of the alphabet down to modern times, has (speaking generally) been the voiced stopped consonant produced by contact of the tip of the tongue with the roots of the teeth, the gums, or the portion of the palate behind the gums. This general description obviously leaves room for considerable diversity of articulation; thus the French *d*, which may be correctly described as dental, differs appreciably in formation and sound from the English *d*, for which the point of contact is farther back. In many languages this sound tends in certain positions to change into the corresponding open consonant (=th in *this*); and as this change was not always indicated in writing, the letter *d* or its equivalent acquired in such cases a second value. It is sounded as the open consonant in late Hebrew and Aramaic after vowels; in modern Greek in all positions except after *n*; in Spanish between vowels (at the end of a word *d* is sounded as the voiceless *th* in *thin*). In some languages, in which the letter at one time had both values, they were afterwards distinguished by diacritics or combinations of the letter; in pointed Hebrew and Aramaic the points show which sound is to be given; in Welsh the open consonant is expressed by *dd*; in Irish written in the native character the dotted S (in transliterated texts and in Scottish Gaelic rendered *dh*) had originally this value (the later pronunciation need

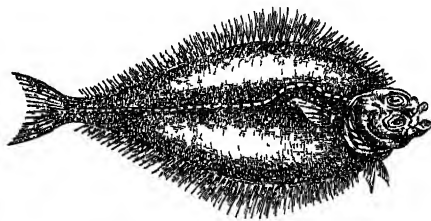
not be noticed here). In Old English the two sounds of our *th* (in *this*, *thin*), for which the Roman alphabet had no symbol, were expressed by *፥* (an altered form of *ð* = *d*), which was used indifferently with *p*. In Icelandic these symbols have been adopted, but with a phonetic distinction: *፥* = *th* in *this*, *p* = *th* in *thin*.

In some German dialects the sound of *d* differs from that of *t* only by having a less degree of force, both being alike voiceless. (Compare the article on B.)

In German, final *d* (preserved in spelling for historical reasons) is pronounced as *t*. The same unphonetic use occurs in English, in the past participles of verbs ending in voiceless consonants (as *miss*ed, *miss*'d), and rarely in French (as in *un grand honn*me).

D, in Music, is the second note in the natural scale. See MUSIC, SCALE.

**Dab** (*Pleuronectes limanda*), a species of Flounder (q.v.), common on European coasts, but not occurring in the Mediterranean. It is distinguishable from plaice and flounder by its light-brown or ashen-gray colour, with small irregular dark spots, by the roughness of its small, close-set scales, and by its more arched lateral line. Its length is from 8 to 16 inches. It is common all



Dab (*Pleuronectes limanda*).

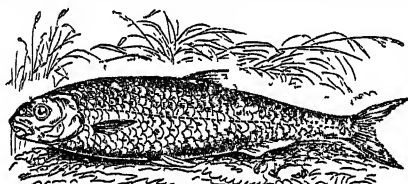
round Britain, and in the Firth of Forth is known as the Salt-water Fluke. Its flavour excels that of flounder. A rather larger species, of even more northern distribution, is the Lemon or Smooth Dab (*P. microcephalus*). It may be distinguished from the common dab by the fact that the first ray of the anal fin is not spiny. The brownish colour is sometimes prettily mottled.

**Dabchick.** See GREBE.

**Dacca**, a town of Bengal, on the Burhiganga, connecting the Ganges and the Brahmaputra, 150 miles NE. of Calcutta, consists of a dull esplanade and one long cross street, with a network of narrow, crooked lanes. Commanding the principal waterways of the delta, it was from about 1610 to 1704 (with an interval of twenty years) the seat of the Mohammedan government of Bengal. The suburbs extended 15 miles northward, where mosques and brick buildings are still found buried in thick jungle. In the 18th century it became widely celebrated for the delicate texture of its muslins, and the French, Dutch, and English had extensive establishments. In the 19th century, however, the change in the river system deprived it of its facilities for transit;

and this, with the competition of Manchester, almost completely ruined it. The population fell from 200,000 in 1800 to 69,212 in 1872. A small colony of muslin-weavers still survives, and other manufactures are coarse cotton cloth, embroidery, silver-work, shell-carving, and pottery. Besides Dacca University (founded 1921), there are many good schools, and a fine hospital; a system of water-works opened in 1878 improved the sanitary condition of the town. Pop. (1901) 90,542; (1911) 108,551; (1921) 119,450.—DACCRA DISTRICT has an area of 2777 sq. m., and consists of a level plain, intersected by a network of levees and artificial water-courses. Floods and droughts are never serious, but earthquakes are common. Food-crops, oil-seeds, jute, cotton, safflower, and sugar-cane are grown. Trade is carried on chiefly by water, and the rivers are crowded at all seasons with steamers and native craft; the adventurous boatmen of the district have a name throughout Bengal.

**Dace**, DARE, or DART (*Leuciscus vulgaris*), a fresh-water fish in the carp family Cyprinidae (q.v.), and of the same genus as the roach, chub, minnow, &c. It chiefly inhabits the deep and clear water of quiet streams. It is found in Italy, France, Germany, &c., and in some of the rivers of England, but is very local. In form it is not unlike the roach, but rather more elongated; the mouth is rather large, the scales smaller. The upper parts are dusky blue, becoming paler on the sides, and



Dace (*Leuciscus vulgaris*).

passing into white on the belly, the cheeks and gill-covers silvery white. It measures about 8 inches in length, and never exceeds a pound in weight. The dace is gregarious, and swims in shoals. It spawns in early summer. Its flesh is preferred to that of the roach, but is not highly esteemed. The dace is perhaps the liveliest and most active of the Cyprinidae, and affords the angler fair sport both with fly and bait.

**Dachshund**, a name adopted from the German, signifying 'badger-dog.' The dachshund has been common in Germany for many years, but was unknown in England until introduced by the Prince Consort towards the middle of the 19th century; it then became very fashionable and popular, but is not now so common. The dachshund is a small dog, weighing about 20 lb., with short crooked fore-legs, and an extremely long body, its head rather resembling that of a miniature bloodhound. Its strong, large paws enable it to dig rapidly. Its colour should be black and tan, or brown. On the Continent the dachshund is extensively used for covert-shooting, but rarely so in Britain, as his headstrong disposition somewhat spoils his usefulness. The dachshund is closely akin to the old English *Turn-spit*, employed to drive a wheel by which roasting-spits were turned.

**Dacia**, the land of the ancient Daci or Getae, including the country between the Danube, the Theiss, the Carpathians, and the Pruth. The Dacians were the most valiant of all the tribes of Thracian origin (see THRACE). In the reign of Augustus they began to molest the Roman allies, and indeed from this time there was almost continual fighting between the Romans and the Daci,

who actually, under their brave king, Decebalus, compelled their civilised enemies, in the reign of Domitian, to purchase peace by paying tribute. In 101 the Emperor Trajan crossed the Danube, and after five years' desperate fighting, conquered the whole country, and formed it into a Roman province. Roman colonists were sent into the country, great roads were opened up, and a bridge was built over the Danube—the ruins of which are still extant. Under Aurelian the Danube was made the boundary of the empire, and Dacia was resigned to the barbarians, its Roman colonies being transplanted to Mœsia.

**Dacier**, ANDRÉ, a French scholar, born of Protestant parents at Castres, in Upper Languedoc, 6th April 1651, studied at Saumur under Tanneguy Lefebvre; and in 1672 came to Paris, where in 1683 he married Anna (1654–1720), his old preceptor's daughter, and two years later was admitted with her to the Roman Catholic Church. Dacier subsequently became royal librarian, member of the Academy of Inscriptions and of the French Academy, and perpetual secretary of the latter. He died 18th September 1722. His works include a Delphin edition of Festus and Verrius Flaccus (1681), as well as indifferent translations of Horace, the *Poetics* of Aristotle, some of the Dialogues of Plato, Epictetus, and Plutarch's *Lives*. His wife's works include Delphin editions of Florus, Aurelius Victor, Eutropius, Dictys Cretensis, and Dares Phrygius; and translations of Anacreon, Sappho, some plays of Plautus and Aristophanes, Terence, the *Iliad* and the *Odyssey*. Her admiration of Homer was more unbounded than discriminating, and involved her in many controversies.

**Dacoits**, or DAKAITS, a name used for brigands herding in gangs in various parts of India, and living by *dakaiti* or robbery with violence, long specially the curse of Central India. The annexation of Burma in 1885 increased for a time the labours of the Thaggy and Dakaiti Department, but systematic dakaiti, which in the later decades of the 19th century had still some 9000 representatives, has steadily been suppressed. Like the Thugs (q.v.), the Dakaits proper recognised specific religious sanctions. See HERVEY, *Some Records of Crime* (1892), and books named at BURMA.

**Da Costa**, ISAAC, a Dutch poet, born at Amsterdam, the son of a Portuguese Jew, 14th January 1798. He studied at Leyden; and in 1822, a year after receiving the degree of doctor of philosophy, he embraced Christianity. His poems speedily gained him such reputation that, on the death in 1831 of Bilderdijk, whose warm friendship he had enjoyed, Da Costa succeeded him in the first place among the poets of Holland, which he held till his death, on 28th April 1860. His principal works are to be found in his *Poezij* (2 vols. 1821–22), *Politieke Poezij* (1854), and *Hesperiden* (1855). His *Battle of Neupoort*, the last of his poems, is one of his masterpieces. Da Costa also made essays in the domain of history and theology, the most important of which, *Israel and the Gentiles*, was translated into English.

**Dacotahs**, or DAKOTAS, a branch of the Sioux Indians. See SIOUX.

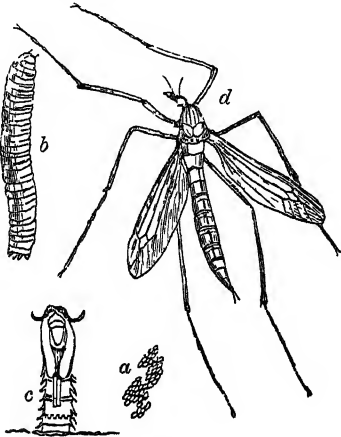
**Dacrydium**, a genus of coniferous trees of the yew family, but more allied to Podocarpus. There are twelve species—Malayan, Tasmanian, and of New Zealand. *Dacrydium cupressinum* of New Zealand is best known in Britain, on account of the beauty of its pendulous foliage. *D. franklinii*, the so-called Huon Pine, and *D. taxifolium*, the Kakaterata tree, yield valuable timber.

**Dactyl** (Gr. *dactylos*, 'finger'), the name of a measure or 'foot' in Greek and Latin versifica-

tion, consisting of a long and two short syllables, as in the word *omnibits*. It was so called from its resemblance to the finger, which consists of three joints—one long and two short. The same name is sometimes applied to a trisyllabic measure in English verse, consisting of one accented syllable and two unaccented syllables, as in *destiny* (see VERSE). Dactylic verse consists of dactyls and spondees, and includes both hexameter and pentameter verse.

**Dactylogy**, the art of communicating thoughts by the fingers. See DEAF AND DUMB.

**Daddy-long-legs**, or CRANE-FLY (*Tipula oleracea*), a familiar insect in the order Diptera, and a good type of its family Tipulidæ. The body, the legs, and the antennæ are very long. The latter have an arched curvature, and are longer in the males; the front of the head projects prominently; the posterior body, which is connected with



Daddy-long-legs (*Tipula oleracea*):

a, eggs; b, larva; c, pupa case as left by the insect sticking out of the earth; d, perfect insect.

the thorax by a very thin bridge, is broader in the females. The middle of the body is gray, with brown stripes, the abdomen reddish-brown, the legs brownish-yellow, and in part blackish, the wings brown, varying to red and white. This common European insect is towards an inch in length, is abundant from July to October in meadows and gardens, and is familiar to every one. The female is often seen laying her numerous eggs in damp places on the ground; the eggs are small, black, and shining; the larvæ, known as 'leather-jackets,' live in the ground, and often do damage in vegetable gardens and fields; the pupæ have spines on their abdominal segments, by which they push their way out of the ground. Of the genus *Tipula* about ninety European species are known. The largest form (*T. gigantea*) measures over an inch, and is not uncommon in Britain. *T. hortulana* is very common in gardens. The genus *Ctenophora*, commoner in wooded districts, is nearly allied. They have stouter bodies, and usually brighter colours. See GNAT, MIDGE.

**Dado** (Ital., 'a die'), in classical Architecture, the term applied to the cubic block which forms the body of a pedestal. It is also applied to the plane face and the series of mouldings which, in the interiors of buildings, form, as it were, a continuous pedestal. The interior dado is formed of wood, and, running round the bottom of the walls of a room, serves to protect the plaster or paper from injury. Dados and wall-linings were much used in Elizabethan and subsequent styles till the 19th century, when under the classic regime, they

were dispensed with. The revival of the 'Queen Anne' taste, however, led to the reintroduction of dados not only in the form of wooden panelings, but also in the painting and papering of the walls.

**Dædalus**, a figure in Greek Mythology who personified the beginning of the arts of sculpture and architecture. He was of the old Athenian royal race of the Erechtheidæ. Having killed his nephew and pupil in envy at his growing skill, he had to flee to Crete, where he made the well-known cow for Queen Pasiphaë, and afterwards for King Minos the famous labyrinth to confine the Minotaur. Minos next imprisoned Dædalus, but he escaped with the help of Pasiphaë, and formed wings for himself and his son Icarus, with which to fly across the sea. He himself flew safe across the Ægean, but unhappily Icarus flew too near the sun, the heat of which melted the wax that fastened his wings to him, so that he dropped into the sea, and left his name to be borne by that part of the Ægean into which he fell. Dædalus made his way to Sicily. Some accounts made him first alight at Cumæ in Italy, where he dedicated his wings to Apollo. Works of art were freely ascribed to Dædalus in Greece, Italy, Libya, and the Mediterranean islands. The name *Dædala* was applied to the earlier painted and gilded wooden statues of the gods.

**Daendels**, HERMAN WILLEM, a great Dutch general, was born in 1762 at Hattem, in Gelderland, took part in the revolutionary disturbances that broke out in Holland in 1787, and was in consequence compelled to seek refuge in France. In the campaign of 1793 he rendered important service to Dumouriez, and was elevated to the rank of a general of brigade. In 1799 he commanded one of the two divisions of the army of the Batavian republic, and in 1806 took service under the king of Holland. From 1808 to 1811 he was governor-general of the Dutch East Indian possessions, and published a work on them. On the overthrow of Napoleon, the new king of Holland, William I., intrusted Daendels with the organisation of the Dutch colonies on the coast of Africa, and there he died in June 1818.

**Daffodil** (corrupted from Lat. *asphodelus*), the English name of those species of *Narcissus* which have a large bell-shaped corona. The Common Daffodil (*N. pseudo-narcissus*) is a native of England and of most parts of Europe, growing in woods and hedges, and often cultivated in gardens, where it not unfrequently becomes double. It is naturalised in many places in Scotland and Ireland, but seems scarcely indigenous. From Herriek's lament to Wordsworth's dancing verse we have widely varied recognitions of the familiar golden cups of the daffodil as a source alike of poetic wealth and inspiration. See NARCISSUS.

**Dafydd ab Gwilym**. See GWILYM.

**Dag**, a thick pistol, of the 15th and 16th centuries. The word sometimes means a dagger.



Common Daffodil  
(*Narcissus pseudo-narcissus*).

**Dagger**, a weapon resembling a sword, but considerably smaller, being used for stabbing at close quarters. Daggers are generally two-edged, and very sharp towards the point. The *dagger of lath* was the Vice's weapon in the old moralities.

**Daghestan** ('mountain-land'), a triangular territory of Ciscaucasia, between the Caucasus and the west coast of the Caspian Sea, was by decree of the Moscow government in 1921 made a republic in federation with Russia. Area, 14,000 sq. m.; pop. 800,000. The surface is generally mountainous, being traversed by offsets from the Caucasus; the level tracts are chiefly near the coast, and here and in the valleys the land is very fertile. The country is well watered, the climate generally mild in the lowlands, and dry, except along the coast, where the rainfall is considerable. In the highlands large flocks of sheep are herded. The capital is Derbend (q.v.). See CAUCASUS, and SHAMYL.

**Dagö** (Hiiumaa), an island near the entrance of the Gulf of Finland, forming part of Esthonia, and separated by the narrow channel called Selsund from the island of Oesel on the south. Area, 367 sq. m. The inhabitants include many Swedes and Germans. The coast is rugged, and the soil fertile only in the south and south-west; inland there are large forests and swamps (54 sq. m.).

**Dago**, an American slang name for a Spaniard, Portuguese, or Italian (perh. from Sp. *Diego*, 'James').

**Dagoba**, the common name in Ceylon for a Buddhist Tope (q.v.).

**Dagobert** was the name of several of the Merovingian kings of France, the first of the name reigning from 631 to 638. See FRANCE.

**Dagon**, the national god of the Philistines, half-man, half-fish, is mentioned in the Old Testament as having temples at Gaza and Ashdod. There is evidence that Dagon was worshipped too in Phœnicia and some districts of south Palestine. He seems to have come to Canaan from Babylonia, the Assyrian monuments presenting a figure with the body of a man and the tail of a fish, and the cuneiform inscriptions containing the name of a god *Dakan* or *Dagan*, which is probably identical with Dagon. Most scholars favour the old derivation of the name from *dag* ('fish'); but others, following Philo Byblius, connect it with the word *dagan* ('corn'), and regard Dagon as the god of agriculture.

**Daguerreotype** is the name of the photographs fixed on a plate of copper thinly coated with silver by the successive action of the vapours of iodine, bromine, and mercury. Louis Daguerre, after whom the invention is named, was born in Normandy in 1789, was a scene-painter in Paris, made a famous diorama in 1822, and devoted the rest of his life mainly to perfecting the processes of photography, from 1826 till 1833 in conjunction with M. Niepce. He wrote two works on the subject, and died in the neighbourhood of Paris, 12th July 1851. The history of the invention is given at PHOTOGRAPHY.

**Dahabiyah**, a boat used by voyagers on the Nile, which varies in size, has one or two masts, and accommodation for from two to eight passengers, including a raised cabin on the after-deck. The boat sails, is rowed, or is dragged by ropes, according to circumstances.

**Dahl**, JOHANN CHRISTIAN CLAUSEN, a Norwegian landscape-painter (1788-1857), born at Bergen, from 1821 onward was professor of Painting at Dresden.

**Dahlak**, a group of three islands, with many smaller rocks, in the Red Sea, off the Bay of Massowah. They were famous in Roman times for their pearl-fisheries, which have been revived

in modern times. The inhabitants carry on a trade with the Arabian coast. The islands form part of the Italian colony of Eritrea.

**Dahlgren**, FREDRIK AUGUST (1816-95), Swedish poet, wrote many popular dialect songs and ballads, and some successful dramas.

**Dahlgren**, JOHN ADOLF (1809-70), born in Philadelphia of Swedish parents, served in the U.S. navy, being attached after 1844 to the ordnance department. In 1850 he invented the muzzle-loading, smooth-bore, cast-iron gun, called after him, which, strengthened by wrought-iron cores or coils, remained in use in the navy till 1880-85.—His wife, SARAH MADELINE VINTON DAHLGREN (1835-98), wrote many poems and sketches.

**Dahlgren**, KARL FREDRIK (1791-1844), Swedish poet, born at Stensbruk in Östergötland, studied at Uppsala, and from 1815 was a preacher at Stockholm. One of the best Swedish humourists, he published songs, odes, a satire, a comedy, idyls, and a novel, and edited a literary annual.

**Dahlia** (*Dahlia variabilis*, &c.)—after Dahl, a Swedish botanist, and pupil of Linnæus—a genus of large perennial composites (sub-order Tubulifloræ, family Helianthææ). It was first brought from the botanic garden of Mexico to that of Madrid in 1784, whence it reached England in



Dahlia :  
A, single; B, double varieties.

1789, and France in 1802, while in 1804 Humboldt sent a fresh supply of seed to Berlin. Its extraordinary variability soon attracted the attention of florists, who brought to bear on it all the resources of selection and crossing, with so much success that by about the middle of the 19th century no fewer than 2000 varieties had been described, all from *D. variabilis* or *D. coccinea* or their hybrids, and chiefly from the first named. For a long time only 'double' dahlias were cultivated, but of late years the single dahlia, in which the florets of the disc remain tubular, has again come into fashion; while among double dahlias the less regular cactus dahlia is highly esteemed. They are easily cultivated, and propagated by seeds, cuttings, or tubers; but the tubers may require to be taken up and stored in a dry place out of the reach of frost. They flower luxuriantly in autumn, until cut off by the first frosts. On account of the quantity of inulin in their tubers, they are cultivated for food in Mexico, but similar attempts in Europe have failed

because of their unpalatableness. See Nicholson's or other *Dictionary of Gardening*, also any florist's catalogue.

**Dahlmann**, FRIEDRICH CHRISTOPH, German historian, was born May 13, 1785, at Wismar. His earlier studies in Copenhagen and Halle were devoted to archæology and philology; but his attention was subsequently directed to the study of politics and the history of the middle ages. From 1813 on, he filled the chair of History at Kiel, and in 1829 was appointed to that of Political Science in Göttingen, where he published (1830) his invaluable *Quellenkunde der deutschen Geschichte*. Banished in 1837 by King Ernst August of Hanover, on account of his protest against the abolition of the Hanoverian constitution, he went to Leipzig, next to Jena, where he wrote his historical masterpiece, *Geschichte von Danemark* (3 vols. 1840-43). In 1842 he became Professor of History at Bonn, and took a prominent part in the political affairs of Germany after the movement in 1848, heading the constitutional liberals, who were unfortunately too reasonable to be successful. At the close of the struggle, he returned to his academic duties, to which he devoted himself till his death, 5th December 1860. See *Life* by A. Springer (2 vols. Leip. 1870-72).

**Dahn**, JULIUS SOPHUS FELIX, publicist, historian, and poet, was born at Hamburg, 9th February 1834, the son of a well-known actor and actress. He studied law, philosophy, and history at Munich and Berlin, became extraordinary professor at Munich (1862), next year ordinary professor at Würzburg, in 1872 professor of German Jurisprudence at Königsberg, and in 1888 at Breslau. Amongst his contributions to public law are *Das Kriegerrecht* (1870), *Handelsrechtliche Vorträge* (1875), *Deutsches Rechtsbuch* (1877), and *Deutsches Privatrecht* (1878). Of his historical works the chief are *Prokopius von Casarea* (1865), *Die Könige der Germanen* (1861-1908), *Westgotische Studien* (1874), *Langobardische Studien* (1876), *Urgeschichte der germanischen und romanischen Völker* (3 vols. 1881-90), and *Geschichte der deutschen Urzeit* (1885). He died 3d January 1912. His versatility is remarkable; he wrote also a series of popular historical romances, and of lyrical and dramatic poems. Of the former may here be named *Ein Kampf um Rom* (1876), a powerful novel, *Odhins Trost* (1880), and *Die Kreuzfahrer* (1885). See his *Erinnerungen* (1892-93).

**Dahna**. See ARABIA.

**Dahomey** (the native name of the people being *Dawma* or *Dahomé*) is since 1892-94 a French protectorate in Western Africa, between Lagos (British) and Togoland, with an area stated at 40,000 miles. The frontiers of the 'hinterland,' always vague, were matters of disagreement and debate, but were finally settled by the Franco-German convention of 1897 and the Anglo-French convention of 1898; and in 1907 about 24,000 sq. m. in the north-west were transferred from Dahomey to the French colony of Upper Senegal and Niger. The long lagoon which, shut in from the ocean by a protecting bank of sand, affords an easy route along nearly the whole of this coast, extends in Dahomey, from its western frontier almost to the Denham lagoon, in the east. About midway is the port of Whydah, whence a road extends inland to Abomey, a distance of 65 miles. Dense forests and dismal swamps cover nearly two-thirds of this distance, but from the Great Swamp of Agrimé vast undulating plains rise for many miles, in the direction of the Kong Mountains. The Avon and Denham lagoons receive the rivers of the country, none of which are very important. The soil is a rich, red-coloured clay, and is extremely fertile.

Groves of oil-palms encircle each town, and palm-oil is made in large quantities. Maize, beans, and peas, as well as cassava, yams, sweet potatoes, limes, oranges, pine-apples, and other tropical fruits, grow luxuriantly; cotton, sugar, and spices are also grown. Cotton cloth is made, and weapons and tools are forged from native iron.

The people are negroes, of the Ewe group, generally of small stature, but very robust and active. The Dahoman kingdom dates from the beginning of the 18th century, and reached its zenith under Gezo, who ruled from about 1818 to 1858. An army of about 10,000 existed, 1000 of whom were Amazons (devoted to celibacy), who were distinguished for their bravery and ferocity. Fetish-worship prevailed, taking the form of serpent-worship along the coast. The king was the most absolute of despots, and wholesale murder was one of the chief features in religious and state ceremonies, as many as 500 human victims having been sacrificed at one of the grand 'customs' which took place annually. The revenue formerly depended greatly upon the sale of slaves. In 1876 the coast of Dahomey was placed under a strict blockade by Great Britain, on account of an outrage on a British subject. In 1892 a French expedition under Colonel Dodds, after several victorious engagements, took Cana and dictated terms to King Behanzin in his capital. The French established a footing on the coast in 1851, and gradually extended their influence till, in 1894, the whole kingdom was taken in. The colony comprises, besides the native kingdom of Dahomey, all the French possessions bounded on the north by the French colonies of Upper Volta and of the Niger, on the east by British Nigeria, on the south by the Gulf of Guinea, and on the west by Togoland. Pop. 842,000. There are about 70 miles of coast. The chief port is Kotonu, terminus of a railway to the Niger. The French capital is Porto Novo (pop. 20,000). Other centres are Abomey, the former capital; Allada; Agone; Grand Popo; Whydah (Ouidah), a port; and Nikki. The chief exports are palm kernels and oil. Steamers ply along the coast lagoons, and Kotonu is in communication with Europe. The foreign trade is chiefly British. The colony has its own budget, and is self-supporting. It is under the governor-general of French West Africa.

See works by Burton (new ed. 1864), Skertchly (1874), Bouche (Paris, 1885), and Aubley (Paris, 1894); Ellis, *The Ewe-Speaking Peoples* (1890); and the British Foreign Office handbook *Dahomey* (1920).

**Dahra**, a district of Algeria, to the east of Mostaganem. In June 1845 Pélissier (q.v.) suffocated 500 refugee Kabyles in caves here.

**Dáil Eireann**. See IRELAND (*Government, History*).

**Daimiel**, a town of Spain, 28 miles ENE. of Ciudad Real by rail, with manufactures of woollens, brandy, &c.; pop. 16,000.

**Daimler Motor**, a specially modified petroleum oil-engine (see INTERNAL-COMBUSTION ENGINE, MOTOR-CARS), perfected by the inventor, Gottlieb Daimler of Cannstatt (who assisted Otto of Deutz in perfecting his gas-engine), for use in automobiles. Such carriages could, even when, noisy and smelly, they were first put upon the roads, easily do twelve and a half miles an hour, and carry supplies of petroleum for four or more hours' running.—Daimler (1834-1900) was born at Schorndorf, and took charge of the Deutz factory in 1872. The Daimler Motor Company was founded in Cannstatt in 1890, with subsequent headquarters in Untertürkheim and Berlin.

**Daimyos**, the old nobles of Japan (q.v.).

**Dairen**, or TAIREN (Russian *Dalny*, Chinese

*Ta-lien-wan*), a great port of Manchuria on the SE. coast of the Liao-tung peninsula, 20 miles ENE of Port Arthur, created by Russia in the last years of the 19th century as one of the Pacific termini of the Trans-Siberian railway. The deep and spacious harbour is ice-free throughout the year. Early in the Russo-Japanese war (May 1904) Dairen was occupied by the Japanese, who declared it a free port. It is the seat of administration of the Japanese leased territory. It exports soy beans, bean products (oil-cake, fertilisers, &c.), wild silk-cocons, and silk thread. Pop. 50,000.

**Dairy** is a word derived from the old *dæge*, *dase*, *dey*, or *deye*, a maid-servant or dairymaid. The dairy or milk-house of a farm should be an entirely detached structure to avoid contamination from cow-house, stable, or other farm buildings. A free current of air in the dairy must be arranged for by a careful system of ventilation. In order to facilitate the washing of the building the walls should be of glazed brick and the floor of cement, with all internal drains in the form of open channels. A butter-dairy is best divided into three compartments—a separating and butter-making room, a cream-ripening room, and a scullery or covered yard for washing milk-cans and other utensils. The first essential in a dairy is the absolute cleanliness not only of the floors and walls of the building, but of all its furnishings. This is secured by daily washing and by the scalding or steaming of all vessels or implements which come in contact with milk or its products. The thermometer in the dairy should stand at 55° F. in summer, and 60° F. in winter. At temperatures higher than these milk is liable to spoil, owing to the greater activity of the microbes in it; many degrees below this it gets chilled, and will not manipulate satisfactorily. An abundant supply of pure water is necessary, and means for boiling water must also be provided, not only to secure scalding water for washing, but to raise, when necessary, the temperature of the products of milk during manufacture, or maintain a suitably high temperature in the air of the cheese-room or the milk-house. A small steam or gas engine is frequently employed in a dairy conducted on a large scale to supply the power necessary for a centrifugal cream-separator, also for churning whole milk or cream.

*Dairying* has developed much within recent years. The growing demand for milk in large towns has increased the volume of the milk-trade, and modified the system of management. Summer dairying, while suitable for the making of cheese, and so far for butter also, must be supplemented by winter dairying to keep up the supply of milk and fresh butter throughout the year. For summer dairying it is usually arranged that the cows calve during March, April, and May, so that they go to pasture when they are coming to the period at which, with a proper supply of succulent food and suitable surroundings, they should develop their greatest yield of milk. They lie out day and night, and have the whole summer and early autumn before them—the period in which grass, the natural food of a cow, is most abundant, best, and cheapest. In some instances the grass is supplemented by 2 or 3 lb. a day of cotton-seed or other cake, and when the grass begins to fail in autumn, some variety of green food, as cabbages, rape, vetches, &c. As frost begins to appear the cows are housed at night, and in spite of liberal and careful feeding, fall off in their yield of milk. Nevertheless it is the better practice to house them in good time, because they keep in better condition during winter than if left out too long, and for the few remaining weeks of the milking period they give a larger average return. All naturally 'dry off,' some more rapidly than others; and milking should be stopped at the end of the

year. After two or three months of rest the cows calve, and this goes on year by year from the age of two or three (depending upon size and condition) until they are ten years old, when all should, without exception, be replaced by heifers. This class of dairy-farming is now only found on cheese-farms where distance from town or station renders the daily sale of milk or butter impossible.

Where winter dairying is practised the cows are so managed as to calve in rotation, and thus keep up a constant supply of milk throughout the year. With the introduction of winter dairying the practice of keeping cows entirely housed day and night came into vogue. As this affected the constitutions of the cows, they were only kept during one period of lactation and then sold. The building up of a good milking herd by the selection of calves from the best milkers was under this system impossible, and it has therefore disappeared, except where cows are kept in towns. In country dairies the cows live entirely in the open during the summer, and are also turned out for a part of each day during the winter months. In order to force the milk-yield in winter the temperature of the cow-houses was kept high, which resulted in an increase in bovine tuberculosis; now sanitary regulations demand an air-space of 600 cubic feet per cow in country districts and 800 cubic feet in towns, with a free current of air by ventilation.

Eight to ten cows is a sufficient number for each milker, and the operation should be performed as quietly and as expeditiously as possible. Men are usually employed in England, and women in Scotland. Efficient milking-machines can now be purchased, and the proper cleaning of these, which was originally a difficult matter, has been rendered easy by simplification of parts. They effect a great saving in wages paid to milkers, and are an especial boon where labour is not easily obtained. The initial cost of a milking-machine, with necessary engine and vacuum-pump, precludes its use in dairies of under twenty cows. When cows give a large flow of milk, or when it is wanted for town consumption, milking is done thrice daily; but in the great majority of cases throughout the country it is only performed morning and evening. Heavy milking cows consume a large quantity of water, which should be supplied to them at least twice daily. Cows consuming a large amount of sloppy food and roots do not require much water.

It is important that the water should be pure and clean. Outbreaks of typhoid fever among children have been traced to cows drinking water contaminated with the germs of this disease, which was communicated to children who drank the milk. No injurious results have been traced to the use of sewage irrigation grass, which has been largely superseded by Italian ryegrass. In some parts clover and vetches take the place of ryegrass. Succulent food is essential for the production of large returns of milk. As the grass season ends in October, the succulent portion of food may be derived from brewers' and distillers' grains (1 bushel per day being a full allowance for a large cow), and from turnips. Turnips, when given in excessive quantities, produce an objectionable taste in the milk and butter; but as an ingredient in a liberal and well-balanced diet they may be used with impunity where milk is the product wanted. Swedes and mangels are not so liable as common turnips to taint cow products. Cows in full milk require a daily allowance of perhaps 5 to 8 lb. of concentrated food—a mixture of various farinaceous meals and oil-seed cakes along with bran, which acts as a corrective as well as a food substance. Bean meal is prominent among the meals for encouraging a flow of rich milk and at the same time maintaining the condition of the cow. Turnips, unless liberally supplemented, are

apt to reduce the condition. There is a decided advantage in giving a mixed food, as compared with one variety, provided a proper proportion is secured between the albuminoids and the carbohydrates—one to five is a good average to aim at under ordinary circumstances, having estimated oil as equivalent to two and a half times its weight of starch. Not only must the proportion of the components of a food mixture be adjusted, but the total bulk of the food must be great enough to distend the stomach sufficiently to promote healthy action in the digestive system. About 30 lb. of dry food substance is a good allowance for a healthy milking cow of one of our large breeds. If that were given entirely in the form of concentrated food, such as meal and cake, the animal could not chew the cud, and impaction of the rumen would result. The practice of chaffing straw into very short lengths is associated with the same danger. Dry fodder, more especially straw, is vastly improved for milk cows by cooking—either steaming it, or throwing warm water over it, and covering it up for a few hours. In spring, before the grass comes, the flow of milk in newly calved cows is often largely developed and maintained by treating hay in this fashion. When very large quantities of concentrated food are used, it is safer to add to the daily allowance of each cow from 1 to 2 lb. of treacle, which not only supplies a valuable ingredient of food, but is also beneficial as a laxative. Epsom salts should never be given to a cow in milk; where an aperient is required, it is safer to give 8 to 10 lb. of warm treacle. Bought concentrated food has another function than the above to perform; its ash ingredients, which pass away in the manure, make good to the land the considerable loss of phosphate and other valuable substances which are removed in dairy products—more especially milk. Education in dairy husbandry and practice holds an important place in the curriculum of the various agricultural colleges in Britain, the United States, and the dominions, and in Britain and elsewhere there are numerous dairy schools.

The Contagious Diseases (Animals) Acts (q.v.) and other acts allow the Ministry of Health and the Scottish Board of Health to make special orders for the purpose of procuring supplies of pure and healthy milk. The registration of all cowkeepers, dairymen, and purveyors of milk is required, and their premises must be open to inspection. The authorities, through an inspector, can enforce rules regarding the necessary lighting, ventilation, and water-supply of dairy buildings. It is also required that cowsheds be properly cleansed by limewashing the walls and ceiling at least twice a year. No person suffering from an infectious disease may milk cows or handle vessels used to contain milk for sale. Buildings converted for use as dairies or cowsheds, or new buildings erected for that purpose, must be passed by the local authority before being occupied. Under the Food and Drugs Act, 1899, the Board of Agriculture made certain regulations known as the Sale of Milk Regulations, 1901, by which milk containing less than 3 per cent. butter-fat and 8·5 per cent. solids other than fat was regarded as adulterated. The Public Health Act, 1907, and later acts control the use of preservatives in milk, as the excessive use of some of these is injurious, especially to children.

The principal breeds of Cattle (q.v.) used in the British Isles for dairy purposes are as follows: Dairy Shorthorns, Jerseys, Guernseys, Devons, and Red Polls in England; Ayrshires in Scotland and north of England; Kerrys in Ireland; and a few other breeds confined to small districts. The Channel Islands breeds are especially suitable for the production of butter, as the fat globules in their

milk are large, and therefore separate easily from the liquid. Ayrshire cattle give milk best suited for the manufacture of cheese, as the fat globules are small and do not readily rise to the surface. There are two types of Shorthorn, the first having been bred by selection with a view to producing a good beef animal; whilst the milking properties of the second class have been the aim of the breeder. This dairy Shorthorn is an excellent combination of qualities for general dairy purposes, and is the breed most extensively distributed throughout England.

Dairying on the factory system is carried on in the United States, chiefly in New York, Wisconsin, Iowa, Ohio, Pennsylvania, Illinois, Vermont, Minnesota, Michigan, and Kansas. The cattle used are chiefly imported breeds—Dutch or Holstein, Channel Islands, Ayrshire, and Brown Swiss. Cows which have been produced by crossing the native cattle with imported bulls are known as 'grade' Shorthorns, 'grade' Jerseys, &c. The 'grade' Shorthorns are fairly numerous, although the pure breed is not popular in America for dairying, as the specimens introduced to that country were rather of the beef type. The methods of feeding dairy stock in America are similar to those in use in Britain; but for winter-feeding, turnips and the various meals are replaced by maize silage and ground maize, while the hay is largely made from alfalfa or lucerne (*Medicago sativa*). The governments in the various states have brought into force stringent sanitary regulations.

In Canada the dairy industry is carried on extensively in many provinces, and it is from this country that Britain mainly draws her imports of cheese, this article being chiefly of the type known as 'Canadian Cheddar.' Ontario, especially in the eastern parts, is the province which supplies the bulk of the cheese exported from Canada; whilst in Quebec butter is the chief dairy product. In southern New Brunswick dairying is on the increase; and other provinces where this type of farming is found to considerable extent are British Columbia, Manitoba, Alberta, Nova Scotia, Prince Edward Island, and Saskatchewan. The conditions of dairying in Canada have shown marked improvement since the appointment of a Dairy Commission in 1890. The government, by opening and staffing with officials several factories and creameries, did much to further the adoption of this system. The factories thus started were afterwards bought up by members of co-operative societies, who still had access to advice from government experts. A service of trains, equipped with facilities for cold-storage transit, was also arranged, and this proved of great benefit for the removal of produce to the towns and for export. The most popular breeds of cattle on dairy-farms in the Dominion are Holstein, Ayrshire, and Jersey; whilst the Shorthorns are also numerous, being more in favour than in America. As in America, maize silage and alfalfa hay are foods largely in use for dairy stock.

New Zealand has the reputation of sending the best class of butter to Great Britain, the quality being sufficiently high to enable it to compete with the Danish butter, which formerly brought the highest price of any imported. Originally the difficulty of obtaining labour checked the spread of the dairy industry; but the introduction of efficient modern milking-machines has led the colonists to convert sheep-runs into pasturage for dairy herds. The co-operative system is largely adopted in New Zealand for the manufacture of butter and cheese, and the establishments producing the former are greatly in the majority. All butter for export is carefully graded by government officials. The crops grown for the winter-feeding of dairy stock are

much the same as those in use in Great Britain, but the American system of growing maize for silage is rapidly increasing in popularity. The usual pure breeds are Dairy Shorthorn, Ayrshire, Holstein, and Kerry; whilst large numbers of crosses between Shorthorn and Ayrshire blood are found on many farms.

The industry of dairying in Australia is carried on chiefly in the states of Victoria, New South Wales, Southern Queensland, and South Australia, and the exports are chiefly composed of butter, with cheese forming a small part. Australia uses the co-operative system, and all butter so produced is government graded, although the Australian article hardly enjoys so high a reputation as that of New Zealand. The Shorthorn is the principal dairy breed, but Ayrshires, Kerrys, and of late years Holsteins have been imported, and crosses between these various strains made with considerable success. The establishment of State experimental and advisory stations has led to the improvement of the natural pastures by the introduction of the seeds of more valuable grasses. The feeding of stock on ensilage during the dry season is becoming common.

In South Africa dairying has as yet not been practised to any great extent, owing to the fact that the native cattle were better suited to beef production, and the efforts of breeders went to improve the animals in this direction. The importation and use in crossing of Dutch cattle gave rise to a general-purpose cow, which was used as a milk-producer. Pure herds of Ayrshires and Jerseys are now found in Cape Province, and the bulls have been used for crossing purposes with benefit to the stock of the district. The Transvaal has imported pure strains of British dairy stock to its experimental farms, whence farmers procure good bulls to improve their stock.

DAIRY FACTORIES originated in the Jura districts of France and Switzerland, but first came into prominence in America. The first American factory was organised in New York state by Jesse Williams in 1860, being for the production of cheese only. The result of the system was so favourable with regard to the uniformity of quality and increased market value that the number of factories increased rapidly in other states and in the Dominion of Canada. The cheese produced in these factories is made on an adaptation of the Cheddar system (see CHEESE), and quickly took a high position in the markets of England and other European countries, being known as 'Standard American' or 'American Cheddar.' The production of butter on the co-operative principle in the States began at a later date, the name creamery being used to distinguish such institutions from the factories producing cheese. The method of dealing with milk in factories spread from America to Denmark, Sweden, and Holland, where its introduction was attended with excellent results. The first cheese factory in England was established in Derby in 1871, and in the same year a new building modelled on those existing in America was erected on the estate of the Hon. E. W. Coke at Longford, Derbyshire. Subsequent institutions have been organised on lines copied from the factories of America and Denmark, which countries have been visited by deputations, and reports issued.

Co-operative dairies may have as their object the selling of milk, the production and sale of butter, or the manufacture of cheese. The last, however, are not increasing to any great extent in England. In forming a co-operative dairy for any of the three above-named purposes, the farmers supplying milk are usually shareholders to the extent of at least £1, but proprietary factories are also found which purchase milk from the farmer, who has no further interest in the business. The

members of a co-operative factory of the milk-selling variety appoint a manager; they receive payment as their milk is delivered, and also participate in the profits of the factory. On becoming shareholders they voluntarily bind themselves under stringent regulations to produce and place on the market milk which is above suspicion. Inspectors from the factory make periodical visits to the farms in the combine, and it is therefore almost impossible for a farmer to supply milk from unhealthy cows, to make use of improper cow-houses, or to carry on the milking without due attention to cleanliness. The presence of an infectious disease in a farm-house from which milk is supplied to a factory is notifiable, and no milk is delivered until the buildings are pronounced free from infection. These precautions are of great benefit to consumers, who are certain of obtaining milk of excellent quality, for which they are willing to pay a slightly increased rate. The advantage to the farmer lies in obtaining a higher price, both on account of the high standard of quality and the factory being in a position to control the market owing to the large output. The milk on arrival at the factory is filtered through sterilised cotton, and cooled to 40° F.; after which it is placed in airtight bottles and supplied to the consumer. These bottles are returnable, and are carefully steamed and cleaned, often with electrically driven brushes, before being refilled. The factories for butter-making have been of special particular service in Ireland.

Where the production of butter is the object of a combine, the regulations as to stock, housing, &c. are the same as for the milk-selling dairy. This system of butter production has the advantage of economy of labour and the manufacture of large quantities under the supervision of one skilled operator. The milk is brought to the creamery by the farmers, or in some cases a motor-van is sent round to the various farms to collect supplies. On arrival at the factory the milk is weighed and tested for butter-fat percentage, as payment is based on the amount of fat present. The payment for milk on its fat content is obviously the only reasonable method where the percentage of fat entirely controls the amount of butter produced from a given quantity of milk. Another advantage of this system of purchase is that, in selecting cows to build up a herd, the farmer must purchase and breed from cattle which are not only heavy milkers, but are known to produce milk of a high fat percentage. This will in time increase the efficiency, as milk-producers, of the dairy cattle of Great Britain. The Cream (q.v.) is removed from the milk received at the factory by centrifugal separators, and the separated milk returned to the farmers. In order to avoid the introduction of deleterious bacteria, the whole of the cream received is pasteurised. As the process of pasteurisation kills the living germs, which would produce ripening, as well as those of a dangerous nature, it is necessary to add a 'starter' (see BUTTER). This is done by adding a pure culture of the lactic acid bacteria, which produces an even condition of ripeness throughout the whole quantity of cream received.

Cheese factories, though not numerous in England, are conducted under the same initial regulations as milk-selling or butter factories, the type of cheese usually produced being the Cheddar (see CHEESE). Factories producing condensed milk are not usually on the co-operative system, but simply purchase their supplies by contract. It is rare for a factory to be built to deal with the milk of less than 300 cows. The average cost of building and erecting a factory for about 500 cows was approximately £2 per cow, but the cost per cow increases as the number decreases,

and for this reason the above-mentioned 300 may be taken as a minimum for economic working.

See CATTLE, MILK, CREAM, BUTTER, CHEESE, AGRICULTURE.

**Daisy** (*Bellis*), a genus of tubulifloral composites (family Asteroidae) characterised by its conical receptacle and absence of pappus. The twelve or fifteen species are palaearctic, save *B. integrifolia*. The familiar species in Britain and Europe is *B. perennis*. The yellow button-like disc is composed of a myriad of small perfect flowers, with yellow five-cleft tubular corolla, and ring of fused stamens surrounding the pistil. The marginal or ray flowers have no stamens, and are female; their corolla is white, and largely expanded outwards. Of calyx there is hardly a trace; but the head is surrounded by a close-fitting double ring of small leaves, the involucre, which encloses the whole when in bud. Double varieties, crimson, pink, white, or striped, are common in gardens, and frequently produce smaller heads in the axils of the involucre bracts of the main capitulum (*Hen-and-chickens*). It has been sparingly introduced into America, where there is a native species (*B. integrifolia*) in Kentucky, Tennessee, Arkansas, and the south-western states. The plant commonly called daisy in the United States is the Ox-eye Daisy, really a *Chrysanthemum* (q.v.). Christmas and Michaelmas Daisies are species of aster. In pastures daisies are unhappily noxious weeds, eaten by no kind of farm-stock, and exhausting the soil; and their spreading clusters cover up and supersede the grass around each centre.

**Dāk**, or DAWK, the mail-post of India; also travelling by Palanquin (q.v.). See BUNGALOW.

**Dakar**, a port of Senegal, and since 1903 capital of French West Africa, is on the southern side of the peninsula of Cape Verde, on the bay of Goree and sheltered by the island of Goree, on which till after the middle of the 19th century the main French settlement was situated. The port has safe anchorage for large vessels, and since 1904 great harbour works have been carried out, so that there are now commercial docks, a naval dock, an arsenal, with admirable quay and railway facilities. The port, the terminus of railways to St Louis and to the interior, commands the trade of the Upper Senegal and the Middle Niger, and, owing to its position, is a great port of call. Pop. with suburbs, 32,000. See SENEGAL, SENEGAMBIA.

**Dakota**. See NORTH DAKOTA, SOUTH DAKOTA; and for the Dakota Indians, see SIOUX.

**Dalai'-Lama**. See LAMAISM.

**Dalbeattie**, a town of Kirkcudbrightshire, near Urr Water, 15 miles SW. of Dumfries. Founded in 1780, it owed its importance to the neighbouring Craignair quarries (now almost exhausted), and to its polishing-works, which furnished granite for the Liverpool and Odessa Docks, the Thames Embankment, &c. Pop. 3000.

**Dalberg**, an ancient and noble German family which long held by hereditary right the office of chamberlain to the archbishopric of Worms. So great was its renown that at every coronation of a German emperor the herald exclaimed, 'Is there no Dalberg here?' whereupon the representative of the family knelt, and received from the new emperor the dignity of 'first knight of the empire.' One of the most eminent members of this family was Karl Theodor (1744-1817), the last prince-bishop of Mainz, who, trained for the church, held numerous high offices, and ultimately became elector of Mainz, chancellor of the empire, and primate of Germany. He was a friend of Wieland, Herder, Goethe, and Schiller, and wrote works on history, philosophy, and aesthetics.

**Dalbergia**, a tropical genus of papilionaceous trees and climbers. Some of them are valuable timber-trees, particularly the *Sissoo* of Bengal (*D. Sissoo*) and *D. melanoxylon* of Senegal (Senegal Ebony, q.v.). *D. monetaria*, of Surinam, yields a resin very similar to Dragon's Blood.

**D'Albert**, EUGEN, musician, born in Glasgow, 10th April 1864, studied under Pauer, Richter, and Liszt, and made his début in Berlin in 1883. Kapellmeister for a short time at Weimar, he lived mostly in Berlin and Lucerne, famous first as a pianist, later as a composer of operas (*Tiefhand* the best known), piano concertos, a symphony in F, and many songs.

**Dale**, DAVID, was born 6th January 1739 at Stewarton in Ayrshire. Early apprenticed to a Paisley weaver, he afterwards travelled some time round the country, buying up homespun linen yarn, next became clerk to a silk-mercator, then an importer of French and Dutch yarns. On Arkwright's visiting Scotland it was agreed that he and Dale should engage in cotton-spinning together at New Lanark near the Falls of Clyde. There Dale built mills, and became prosperous. In 1799 he sold these mills to Robert Owen (who became his son-in-law) and his partners. Dale spent his last years in active works of benevolence in Glasgow, and in preaching to a church of his own which called itself the 'Old Independents.' He died at Glasgow, 17th March 1806.

**Dalecarlia**, or DALARNÉ (signifying 'valley-country'), an old province of central Sweden, now forming the lan or county of Kopparberg. The Dalecarlians are celebrated for the part they took under Gustavus Vasa in freeing their country from the yoke of Christian II. of Denmark.

**D'Alembert**, JEAN LE ROND, mathematician and encyclopædist, was born in Paris, November 16, 1717, and was found the day after his birth near the church of St Jean-le-Rond, from which he derived his name—the surname he himself added long after. He was the illegitimate son of Madame de Tencin and the Chevalier Destouches, and was brought up by the wife of a poor glazier; but his father, without publicly acknowledging the paternity, secured to him an allowance of 1200 francs a year. At twelve the boy entered the Collège Mazarin, where he soon showed his lifelong passion for mathematical studies. On leaving college, he returned to the humble home of his kind foster-mother, where he continued to live and pursue his favourite studies for thirty years, broken only by two ineffectual attempts to earn a living by law and medicine. 'You will never,' said his foster-mother, 'be anything but a philosopher; and what is a philosopher, but a fool who torments himself during his life that people may talk about him when he is dead?' His first distinction was admission at twenty-three to the Academy of Sciences. Two years later appeared his *Traité de Dynamique*, which reduces all the laws of motion to the consideration of Equilibrium, thereby making an epoch in mechanical philosophy. Later works were *Réflexions sur la Cause générale des Vents*, which gained the prize of the Academy of Berlin, 1746, and which contains the first conception and use of the Calculus of Partial Differences; *Traité de l'Équilibre et du Mouvement des Fluides* (1744); *Recherches sur la Précession des Équinoxes et sur la Mutation de l'Axe de la Terre* (1749); and *Recherches sur Différents Points Importants du Système du Monde* (1754). His *Opuscules Mathématiques* (8 vols. 1761-80) contain an immense number of memoirs, some on new subjects, some containing developments of his previous works.

But D'Alembert did not confine himself to

physical science. For the great *Encyclopédie* planned by Diderot he wrote the famous *Discours Préliminaire*, a noble tribute to literature and philosophy, a model of lucid and eloquent exposition, although its classification of the sciences is open to question. Besides numerous articles in the *Encyclopédie* (the mathematical portion of which he edited), he published books on philosophy, literary criticism, the theory of music, and a treatise, *Sur la Destruction des Jésuites* (1765), which involved him in controversy. He became secretary to the Academy in 1772, and thereafter he wrote the lives of all the members deceased between 1700 and that year—one of the most pleasing of his works. His literary works have been published in a collected form, new edition, by Bossange (Paris, 5 vols. 1821). This edition contains his correspondence with Voltaire and the king of Prussia. His scientific works have never been collected.

So genuine was D'Alembert's love of independence that wealth and rank had no fascination for him. Frederick II. of Prussia offered him the presidency of the Academy of Berlin in 1752, but he declined to leave France, and only accepted a subsequent offer of a pension of 1200 francs. The king of France granted him a similar sum. In 1762 Catharine II. of Russia invited him, through her ambassador, to undertake the education of her son, with a salary of 100,000 francs; and when he declined, she wrote him an autograph letter, urging that to refuse to contribute to the education of a whole nation was inconsistent with his own principles; and inviting him, if he could not reconcile himself to the breaking-off of his pursuits and friendships, to bring all his friends with him, and she would provide both for them and for him everything they could desire. But he remained steadfast. D'Alembert never married. He was tenderly attached for many years to Mademoiselle Lespinasse (q.v.), with whom he lived in the same house in Platonic affection for nearly a dozen years, but who was scarce worthy of his devotion. Her death in 1776 was a crushing blow to the philosopher. He died October 29, 1783. See his *Œuvres et Correspondances inédites*, edited by Charles Henry (1887); the Life by J. Bertrand (Par. 1889); and Ducros, *Les Encyclopédistes* (1900).

**Dalgarno**, GEORGE, an almost forgotten but very able author, was born at Aberdeen about 1626, studied at Marischal College, and afterwards kept a school in Oxford for thirty years, where he died August 28, 1687. He deserves to be remembered for two remarkable works—the *Ars Signorum*, *vulgo Character Universalis et Lingua Philosophica* (1661), and *Didascalocophus, or the Deaf and Dumb Man's Tutor* (1680). The former is a very ingenious attempt to represent and classify ideas by specific arbitrary characters irrespective of words. It contains the germs of the 'Universal Language' (q.v.) of Bishop Wilkins (q.v.). See DEAF AND DUMB.

**Dalgety**, formerly called BUCKLEY'S CROSSING, was in 1904 proposed as Federal capital of the Commonwealth of Australia. In the south-east corner of New South Wales, the township is 296 miles SW. of Sydney. It was set aside in favour of Canberra.

**Dalhousie**, JAMES ANDREW BROWN-RAMSAY, MARQUIS OF, Governor-general of India, and 'greatest of Indian proconsuls,' was the third son of the ninth Earl of Dalhousie, and was born April 22, 1812, at Dalhousie Castle, Midlothian. He was educated at Harrow, and graduated at Christ Church, Oxford. In 1832, by the death of his only remaining brother, he succeeded to the courtesy title of Lord Ramsay. In 1835 he stood unsuccessfully for Edinburgh in the Conservative interest; in 1837

was elected for Haddingtonshire. On the death of his father in 1838 he entered the House of Peers as Earl of Dalhousie. In 1843 Sir Robert Peel appointed him Vice-president of the Board of Trade, and in 1845 he succeeded Mr Gladstone as President of the Board. The 'railway mania' threw an immense amount of labour and responsibility upon his department; but the energy, industry, and administrative ability he displayed in his office, no less than his readiness and fluency in parliament, marked him out for the highest offices in the state. When Peel resigned office in 1846, Lord John Russell paid the Earl of Dalhousie the rare compliment of asking him to remain at the Board of Trade, in order to carry out the regulations he had framed for the railway system. In 1847 he was appointed Governor-general of India, as successor to Lord Hardinge, and arrived in Calcutta, January 12, 1848—the youngest governor-general ever sent to that country. His Indian administration was not less splendid and successful in regard to the acquisition of territory than in the means he adopted for developing the resources of the country, and improving the administration of the East Indian government. Pegu and the Punjab were conquered; Nagpur, Oudh, Sattara, Jhansi, and Bejar were annexed—together, four great kingdoms, besides a number of minor principalities, were added to the dominions of the Queen. Railways on a colossal scale were planned, and partly commenced; 4000 miles of electric telegraph were spread over India; 2000 miles of road between Calcutta and Peshawar were bridged and metalled; the Ganges Canal, the largest of the kind in the country, was opened; important works of irrigation all over India were planned and executed; and the department of public works was reorganised. Among other incidents of his beneficent administration may be mentioned his energetic action against suttee, thuggee, female infanticide, and the slave-trade; the organisation of the Legislative Council; the improved training of the civil service, which was opened to all natural-born subjects of the British crown, black or white; the successful development of trade, agriculture, forestry, mining; and a great reform in the postal service of India. In a minute which he drew up on resigning office, he reviewed with pardonable pride the events of his eight years' governor-generalship. His constitution had never been strong, and it gave way under the incessant labour and responsibility imposed upon him by his noble ambition. Meanwhile, honours had been showered upon him by his Queen and country with no sparing hand: in 1848 he was made a Knight of the Thistle; in 1849 he received the marquissate, the thanks of both Houses of Parliament and of the East India Company for the 'zeal and ability' displayed in administering the resources of British India in the contest with the Sikhs; in 1852, on the death of Wellington, he was nominated by the then prime-minister, the Earl of Derby, to the office of Constable of Her Majesty's Castle of Dover and Lord Warden of the Cinque Ports. Dalhousie sailed from Calcutta in March 1856. On his arrival in England he was unable to take his seat in the House of Lords; and the remainder of his days was spent in much physical suffering and prostration of strength. On 19th December 1860 he died at Dalhousie Castle in his 48th year, leaving behind him a name that ranks among the highest in the roll of Indian viceroys for statesmanship, administrative vigour, and the faculty of inspiring confidence among the millions subjected to his sway. As he died without male issue, his title of marquis became extinct, the earldom of Dalhousie and other Scottish honours reverting to his cousin, Baron Panmure. His policy of annexation has been blamed for the

mutiny which broke out ere his death; but though, in Justin M'Carthy's words, 'he was a man of commanding energy and indomitable courage, with the intellect of a ruler of men and the spirit of a conqueror,' he was also of a most sensitive conscience, and entered on the Sikh and Burmese wars and embarked on a policy of annexation against his will.

See the articles **INDIA**, **ODDE**, **PEGU**, **PUNJAB**, **SIKHS**; the Duke of Argyll's *India under Dalhousie and Canning* (1865); Trotter's *Dalhousie* (1889); the Life by Lee-Warner (1904); and his *Private Letters* (ed. Baird, 1910).

**Dalhousie**, an Indian hill sanatorium in the Himalayas, at the altitude of 7700 feet, 93 miles N.E. from Amritsar. It was first occupied in 1860. Pop. 1600.

**Dalkeith**, a town of Midlothian, 6 miles S.E. of Edinburgh, on a tongue of land between the North and South Esks. There is a large corn exchange (1855); of nearly a dozen places of worship the only old one is the parish church, collegiate once, of which Norman Macleod was for three years minister. The chief glory of the place is Dalkeith Palace, a seat of the Duke of Buccleuch (see **SCOTT**). Standing near the end of the High Street, in a beautiful park of 1035 acres, it is a Grecian edifice, built in 1700 by Sir John Vanbrugh for Monmouth's widowed duchess. The castle, its predecessor, was the seat first of the Grahams, and then of the Douglasses from the 14th century till 1642, when the ninth Earl of Morton sold it to the second Earl of Buccleuch. Dalkeith thus has memories of the Regent Morton (the 'Lion's Den' the castle was called in his day), of General Monk (1654-59), and of visits from James IV., James VI., Charles I., Prince Charles Edward, George IV., and Queen Victoria. Professor Tait was a native; it is the scene, too, of Moir's *Mansie Wauch*. Pop. (1841) 4831; (1881) 6931; (1921) 7238.

**Dallas**, capital of Dallas county, Texas, on Trinity River, 265 miles NNW. of Houston by rail. It has schools and colleges, flour-mills and meat packing concerns, and manufactures of agricultural and cotton-gin machinery, cotton-seed oil-cake, petroleum, and much else. Pop. (1880) 10,358; (1900) 42,638; (1910) 92,104; (1920) 158,976.

**Dallas**, **GEORGE MIFFLIN**, an American diplomatist and statesman, was born in Philadelphia, July 10, 1792. His father, A. J. Dallas (1759-1817), was a distinguished lawyer of West Indian birth and Scottish descent, who filled with credit the positions of secretary of the treasury and acting-secretary of war under President Madison. The younger Dallas graduated at Princeton College in 1810. In 1813 he was admitted to the bar, and soon after entered the diplomatic service. In 1831 he was sent to the United States senate by the Pennsylvania legislature. He was United States minister to Russia from 1837 to 1839, and in 1844 was elected vice-president of the United States. In 1846 his casting-vote as president of the senate repealed the protective tariff of 1842, though he had previously been considered a Protectionist. His course on this question aroused much indignation in Pennsylvania. He was sent to Great Britain as United States minister at St James's from 1856 to 1861. He died at Philadelphia, December 31, 1864. His principal published writings were posthumous; they include a very readable and entertaining series of *Letters from London* (1869), and a *Life of A. J. Dallas* (1871). His life was marked by assiduous devotion to official duties, which left him little leisure to look after his own private interests, and he lived and died a poor man.

**Dalles**. See **COLUMBIA RIVER**.

**Dalling**, **LORD**. See **BULWER**.

**Dalmatia**, a narrow strip of Yugo-Slav territory extending along the Adriatic Sea, and bounded on the N. by Croatia, on the E. by Bosnia, Herzegovina, and Montenegro; area, 5000 sq. m.; pop. (1921) 621,429. The coast of Dalmatia and numerous adjacent islands is everywhere steep and rocky, and the chief towns, all of which are on the coast, are Sebenico, Lissa, Spalato, Brazza, Ragusa, and Cattaro. The country is mountainous, chiefly dry moorland, with numerous small lakes and rivers, most of which dry up in summer. The highest mountain is Orjen, near Cattaro, 6235 feet. The climate is uncertain; mean temperature about 60°; rainfall about 28 in. The Bora (q.v.) wind is much dreaded. About one-ninth of the land is arable, and produces wheat, barley, oats, maize, rye, and potatoes. Wine and olives are also produced. Nearly half of the land is in pasture, and wood occupies about a third. The islands are not very fertile, but supply good timber for shipbuilding. Cattle-rearing, seafaring, and the fisheries are the chief industries. The exports consist principally of wine, oil, brandy, hides, wool, wax, honey, and fruits. The population includes a considerable (but disputed) number of Italians, with some Albanians, Germans, and Jews, and the remainder consists of Southern Slavonians—chiefly Dalmatians and Morlaks. The Dalmatians are a fine race of men, bold and brave as seamen and soldiers, and formerly were the main support of the military power of Venice.

In ancient times Dalmatia was a considerable kingdom, first subjugated, after many attempts, by the Romans in the time of Augustus. On the fall of the Western Empire, Dalmatia, which had formed the southern part of Illyricum, was captured by the Goths, from whom it was taken by the Avari (490), who in their turn yielded it to the Slavonians about 620. The state founded by these continued until the beginning of the 11th century, when King Ladislaus of Hungary incorporated part with Croatia, while the rest (as a duchy) placed itself under Venetian protection. The Turks afterwards made themselves masters of a small portion; and by the peace of Campo-Formio (1797) the Venetian part, with Venice itself, became subject to Austria. When Austria, in 1805, had ceded this part to Napoleon, it was annexed to the kingdom of Italy; afterwards (1810) to Illyria. From 1814 Dalmatia formed part of Austria, the commune of Spizza being added by the Congress of Berlin in 1878. Italy looked upon Dalmatia as part of Italia Irredenta. The Slavs of Dalmatia, on the other hand, shared in the Illyrian nationalist movements of the 19th and 20th centuries, aspiring either to incorporation in a Greater Serbia or Yugo-Slav state, or to equal status with Austria and Hungary in a trial monarchy. The Great War and the break-up of Austria-Hungary brought the Yugo-Slavs their opportunity; Dalmatian independence was declared in October 1918, and representatives sent to a Yugo-Slav National Council.

**Dalmatian Dog**, or **CARRIAGE-DOG**, a variety of dog closely resembling in size and shape the modern pointer. It is often kept in stables, becomes attached to the horses, and may be seen running after carriages. Its colour should be white with black spots not more than an inch in diameter regularly distributed over its body, including its ears and tail. Its origin is uncertain; the name Dalmatian is probably altogether misleading; and it is supposed that it may have been brought from India, where a very similar kind of dog exists.

**Dalmatic** (*Dalmatica*), the deacon's robe in the Roman Catholic Church. The most ancient form of the dalmatic is exhibited in the annexed

woodcut, after an early Christian painting on a wall in the catacombs at Rome. It was originally



of linen, but it is now generally made of the same heavy silk as the Chasuble (q.v.). In Italy it is still a tunic with wide sleeves, but open up the sides; in most countries it is rather a cloak open at the sides, and instead of sleeves has square-cut lapports falling over the top of the arm. It is worn by deacons at High Mass, processions, and benedictions. It was originally the Dalmatian under-garment of

civilians, and was made of native white wool.

**Dalmellington**, an Ayrshire village, near the Doon, 15½ miles SE. of Ayr, with large collieries and ironworks.

**Dalny**. See DAIREN.

**Dalri'ada** ('the home of the descendants of Riada'), the ancient name of a territory in Ireland, comprehending what is now called 'the Route,' or the northern half of County Antrim. Its inhabitants were Gaelic Scots living in the midst of a Pictish population, and a number of them crossed over to Argyll in 498 and founded there another Dalriada, the nucleus of the kingdom of the Scots of Alban, who ultimately gave a dynasty to North Britain. See SCOTLAND.

**Dalry**, a town of Ayrshire, on the Garnock, 23 miles SW. of Glasgow. Pop. 4000. It increased rapidly in size after the establishment of neighbouring ironworks in 1845.—For the skirmish at Dalry, near Tyndrum, see BRUCE.

**Dalrymple**, ALEXANDER, hydrographer, was a younger brother of Sir David Dalrymple, Lord Hailes, and was thus a member of an old and illustrious Scottish family (for its chief members, see STAIR and HAILES); he was born at New Hailes, near Edinburgh, 24th July 1737. At fifteen he sailed for Madras as writer in the East India Company's service, and after a few years' dreary work began to attract the notice of his superiors by his industry and intelligence. In 1759 he made a voyage of observation among the eastern islands, and after returning to Madras in 1762, was sent to open up the trade with Sulu, reaching Canton late in 1764. In 1775 he went to Madras as a member of council, but was recalled two years after on an unfounded charge of misconduct. He became hydrographer to the East India Company in 1779, and to the Admiralty in 1795, and died, three weeks after his summary dismissal from the latter office, 19th June 1808.

**Dalrymple**, SIR JAMES, was the second son of Sir James Dalrymple, baronet, afterwards first Viscount Stair. He was called to the Scottish bar in 1675, and ultimately became one of the chief clerks of the Court of Session, and a Nova Scotia baronet in 1698. He was a sound antiquary, and his work entitled *Collections concerning the Scottish History preceding 1153* (Edin. 1705) is still of value.

**Dalton**, JOHN, chemist and physicist, born about 6th September 1766, at Eaglesfield, near Cockermouth, in Cumberland, was the son of a Quaker weaver. He received his early education at a

Quaker school in his native place, and, after 1781, in a boarding-school kept by a relative in Kendal, of which three years later he and a brother became the proprietors. Here his love of mathematical and physical studies was first developed. He wrote several mathematical essays, and in 1787 commenced a journal of meteorological observations, which he continued throughout his whole life, recording in all 200,000 observations. He collected butterflies, and gathered a great hortus siccus and herbarium. In 1793 he was appointed teacher of mathematics and the physical sciences in New College, Manchester: after the removal of the college to York in 1799, he supported himself in Manchester by private tuition. In 1803 he lectured at the Royal Institution. His *Meteorological Observations* (1793), dealing largely with auroras, contained the germs of many of his future discoveries. In 1794 he first described the phenomena of colour-blindness, observed by him in his own case and that of his brother, and often called Daltonism. In 1808–10 he published his *New System of Chemical Philosophy*, to which he added the first part of a second volume in 1827. In 1817 he was appointed president of the Manchester Philosophical Society. He was also a member of the Royal Society, and an associate of the Paris Academy, and of several other foreign societies. In 1833 he received a pension of £250, afterwards raised to £300. In the same year Dalton's friends and fellow-townsmen collected £2000, to raise a statue to his honour, which was executed by Chantrey, and placed at the entrance of the Royal Institution in Manchester. Oxford gave him its D.C.L., and Edinburgh, LL.D. He was twice a vice-president of the British Association. In 1837 he had a shock of paralysis, and he died, universally respected, at Manchester, July 27, 1844. His chief physical researches were on the constitution of mixed gases, on the force of steam, on the elasticity of vapours, and on the expansion of gases by heat. In chemistry, he distinguished himself by his development of the atomic theory, as also by his researches on the absorption of gases by water, on carbonic acid, carburetted hydrogen, &c. Dalton was unquestionably one of the greatest chemists that any country has produced. Profound, patient, and intuitive, he had precisely the faculties requisite for a great scientific discoverer. His atomic theory elevated chemistry into a science. In his habits, Dalton was simple; in manners, grave and reserved, but kindly, and distinguished by his truthfulness and integrity of character. He 'never found time' to marry. See LIVES by Angus Smith (1836); Henry (1854); Lonsdale (1874); and Sir H. Roscoe (1895); and the article ATOMIC THEORY.

**Dalton-in-Furness**, a town of Lancashire, 16 miles WNW. of Lancaster, communicating with the sea by a canal (3½ miles). It has extensive malting and ironworks; and the ruins of Furness (q.v.) Abbey are in the vicinity. Romney was a native. Pop. (1861) 2812; (1921) 12,303.

**Daltonism**. See COLOUR-BLINDNESS.

**Dalyell**, or DALZELL, THOMAS, a Scottish general famed for his zeal in the repression of the Covenanters, was born about 1599, the son of Thomas Dalyell of Binns, Linlithgowshire. He served in the Rochelle expedition (1628) and in Ireland, was taken prisoner at Worcester (1651), but escaped. In 1655 he entered the service of Russia, and distinguished himself in the wars against the Tatars and Turks. At the request of Charles II. he was permitted to return home, and in 1666 was appointed commander-in-chief in Scotland with the view of repressing the Covenanters. On 28th November he defeated them at Rullion Green, in the Pentlands, and, in Burnet's

words, 'acting the Muscovite too grossly,' made his name a byword of terror. A very devoted royalist, he is said never to have shaved his beard after the execution of Charles I. He died 23d August 1685.

**Dam.** See WATER, COFFERDAM.

**Damages**, in Law, are the pecuniary reparation due for loss or injury sustained by one person through the fraud or negligence of another. Where a sum ascertained in amount is due, the action is one not properly for damages, but of debt. But where the sum is not ascertained, as where an injury has been done to a man's character or property, the action can in general only be for damages the amount of which the injured party estimates, and which is determined by the judgment of the court or verdict of a jury. When parties to a contract agree that if the contract be broken, a specified sum of money shall be paid, this sum is spoken of as liquidated damages, a sum agreed upon to save the trouble of ascertaining the actual damage done. Nominal damages are those given to a plaintiff who establishes his right, but has not shown that he has suffered actual loss. Exemplary or vindictive damages are given not only to compensate the injured party, but to punish the offender, as in actions for damages by fraud, seduction, and the like. Damages *ultra* are additional damages claimed by a plaintiff over and above those paid into court by a defendant. Every person is liable in damages for injuries caused by culpable neglect or ignorance. Professional persons are liable to make reparation of loss occasioned through their want of ordinary skill in their calling. Employers are liable for injuries to person or property caused by the fault of themselves or their servants. The principal rules according to which damages are awarded are, that they are given only for actual pecuniary loss (in Scotland, however, also for wounded feelings); that the injury suffered must be the immediate consequence of the faulty act or omission; and that all the parties concerned in committing a wrong are liable each for the full amount of damages to the injured party.

The growth of corporations, such as limited liability companies, has necessitated the settlement of many difficult points; but now a corporation is liable in damages for fraud, negligence, or even slander on the part of one of its officials or employees, if the act was done within the scope of their authority or employment, in the same way as an individual employer would be. A corporation may even be prosecuted for an official's crime if the offence is one where guilty intention is not an essential, and where the penalty is a money fine. See COSTS.

**Daman'**, an outlying portion of the Punjab and of the NW. Frontier Province, extending along the Indus, and as far back as the Suliman Mountains.

**Daman'**, a Portuguese settlement and port in the province of Gujarat, on the Gulf of Cambay, 100 miles N. of Bombay. The settlement consists of Daman proper (22 sq. m.), and the *pargana* of Nagar Havili (60 sq. m.), to the east. Pop. of the former, 56,084; of the latter, 12,636, nearly all Hindus. The climate is generally healthy, the soil moist and fertile. The magnificent teak forests of Nagar Havili provide excellent timber for shipbuilding, for which Daman has some celebrity. The port, guarded by two forts, stands at the mouth of the Daman-Ganga, a deep, navigable stream, with a bar at its mouth, while outside is an excellent roadstead. Although the Portuguese have held Nagar Havili since 1780 only, Daman has been occupied by them since 1558. It formerly was noted for its weaving and dyeing, and exported its own fabrics to the

coast of Africa, besides opium to China; but now the chief industries are fishing and weaving.

**Daman.** See HYRAX.

**Damanhur**, a town of Lower Egypt, capital of the province of Beherah, 10 miles from Alexandria, is an important station on the Cairo to Alexandria railway. Pop. 50,000.

**Daman-i-Koh** ('skirts of the hills'), a tract of hilly country in Bihar, reserved for the Santals and other equally primitive races. Area, 1351 sq. m.; pop 360,000.

**Dam'araland**, a territory in the west of South Africa, between Namaqualand and Ovampoland proper, extending from the Atlantic to about 19° 45' E. long. Behind the waterless coast region (100 miles) rises a mountain district, with peaks over 8500 feet above the sea; and farther inland stretch wide prairies. The mountains are rich in minerals, especially copper; vegetation is confined to their valleys, and to the prairie region, which in the north enjoys a fine rainfall. Damaras is a Hottentot name for the Ova-Hereio, a Bantu (q.v.) stem, who may number 70,000, and own large flocks and herds. Distinct from the Cattle Damaras are the lower Hill Damaras, who are largely Hottentot in blood and speak Hottentot. Walvisch Bay (q.v.), the best port, belongs to the Cape Province; Swakopmund was improved by the Germans, who from 1884-90 owned the territory. With the rest of German South-west Africa, Damaraaland was conquered by the Union, to which the mandate for its administration was given in 1919. Windhoek is capital of the whole.

**Damascening**, or DAMASKENING, is a name which is given (1) to the watered or striated structure seen in certain sword-blades and other weapons, and (2) to the ornamental incrustation with gold and silver of steel and iron surfaces. The term in both its applications originates from the city of Damascus, whence the crusaders brought into Europe swords and other weapons of remarkable strength, elasticity, and keenness of edge, the surfaces of which were beautifully striated with waved dark and light lines. The hilts of such weapons, and the whole surface of defensive armour from the same source were in many cases elaborately ornamented with incrustated gold, and hence one term came to be applied to the peculiar structure of the metal, and to its ornamental treatment. It is probable that even in the crusaders' times the making of the so-called Damascus blades and the art of damascening were Persian, and to this day they remain characteristic of that country, the practice having spread thence eastward into India, while the Persians still supply the Turks on the west with their best and most highly ornamented weapons. The production of a watered or damascened surface is illustrated by the manufacture of 'Damascus twist' barrels for sporting-guns. The metal for the barrels is prepared from rods of iron and steel, piled alternately and forged and welded together into a single solid rod of small section. Three of these composite rods are used in forming a barrel. They are separately twisted in contrary directions till each has the appearance of a fine threaded screw, then they are welded together into a solid ribbon, which in its turn is spirally wound and welded by the edges till the requisite length and bore of barrel are formed. The result of the intertwisting of fine laminæ of steel and iron is a beautifully damascened surface which shows itself when the barrel has been treated with acid. The incrustation of arms, armour, and other objects of steel and iron with gold, and more rarely with silver, is very extensively practised in the United Provinces of India, as well as in Persia. In India it is known as Kufi work or Kufigari. The

design to be worked out is undercut in the metal, into this the gold or silver wire is laid, and the scarp edge is beaten down with a hammer, thus securing the wire in its position. Another method consists in scratching the surface, and beating into the scratched lines the gold or silver wire, after which the whole surface is burnished to remove the incisions. See GUN.

**Damascenus.** See JOANNES DAMASCENUS.

**Damascus** is the capital of the state of Damascus in Syria. It is called by the natives *Dimashk es-Sham*, or simply *es-Sham*, the name which is generally applied to all Syria. It stands  $1\frac{1}{2}$  mile from the mouth of the gorge through which the Barada, the *Chrysorrhoea* of the Greeks, forces its way into the plain; and it is connected with Beyrout on the Mediterranean by an excellent road (70 miles) and a railway. The plain of Damascus, 500 sq. m. in area, is dotted by over a hundred towns and villages. It is bounded on the north-west by the Anti-Libanus range, on the south by the Black Mountains, beyond which are the hills of Bashan, and on the east by the marshes of the plain. Damascus is situated on the western side of the great plain at an elevation of 2260 feet above the level of the sea, and immediately to the north-west of the city the Anti-Libanus rises to a height of 3840 feet. This elevated part of the mountain, called Jebel Kasyún, is crowned by the Kubbet en-Nasr ('Dome of Victory'). From the base of this dome the best view of Damascus is obtained. Its exquisite beauty, as seen from the mountain, is greatly enhanced by contrast. Towards the west there are the bare chocolate sahara and the storm-bleached, lime-streaked mountains. But the Barada, having forced its way through the mountain, spreads fan-like by seven rivers over the plain of Damascus, 'and everything lives whither the river cometh.' A beautiful green meadow, the joy of all orientals, extends almost from the mountain to the city; gardens, in which all the trees of the forest and the field blend their many shades, extend for many a mile and hold the desert at bay. From out this bower of soft green the city lifts to heaven its forest of minarets towering above pearly domes. The rivers of Damascus are the constant source of the city's perennial existence. According to tradition, Abraham on his westward march lingered by the crystal waters, and ruled the city in peace.

The seven canals by which water is drawn off from the central Barada are called rivers. The most important on the right side is Nahar Abanias. This is the river Abana, and it flowed through the fashionable west-end suburb in the palmy days of Damascus. The most important canal on the left side of the Barada is Nahar Taura—the Pharpar of 2 Kings, v. 12. Both rivers flowed through the residential parts of the city, and were largely used for bathing purposes.

The appearance of Damascus as viewed from the mountain resembles a tennis-racquet. The handle, which lies in a south-westerly direction, is the Meidan, a suburb which extends along the Mecca pilgrim-route for about a mile, and ends at the Bawabat Alla ('Gate of God'). The other part is concentrated on the rivers, and is inclosed within ancient walls and encompassed by luxuriant gardens which seem to surge around and over the pearl-coloured city like a sea. At the western side of the city within the walls stands the citadel. It is a large quadrangular structure about 300 yards long and 250 wide, with projecting towers, and surrounded by a moat. It was erected in 1219 by Melik-el-Ashraf, and has a massive appearance, but it is a good deal dilapidated. The palace stands outside the walls west of the citadel, and about 400

yards east of the citadel stands the Great Mosque, burnt in October 1893. The Mosque was erected by Walid 'Abd-el-Melik at the beginning of the 8th century on the site of the church of St John, just as that church had been erected by Arcadius about the beginning of the 5th century on the site of a pagan temple, which probably occupied the site of the ancient *Beit Rimmon*. The church was constructed from the splendid material of ancient temples, and the mosque is made up of the materials of ancient churches. The old walls and many of the columns of the church are still in position, and on a portal, older than Mohammedan or Christian times, is carved a cross, followed by the 13th verse of the 145th Psalm in Greek, from the Septuagint, with the abbreviation X $\epsilon$  added. The mosque is adorned by three minarets, one of which, called the minaret of Jesus, rises to a height of 250 feet, and on this minaret, according to Mohammedan tradition, Jesus will appear when he comes to judge the world. Near to the pulpit there is a richly gilded dome, beneath which the head of John the Baptist is said to rest, and in the court there is another dome which contains precious fragments of Kufic, Syriac, and other manuscripts. Damascus contains 70 other mosques, and more than 150 chapels for prayer and instruction. The churches and synagogues have no architectural pretensions, and their internal decorations are gorgeous but tawdry. The tomb of Nûr ed-Dîn is one of the ornaments of the city, and the walls of the best baths are decorated with beautiful Kishani tiles, and the floors with parian marble. The public cafés, though picturesque when lighted up, are dirty and sodden.

The religious communities occupy different quarters of Damascus. The Jewish quarter (*Harat-el-Yahoud*) lies to the south of the 'street called Straight,' which runs east and west for about a mile, with Roman gateways at either end. The course of the *Via Recta* can be traced by the columns *in situ*. The Christian quarter (*Harat-en-Nasara*) lies north of the street called Straight in the eastern part of the city, and the remainder of the city is occupied by Mohammedans. It is spoken of as *Harat-el-Islam*. The Christians are superior in physique, in education, in enterprise, in skill, in industry to their Mohammedan neighbours.

The different industries are also carried on in separate quarters. There is the silversmiths' bazaar, where rough but very effective personal ornaments are made; the saddlers' bazaar, where scarlet saddles and horse-trappings are gaily decorated with gold and silver thread; the shoemakers' bazaar, where red and yellow slippers of gondola-form and gorgeous top-boots are made; the Greek bazaar, where imitation 'Damascus blades' and 'antiques' newly made are offered to the unwary. The book bazaar (the Paternoster Row of the East), the cloth bazaar, the seed bazaar, the silk bazaar, and all the other trades and commodities, have their distinct locations. The narrow and badly paved streets of Damascus are dusty in summer and muddy in winter. On either side are the rows of arched niches which are the shops of the place. Each shopkeeper sits cross-legged in his *dukkan*, with his spices or Manchester goods piled up around him, awaiting customers, whom he serves with great stateliness of manner. Behind the mud walls and mean entrances there are splendid houses in Damascus. On entering, one is dazzled by the barbaric grandeur—white marble pavements, tessellated with coloured stone; snowy fountains where the constant music of falling water mingles with the cooing of doves from their nests in the lemon-trees or trellised vines; walls frescoed and decorated with mosaics and Persian tiles, and slabs inlaid with coloured pastes and

precious stones; arabesque ceilings set with Venetian mirrors, and adorned with blue and purple and gold—all that oriental art can do has been done to attract and charm the eye.

Great and steady progress is being made in Damascus in education, especially by the Christians; but the Jews and Mohammedans are also awaking to the necessity of a higher standard of civilisation.

One of the sights of Damascus is the Hajj (q.v.). When it is starting for Mecca the whole city turns out to see the procession. For miles around there is a surging sea of human beings, dressed in the brightest and most striking colours. Circassians and Afghans, Kurds and Kalmuks, Turkomans and Tekkes, Bedawin from the desert, and shepherds from the steppes, and all the heterogeneous tribes and peoples of the East, are represented in that brilliant procession. Damascus is also one of the meeting-places between the East and West. Enormous caravans of camels pass to and fro between Bagdad and Damascus, exchanging the dates and tobacco and spices and carpets of the East for the produce of the looms and workshops of Europe. The chief exports are grain, flour, native cotton and silk manufactures, wool, apricot paste and stones, raisins, and liquorice-root; the imports include textiles, indigo, tobacco, coffee, sugar, and leather. In 1889 tramways were introduced into the city; and a railway to its port, Beyrout, was opened in 1895, and one to Medina in 1908. Pop. about 250,000, of whom 40,000 are Christians of various sects; 10,000 are Jews. In the great war of 1914-19 Damascus fell to General Allenby and the Allies, 30th September 1918. An Arab state of Syria was set up, and Feisal, son of the king of the Hejaz, was chosen as king. The French, however, claiming a mandate, occupied Damascus (August 1920), deposed Feisal, and heavily repressed the discontented Arabs. The sanjaks of Damascus and Hama were made a state of the Syrian federation (1922), and Damascus was united with Aleppo in 1925. See SYRIA.

**Damask** is a figured textile in which the pattern is due to the method of weaving. The name indicates that the knowledge of the fabric reached the Western nations through Damascus, which in early medieval times was famous for its figured silks, as well as for other industries imported from the East. But there is no doubt that damask-weaving originated in China at a very remote period. The manufacture of damask was introduced to the commercial towns of Italy in the 13th century; and in the 15th century, under Louis XI., it was planted in Lyons and Tours in France by workmen brought from Italy. Originally damask was a rich and costly silken fabric; but in modern times it is also made from linen, cotton, wool, and other fibres, plain or dyed. When the term is unqualified it is now generally understood to apply to figured linen, chiefly used for table-linen, towels, and napkins. The structure of damask, like diaper, is merely a variety of twilling. It is by the order in which the warp threads are raised and depressed for the interweaving with the weft that the pattern is produced; the weft, as a rule, intersecting the warp from every fourth up to every eighth thread. This is accomplished by a Jacquard apparatus attached to the loom. The pattern is first painted on a specially prepared paper, and then 'read off' and perforated on cards by a cutting machine made for the purpose, each card being made to control the arrangement for one shot or weft thread. These cards, which may be from 200 to 2000 in number, are laced into an endless chain, and made to revolve on a cylinder forming part of the apparatus. The holes in the cards correspond to a certain number of cross 'needles,' into which are looped upright wires

terminating in hooks for lifting the warp threads. The mechanism for raising such of these wires (and with them the warp threads) as are required for each throw of the shuttle, is explained in the article WEAVING. It requires four Jacquard-machines to complete some patterns of damask, and a greater number if the design is exceptionally elaborate.

Table-linen damask is perhaps the kind most largely made, the finer qualities of which are distinguished as eight-leaf or double damask. An inferior table damask is woven of a combination of linen and cotton. In Great Britain, the principal seats of this manufacture are Dunfermline, Kirkcaldy, and Perth in Scotland, Belfast and Lisburn in Ireland, and Barnsley in Yorkshire. At some of the linen-damask mills in England and Scotland coloured union damask, of wool and linen, is also made on a large scale. Cotton damasks, both dyed and undyed, are woven extensively at Manchester and its neighbourhood, as well as at Glasgow and Paisley. The mills where all-wool mohair and alpaca damasks, as well as unions of these with silk, are chiefly manufactured are situated at or near Halifax and Bradford. Silk damasks are principally made in the neighbourhood of London. In the second half of the 19th century, largely through the labours of Dr Bock of Aix-la-Chapelle, one or two very interesting collections of European damasks and other figured stuffs, ranging in date from the 13th to the 15th century, were made. A valuable illustrated catalogue of the collection in the Victoria and Albert Museum (*Catalogue of Textile Fabrics, South Kensington Museum*), by Dr Daniel Rock, was published in 1870. The original pieces, even though many of them are much faded, give a vivid idea of the beauty of the products of the looms of Sicily, of Florence, Venice, Lucca, and Genoa, and of some Spanish towns, during the middle ages. The materials of which they are made are silk alone, silk and gold, silk and linen, and silk and cotton. The designs of these damasks are so appropriate and effective that even the chromo-lithographs of them are of great value not only to the textile designer, but to students of decorative art generally.

**Damaskening.** See DAMASCENING.

**Damasus**, the name of two popes of Rome.—**DAMASUS I.** was born in 306, probably at Rome, became archdeacon of the Roman Church in 355, and pope in 366. The party of Ursinus, the rival of Damasus, were overpowered after a sanguinary struggle of three days in the streets of Rome, and afterwards in the Basilica Liberiana (S. Maria Maggiore), from which 137 corpses were carried out in one day, the 25th October 366. The Emperor Valentinian I. decided in favour of Damasus, and twelve years later, the schism still continuing, an edict of Gratian (378) made him the judge in the case of all the clergy of the hostile party who still lived in Rome. He was a zealous opponent of the Arians, and condemned the Illyrian bishops Ursacius and Valens at a synod which he held at Rome in 368, and Auxentius, Bishop of Milan, at a second synod there in 370. Damasus induced his friend Jerome to undertake the revision of the *Italia* (in 383 and 384), which led him to the preparation of the Vulgate version; and he did much for the preservation and adornment of the Roman catacombs. He died in 384, and was canonised. His festival falls on the 11th December. The writings of Damasus, which are chiefly letters and epigrams, were published at Rome in 1638 (new editions, Rome, 1754, and Paris, 1840). See Langen, *Geschichte der römischen Kirche* (vol. i. Bonn, 1881), and Rade, *Damasus, Bischof von Rom* (Freiburg, 1882).—**DAMASUS II.**, previously Poppo, Bishop of Brixen, was elected pope in 1043, through the influ-

ence of the Emperor Henry III., and died twenty-three days after his accession.

**Dambula**, or DAMBUL, a vast Buddhist rock-temple in Ceylon, 40 miles N. of Kandy, containing, among a profusion of carvings, figures of Buddha of extraordinary magnitude. See CEYLON.

**Dame** (Lat. *domina*, 'a mistress'), a title of honour which long distinguished high-born ladies from the wives of citizens and of the commonalty in general, and which still is the accurate title of a knight's wife (see also BARONET). In the Order of the British Empire, Dame is the feminine equivalent of knight, Dame Grand Cross and Dame Commander (G.B.E., D.B.E.) answering to Knight Grand Cross and Knight Commander (G.B.E., K.B.E.). Ladies of those classes prefix Dame to their names. In the age of chivalry it was customary even for a queen to be so called by her chosen knight ('the dame of his heart, of his thoughts,' &c.). In consequence of the greater courtesy shown towards women of higher rank, arose the custom of prefixing the word *ma* to *dame*, as a special proof of veneration and homage. Hence, too, the Virgin-mother was called in France *Notre Dame* ('Our Lady,' as if no single Christian could exclusively claim the privilege of serving her with the homage of his heart). The daughters of the king of France, as soon as they came into the world, were called *Madame*; and this was also the sole title of the wife of the king's eldest brother. In England the word Dame, though not much used, is now applied to married women of all classes, but has recently acquired a special significance in connection with the Primrose League (q.v.). It is also applied specially to the mistress of a small elementary school, especially if elderly and ignorant. *Madame* is shortened into *Madam*, and vulgarly into *Ma'am* and similar forms.

**Dame's Violet** (*Hesperis*), a genus of Cruciferae, closely allied to stock and wallflower; natives

chiefly of the middle and south of Europe, and temperate Asia. One only, the Common Dame's Violet or Rocket (*H. matronalis*), occurs wild in Britain as a garden escape. The usually lilac-coloured flowers are scentless by day, but very fragrant at night, on which account this plant is cultivated in flower-pots by German ladies. The custom appears to have been an old English one also, and from it the plant derives its technical name. The Night-scented Rocket (*H. tristis*) is also a favourite flower in Germany.

There are many florist's varieties ranging on each side of the familiar lilac tint to purple or white, often also variegated, and single or double.

**Damiani**, PIETRO, a great Italian ecclesiastic of the 11th century, was born in 1007 at Ravenna,

herded swine in his boyhood, but rose by his learning and devotion to the interests of the church to be cardinal and Bishop of Ostia (1057). He supported with vigour the ecclesiastical policy of Hildebrand (afterwards Gregory VII.), without sharing his arrogance and ambition, and was employed in many important missions. He died at Faenza in 1072. His letters, speeches, and other writings were collected by Cardinal Cajetan, and often reprinted (best ed. 4 vols. Ven. 1743). See the Life by Neukirch (Gott. 1875).

**Damianus**, ST. See COSMAS.

**Damien**, FATHER. Joseph Damien, born at Louvain, 3d January 1841, in 1873 devoted himself to the awful duties of spiritual guide to the lepers confined to the Hawaiian island of Molokai. Sent on a mission to Honolulu, where he heard from the bishop the neglected state of the lepers, some 700 or 800 in number, who lived on that small island, he volunteered to establish himself amongst them; and from 1877 onwards became physician of their souls and bodies, their magistrate, teacher, carpenter, gardener, cook, and even gravedigger at need. For long he worked on single-handed at his noble labours, but was ultimately joined by another priest. In 1885 the malady appeared in him; yet he continued unabated his heroic labours till near his death, 10th April 1889. There are lives by Clifford (1889), Cooke (1889), and Father Pamphile (1889); R. L. Stevenson's *Open Letter to the Reverend Dr Hyde* (1890) is a famous appreciation.

**Damiens**, ROBERT FRANÇOIS, the would-be murderer of Louis XV., was born in 1714 near Arras. Already known in his youth as *Robert le Diable*, he was by turns a soldier and a servant in Paris; in 1756 he was forced for a robbery to flee to Belgium, but ventured to return to Paris about the end of the year. Already he had formed the plan to murder the king, either, as he himself alleged, on account of his conduct towards the parliament, or because, as was generally asserted, he was instigated by the Jesuits. On 4th January 1757 he went to Versailles, next day followed the king and his courtiers about everywhere, and about six o'clock at night, when the king was entering his carriage to leave Trianon, managed to stab him. Damiens was seized before he could finish the deed, and was nearly three months later adjudged by the parliament to a horrible death. The hand which had attempted the murder was burned at a slow fire; the fleshy parts of his body were then torn off by pincers, and melted resin and oil poured into the wounds; finally, he was torn to pieces by four horses. The fragments of his body were burned, the house in which he was born pulled down, and his family banished from France for ever.

**Damietta** (Arab. *Dimyat*), a town of Lower Egypt, situated on the right bank of the chief eastern mouth of the Nile, about 8 miles from its mouth in the Mediterranean. It is irregularly but well built, and has some handsome mosques and marble baths, and of course several bazaars. Its commerce has been much injured by the prosperity of Alexandria, but it still carries on a considerable trade in exporting rice, fish (from Lake Menzala), coffee, and dates; and imports charcoal, soap, and manufactured goods. It is the terminus of a branch-railway from Cairo. The cambric (*kasab*) known as *dimity* received its name from Damietta, where it was first manufactured, but it is so no longer (Lane-Poole, *Art of the Saracens*), and the leather-work for which it was famous has also declined. A bar at the mouth of the river prevents vessels of more than fifty or sixty tons burden from ascending to the city. Population, 30,000. The existing town was erected after 1251, but prior to that a city of



Common Dame's Violet (*Hesperis matronalis*).

the same name (more anciently Tamiáthis) stood more to the south. It was strongly fortified by the Saracens, and formed on that side the bulwark of Egypt against the early crusaders, who, however, succeeded in capturing it more than once. It was razed, and rebuilt farther inland on the site it now occupies, by the Mamluk sultan Beybars.

**Dammar**, or **DAMMAR PINE** (*Agathis*, *Dammara*), a genus of Coniferæ, of the family Araucariinæ, distinguished from Araucaria by its laterally winged seeds not being adherent to the carpellary leaf. There are four species, all oriental



Branch of Dammar Pine.

or Australasian, of which the most familiar is *A. (Dammara) orientalis* or *alba* of the lower mountain-regions of the Malay Archipelago, Borneo, and the Philippines, a lofty tree with stout, leathery, lanceolate leaves. The timber is light, but the tree is chiefly valuable for its extraordinary abundance of resin, which is not only obtained in quantity from incisions which are best made in the large knot-like prominences of the lower part of the stem and the root, but which naturally exudes so freely as to form large lumps underground, and

foot-long icicles or stalactite-like masses hanging from the branches. According to Miguel it even drips from the branches in Sumatra in such quantity as often to form incrustations and rock-like masses on the banks of streams. At first semifluid and of pleasant balsamic odour, it soon hardens into an inodorous transparent mass, of no great hardness, but of glossy appearance and conchoidal fracture. It is soluble in cold ether, and at all temperatures in ethereal and fatty oils; but not entirely in boiling alcohol. It is of great value in the preparation of transparent and rapidly drying varnishes. The name signifies in Malay, 'light.' The Kauri Pine (q.v.) of New Zealand is *A. australis*. *D. ovata* of New Caledonia has also similar properties.

The same name is applied in commerce to the resin of other and unrelated trees. Thus the dammar of shipyards is derived from a species of *Canarium*, an Amyridaceous tree, while Black Dammar is a kind of pitch derived from the allied *Marignia*. *Shorea robusta*, a dipteraceous tree, yields pitch and resin used in Indian dockyards, and sometimes also called dammar. Dammar is also occasionally confused with kinds of copal; thus the resin of *Vateria indica* (Dipteracæ) is sometimes known as Dammar or Piny Dammar. It is the source of the Piny Varnish of India. See COPAL.

**Damnatory Clauses.** See ATHANASIAN CREED.

**Damocles**, one of the courtiers and flatterers of the elder Dionysius, tyrant of Syracuse. Cicero tells how Damocles, having extolled in the highest terms the grandeur and happiness of royalty, was reproved by Dionysius in a singular manner. The sycophant was seated at a table, richly spread and

surrounded by all the furniture of royalty, but in the midst of his luxurious banquet, on looking upwards, he saw a keen-edged sword suspended over his head by a single horse-hair—a sight that at once altered his views of the felicity of kings.

**Damodar**, a river of India, rises in the Chutia Nagpur watershed, and after a south-easterly course of 350 miles enters the Hugli from the right. The valley of the Damodar abounds in coal and iron.

**Damoh**, a town of India, in the Jabalpur (Jubbulpore) division of the Central Provinces, 50 miles E. of Sagar, with 17,000 inhabitants.—The district of Damoh has an area of 2800 sq. m., and a pop. of about 333,000.

**Damon and Pythias** (more correctly Phintias), two noble Pythagoreans of Syracuse, remembered as the models of faithful friendship. Pythias, having been condemned to death by the elder Dionysius, the tyrant of Syracuse, begged to be allowed to go home for the purpose of arranging his domestic affairs, Damon pledging his own life for the reappearance of his friend at the time appointed for his doom. Dionysius consented, and Pythias returned just in time to save Damon from death. Struck by so noble an example of mutual affection, the tyrant pardoned Pythias, and desired to be admitted into the sacred fellowship.

**Damper**, a door or valve which, by sliding, rising and falling, turning on a hinge, or otherwise, diminishes the aperture of a chimney or air-flue; this lessens the quantity of air that can pass through a furnace or other fire, and thus 'damps' or checks the combustion.—The damper of a piano-forte is that part of the mechanism which, after a key is struck and the finger is lifted up from the key, immediately checks or stops the vibration of the string, unless prevented by the use of the pedal (see PIANOFORTE). The mute used with the horn and other brass instruments is also called a damper.

—Damper is also the name given in Australia to a simple kind of unleavened bread formed of wheat-flour. It is made by travellers in the bush, and baked among the ashes of a fire often kindled for the purpose.

**Dampier**, the name of several places in Australasia: (1) Dampier Archipelago, a cluster of about twenty small rocky islands off the NW. coast of Australia, in 21° S. lat., and 117° E. long., divided by the Mermaid Strait in two groups; in the eastern is Rosemary, the largest island.—(2) Dampier Island, off the NE. coast of New Guinea, with a volcano about 5250 feet high.—(3) Dampier's Land, a peninsula of Western Australia, fertile and well watered, lying between King Sound and the Indian Ocean.—(4) Dampier Strait, between New Guinea and the archipelago of New Britain, forming, with Goschen Strait to the SE., the shortest route from Eastern Australia to China by some 300 miles.—(5) Dampier Strait, separating the island of Waygiu from the NW. end of New Guinea, the easiest passage between the Indian and Pacific oceans.—(6) Mt. Dampier, S. Island, New Zealand (q.v.).

**Dampier**, WILLIAM, a celebrated English navigator and hydrographer, was born near Yeovil in Somersetshire in 1652. He went early to sea, saw much hard service, and gained a great knowledge of hydrography in voyages to Newfoundland, Bantam, Jamaica, and the Bay of Campeachy. After spending a short time among the lawless log-wood-cutters on the coast of Yucatan, where honest trade was pleasantly varied with private piracy, he joined in 1679 a regular party of buccaneers who crossed the Isthmus of Darien, sacked Santa Marta, and ravaged the coast as far south as the island of Juan Fernandez. In 1683 he engaged in another

buccaneering expedition, in which he coasted along the shores of Chili, Peru, and Mexico, sailing thence across the Pacific, and touching at the Philippine Islands, China, and New Holland. Put ashore on Nicobar Islands, May 1688, after a dispute with his comrades, he made his way by sheer seamanship in a native canoe to Atcheen, and after two years' trading in the neighbouring seas, got back to England (1691), where he published his vigorous and interesting *Voyage round the World* (1697). He was afterwards deputed by government to conduct a voyage of discovery to the South Seas, in which he explored the west and north-west coasts of Australia, also the coasts of New Guinea and New Britain, giving his name to the Dampier Archipelago and Strait. On the return voyage his vessel was wrecked off Ascension, and Dampier with his crew lived on turtles and goats on that island for over five weeks, until relieved. The old buccaneer was more skilful as a pilot than successful as a commander, and his overbearing cruelty to his lieutenant led to himself being court-martialled. Yet soon after he was again appointed to the command of two vessels in a privateering expedition to the South Seas. He was as unfortunate as before. According to an account published by Funnell, one of his sailors, Dampier was guilty not merely of drunkenness and brutality, but even of cowardice, which at least is hard to believe of an old buccaneer. The sailing-master of one of his ships was that Alexander Selkirk who was marooned at Juan Fernandez, and was yet to be made immortal as Robinson Crusoe. Dampier returned home at the close of 1707, poor and broken, nor did his angry *Vindication* re-establish his reputation. Next year he sailed again to the South Seas as pilot to a privateer, which rescued Selkirk, and returned in 1711 after a prosperous voyage. Dampier died in London early in March 1715. See *Life* by Masefield (1907).

**Damping off**, in Horticulture, the death of plants from excess of moisture in the soil and atmosphere. Young seedlings in stoves and hotbeds are particularly liable to it. The cause is a parasitic fungus, *Pythium*. Prevention is not always easy; not only because some plants are very sensitive as to moisture, but also because the necessity of keeping sashes closed on account of temperature often stands in the way of the ventilation which would otherwise be desirable, and it is when a moist atmosphere stagnates around them, and the temperature is not very low, that plants are most liable to damp off.

**Damson**, a rather small oval-fruited variety of the common plum, much esteemed for preserving, and not wholly unfit for dessert. The tree grows to a considerable height, but has a bushy, sloe-like appearance. It is extremely fruitful. There are many sub-varieties, with fruit of different colours, dark purple, bluish, black, yellow, &c. Damsons grow in great quantities in some parts of England. Damson pies and damson cheese—made somewhat in the manner of fig-cake—are well known. The name is a corruption of *Damascene*, from Damascus.—The Mountain or Bitter Damson of the West Indies is the Simaruba (see SIMARUBACEÆ).

**Dana**, CHARLES ANDERSON, an American man of letters, was born at Hinsdale, New Hampshire, 8th August 1819, spent two years at Harvard, and was a member of the Brook Farm (q.v.) community. From 1848 to 1862 he was the managing editor of the *New York Tribune*, which he was largely instrumental in making the leading organ of the party opposed to the extension of slavery to new territories; and from 1863 to the close of the war he was assistant-secretary of war. In 1867 he purchased the *New York Sun*, and commenced the

successful management of that journal on democratic lines. He published several translations and anthologies, collaborated in a *Life of Giant* (1868), and, along with George Ripley (q.v.), planned and edited the *New American Cyclopædia* (1857-63), and its revised edition, the *American Cyclopædia* (1873-76; see ENCYCLOPÆDIA). He died on the 18th October 1897. See his *Life* by James Wilson (1907).

**Dana**, JAMES DWIGHT, an American mineralogist and geologist, was born at Utica, New York, 12th February 1813. He graduated at Yale College in 1833, and was sent out in 1838 as a scientific observer in the United States exploring expedition, under Wilkes, visiting the Antarctic and Pacific. During the course of this expedition Dana's ship was wrecked. He was afterwards associated with his father-in-law, the elder Silliman, in the editorship of the *American Journal of Science*. In 1846 he was elected professor of Natural History and Geology in Yale College. Among his works are a *System of Mineralogy* (1837), a *Manual of Mineralogy* (1848), two treatises on Coals, a *Text-book of Geology* (1864), *Hawaiian Volcanoes* (1890), and many reports on geological, mineralogical, and zoological subjects. He died 14th April 1895. See his *Life* by Gilman (1899).—His son, EDWARD SALISBURY DANA, born 1849, was professor of physics at Yale (1890-1917), and has written on mineralogy.

**Dana**, RICHARD HENRY, an American poet and prose writer, was born at Cambridge, Massachusetts, 15th November 1787. He was educated at Harvard College, and was admitted to the bar at Boston in 1811. In 1818 he became associate editor of the *North American Review*, to which he contributed largely. Some of his poems, such as *The Dying Raven* (1821), and *The Buccaneer* (1827), were warmly praised by critics on both sides of the Atlantic. The American public, however, received them coldly, partly because it was not at that time educated up to the standard of Dana's work, but chiefly because that work, with all its literary merits, such as learning, neatness of execution, and precision in verbal expression, lacked the elements which most appeal to the popular feelings. Dana's best literary work was done in the field of criticism. His abilities as a critic were very decided; and though many of his best efforts were not duly appreciated in his day, they did much to educate and elevate the literary taste of New England. A collection of his prose and verse appeared in 1833. He was for a time in 1821-22 connected with *The Idle Man*, a meritorious though ill-supported literary periodical. He died at Boston, 2d February 1879.—His son, RICHARD H. DANA, author and lawyer, was born 1st August 1815, and graduated at Harvard College in 1837. During an interval in his collegiate career, occasioned in part by a troublesome affection of the eyes, he shipped as a common sailor, and made a voyage to California and back. This voyage he described in *Two Years before the Mast* (1840), the best book of the kind in the language; in 1840 he was admitted to the Massachusetts bar. As a lawyer he attained great distinction, especially in the department of maritime law. Among his works are *The Seaman's Friend* (1841) and *To Cuba and Back* (1859). He also published an edition of Wheaton's *International Law*, and was prominent as a Free-soiler and Republican. In 1879 he was nominated minister to England, but after a long contest the senate failed to confirm the appointment. He died in Rome, 7th Jan. 1882. See *Life* by C. F. Adams (2 vols. 1890).

**Danaë**, the daughter of Acrisius, king of Argos, herself the great-grandson of Danaus. An oracle had announced that she would one day give birth to a son, who should kill his grandfather. Acrisius,

for safety's sake, shut her up in a dungeon, where, nevertheless, she was visited by Zeus in a shower of gold, and so became the mother of Perseus. Acrisius next put both the mother and child into a chest, and exposed them on the sea. The chest, however, drifted ashore on the island of Seriphos, and Danaë and her child were saved. She remained in the island until Perseus (q.v.) had grown up and become a hero famous for his exploits; afterwards she accompanied him to Argos. On his arrival, Acrisius fled, but was subsequently slain accidentally by Perseus at Larissa.

**Danākīl** (singular *Dankālī*), the Arabic and now general name for the numerous nomad and fisher tribes inhabiting the coast plains of north-east Africa, between the Abyssinian highlands and the Red Sea, from Massowah south to Tajurrah Bay. They belong to the Ethiopic Hamites, are akin to the Gallas and Somalis, and call themselves Afar, and are well built and slender. The greater part of their country is (nominally) a province of Abyssinia, but there are many of them in Eritrea and French Somaliland. Formerly piratical, they are now peaceful fishermen, and are skilful in catching the dugong.

**Danaüs**, in Greek Mythology, the son of Belus and twin-brother of Ægyptus, originally ruler of Libya. Fearing his brother, he fled to Argos, with his fifty daughters, the Danaides, and here he was chosen king, in place of Gelanor. The fifty sons of Ægyptus followed him, and under the pretence of friendship, sought the hand of his daughters in marriage. Danaus consented, but on the bridal night he gave his daughters each a dagger, and urged them to murder their bridegrooms in revenge for the treatment he had received from Ægyptus. All did so, except one, Hypermeestra, who allowed her husband, Lynceus, to escape. The poets tell how in the under-world the Danaides were compelled, as a punishment for their crimes, to pour water for ever into a vessel full of holes. From Danaus, the Argives were called Danai.

**Danbury**, one of the capitals of Fairfield county, Connecticut, 69 miles NNE. of New York, has some forty manufactories of felt hats (the chief industry), and produces also machinery, paper boxes, and silver-plate. Pop. (1880) 11,666; (1900) 16,537; (1910) 20,234; (1921) 18,943.

**Danby**, FRANCIS, A.R.A., landscape-painter, was born near Wexford, Ireland, 16th November 1793. In 1812 he began to exhibit in Dublin; in 1813, with O'Connor and George Petrie, afterwards president of the Hibernian Academy, he went to London. At Bristol, on the return journey, the means of the party were exhausted, and Danby settled in that city, where he resided till 1824. His 'Upas Tree,' a large and impressive work, now in the South Kensington Museum, was exhibited in the British Institution (1820); his 'Disappointed Love,' in the Academy (1821), as also his 'Delivery of the Israelites out of Egypt' (1825), which gained him his election as an associate. In 1828 his 'Opening of the Sixth Seal' won a premium of £200 at the British Institution; in the following year two other important subjects from the Apocalypse appeared in the Academy. At this time a disagreement arose between the artist and the Academy, which, along with other reasons, led to his leaving England. For eleven years he resided on the Continent, mainly in Switzerland, painting little, and amusing himself with boating. On his return to England, he took up his residence at Exmouth, and contributed very regularly to the Academy till his death on 9th February 1861. His 'Fisherman's House, Sunset' (1846), is now in the National Gallery. His works, of which several have been engraved, are distinguished by

imagination and poetic feeling. His three sons, John, Thomas, and James Francis, were all landscape-painters. The last named was born at Bristol in 1816, and died in London, 22d October 1875.

**Danby**, LORD. See LEEDS, DUKE OF.

**Dance**, GEORGE (1700-68), architect, designed the Mansion House (1739) and many other London buildings.—His son, GEORGE DANCE, the younger (1741-1825), rebuilt Newgate (1770-83), and was one of the original Royal Academicians.

**Dance of Death** (Lat. *Chorea Machabæorum*, Fr. *La Danse Macabre*), a name given to a certain class of allegorical representations, illustrative of the universal power of death, and dating from the 14th century. When the introduction of Christianity first banished the ancient Germanic conception of a future state, a new description of death-mythology arose, partly out of biblical sources, partly out of the popular character itself, wherein the Last Enemy was represented under simple and majestic images, such as that of a husbandman watering the ground with blood, ploughing it with swords, sowing it with corpses, rooting out weeds, plucking up flowers, or felling trees; or of a monarch assembling his armies, making war, taking prisoners, inviting his subjects to a festival, or citing them to judgment. But with a gradual change in national manners came a change in the mode of treating the subject, and it was associated with everyday images, such as the confessional, chess-playing, and above all, with the adjuncts of a festival—viz. music and dancing. This tendency to familiarise the theme increased during the confusion and turmoil of the 14th century, when the national mind alternated between fits of devotion and license, or blended both elements in satire and humour. Such a mood as this naturally occupied itself with personifying Death, and adopted by preference the most startling and grotesque images it could find—that of a musician playing to dancing-men, or a dancer leading them on; and as the dance and the drama were then intimately connected, and employed on religious occasions, this particular idea soon assumed a dramatic form.

This drama was most simply constructed, consisting of short dialogues between Death and four-and-twenty or more followers, and was undoubtedly enacted in or near churches by religious orders in Germany during the 14th century, and at a rather later period in France. It would appear that the seven brothers, whose martyrdom is recorded in the 7th chapter of the 2d Book of Maccabees, either played an important part in the drama, or the first representation, which took place at Paris in the Monastery of the Innocents, fell upon their festival, and hence the origin of the ancient name, *Chorea Machabæorum*, or *La Danse Macabre*. As early as 1400, the dramatic poem was imitated in Spain, and appears there in seventy-nine strophes of eight lines each (*La Dança General de los Muertos*), but it did not spread; while the French, having a love for pictorial representation, very early affixed an illustration to each strophe, and in 1425 painted the whole series on the churchyard wall of the Monastery of the Innocents, where the Dance of Death was habitually enacted. We find the subject treated in painting, sculpture, and tapestry, in the churches of Anjou, Amiens, Angers, Rouen, to say nothing of the numerous woodcuts and accompanying letterpress which succeeded the invention of printing. From Paris, both poem and pictures were transplanted to London (1430), Salisbury (about 1460), Wortley Hall in Gloucestershire, Hexham, &c.

But nowhere was the subject so variously and strikingly treated as in Germany. A picture in one of the chapels of the Marienkirche, at Lübeck,

still, in spite of repeated re-paintings, bearing the unmistakable impress of the 14th century, exhibits the very simplest form of the drama, and has some Low-German verses attached to it. Here we see twenty-four figures, partly clerical, partly lay, arranged in a descending scale, from the pope himself down to a little child, and between each of them a dancing figure of Death, not in the form of a skeleton, but a shrivelled corpse, the whole being linked in one chain, and dancing to the music of another Death. This representation is almost the same as a very ancient one at La Chaise-Dieu, in Auvergne, and points to the identity of the original dramatic spectacle in both countries.

The celebrated Dance of Death on the cloister walls of the Klingenthal, a convent in Basel, though painted probably not later than 1312, exhibited a departure from the simplest form—the number of persons exceeding the original twenty-four, and the chain being broken up into separate couples. But both alike are only to be regarded as scenes from a drama, and cannot, therefore, be justly compared with a painting in the Pisan Campo Santo, the 'Triumph of Death,' ascribed to Andrea Orcagna. And the acted drama enduring till the 15th century, we find that while there were varieties in the paintings, the poem, which was the most important feature, remained almost unchanged.

About the middle of the 15th century, however, the drama being altogether laid aside, the pictures became the main point of interest, the verses merely subsidiary. Accordingly, we find from this time the same pictures repeated in different places, with different verses, or no verses at all, till at length both verses and pictures entirely change their original character. The Dance of Death being transferred from the quiet convent walls into public places, gave a new impulse to popular art. Duke George of Saxony had, in 1534, the front of his Dresden castle ornamented with a life-size bas-relief of the subject, and other representations are to be found at Strasburg and Bern. There was a Dance of Death painted round the cloister of old St Paul's in London, in the reign of Henry VI.; and there is a sculptured one at Rouen, in the cemetery of St Maclou. But Holbein has the credit of availing himself most effectively of the original design, and giving it a new and more artistic character. Departing from the idea of a dance, he illustrated the subject by fifty-three distinct sketches for engravings, which he called 'Imagines Mortis.' The originals of these are at Petrograd, and reproductions of them have been frequently made. There is a famous Dance of Death at Coire. In the 19th century Kaulbach and Rethel (in satires against the French republic of 1848; text in verse by Reinick, 13th ed. 1902) worked at the subject; Rowlandson and Dr Syntax produced an English *Dance of Death* (1815; new ed. 1904). In pure literature, Goethe's *Totentanz* is memorable; in music, Saint Saens gave notable expression to the idea in his *Danse Macabre*, a symphonic piece with xylophone effects.

See Peignot's *Recherches sur les Danses des Morts* (1826); Massman's *Basler Todtentanz* (1847); Langlois's *Les Danses des Morts* (1851); Douce's *Dance of Death* (1833); Seelmann's *Die Totentanz des Mittelalters* (1893).

**Dancing**, an exercise or amusement in which one or more persons make a series of more or less graceful movements with measured step in accord with music. In its earliest forms among simple races it is a mode of outward expression for strong emotions of joy and sorrow, love and rage, and even for the most solemn and impassioned religious feelings; in more civilised strata of human society it becomes a mere frivolous amusement with no high signification whatever. Dancing corresponds to a universal primitive instinct in man.

It is still practised by the South Sea Islanders, the forest Indians of Brazil, the Zulus, the negroes of Central Africa, and the native Australians, exactly as it was in the earlier stages of every civilised modern race. Many of the rude courting dances of modern savages, like the native Australian *corro-boree*, are themselves refinements of more ancient dances, in the survivals of which we can guess at their original grossness and obscenity. Ferocious war-dances were constantly practised by savage warriors, as the North American Indian braves, who worked themselves up into frantic mechanical intoxication capable of carrying them irresistibly on to victory. The Zulu war-dance is still a noble exercise for warriors, like the Pyrrhic dance of the ancient Spartans; and the dancing and spinning dervishes in the East, who work themselves into spasms of physical excitement, are still highly esteemed for devoutness and piety. Into savage dancing, moreover, the idea of magic always enters. Thus the Mandan Indians dance buffalo to bring game when supplies of food are low, the rain-doctors of Central Africa dance mystic dances to bring down rain, and the wives of Gold Coast negroes dance a battle-dance to give their absent husbands courage in the battle. Everywhere in ancient religions is dancing one of the chief acts of worship. Religious processions went with song and dance to the Egyptian temples; the Cretan chorus, moving in measured pace, sang hymns to the Greek god, Apollo; and one of the Muses (Terpsichore), themselves daughters of Zeus, was the especial patroness of the art. The Phrygian Corybantes danced in honour of Rhea to drum and cymbal; at Rome, during the yearly festival of Mars, the Salian priests sang and danced, beating their shields; among the ancient Jews, Miriam danced to a song of triumph—itself an act of worship, and David danced in procession before the Ark of God. A survival of religious dancing is still seen even within the pale of Christendom, where during the Corpus Christi Octave a ballet is danced every evening before the high altar of Seville Cathedral, by boys from twelve to seventeen years of age, in plumed hats and the dress of pages of Philip III.'s time.

Dancing and imitative acting in the lower stages of civilisation are identical, and in the sacred dances of ancient Greece we may trace the whole dramatic art of the modern world. Aristotle ranked dancing with poetry, and Pindar applies the name of the dancer even to Apollo. The dancing-master in *Le Bourgeois Gentilhomme* asserts that the destinies of the nations depend on the science of dancing; and Lucian, in a well-known dialogue, proves that the art is superior to tragedy, and coeval with the world itself. Sir John Davies, in his long poem, the *Orchestra*, illustrates the origin and importance of dancing, tracing in it all the motions of nature:

For what are breath, speech, echoes, music, winds,  
But dancings of the ayre in sundry kinds.

The Spartans practised dancing as a gymnastic exercise, and made it compulsory upon all children from the age of five. Cicero says, 'No one dances sober unless he chances to be mad;' and indeed sedate Romans in general considered it disgraceful for a free citizen to dance, except in connection with religious ceremonies, but willingly enough witnessed the performances of professional dancers, like the *Almé* of modern Egypt, and the Bayaderes or Nautch girls of India. The early Christians practised choral dances, which came into discredit with the love-feasts or *Agapæ*. St Augustine says, 'it is better to dig than to dance,' and many of the Fathers condemned the practice as vigorously as our Puritan ancestors, who

saw deadly sin in 'promiscuous dancing.' St Chrysostom says dancing came first from the devil, and Father Mariana tells us the famous *saraband* worked more mischief than the plague. The *fundango* was hotly condemned by the clergy, but when danced before the Sacred College, who wished to see it before finally prohibiting it, so charmed the grave judges that they gave it their unanimous approval. Many of the medieval dances were solemn and stately in character, like the *danses basses*, which were danced to psalm-tunes at the court of Charles IX. of France; while it was not uncommon to see the princes of the church themselves treading a measure, and it is said the whole august Council of Trent danced at a ball given in 1562 to King Philip II. of Spain. The more lively *galliarde* and *volta* were introduced into France from Italy by Catharine de' Medici, but it was not till the reign of Louis XIV., himself an enthusiastic dancer and performer in the court ballets until cured by some verses about Nero in Racine's *Britannicus*, that dancing reached its height in France. A Royal Academy of Dancing was founded in 1662, at the head of which was the famous Beauchamps, from whom the king took a dancing lesson every day for twenty years. Later great dancing-masters in France were Pécour, Marcel, and Noverre. Among dances that successively were paramount in society in France were the graceful *minuet*, the favourite for a century; the *quadrille* or *contre-danse*, often connected erroneously with the English country-dance; the *Écossaise*, first introduced in 1760; the *galop*, a death-blow to the 'poetry of motion,' introduced from Germany; the *cotillon*, fashionable under Charles X.; the *polka*, first danced at the Odéon in 1840 by a dancing-master from Prague; the *polka tremblante*, or *schottisch*, also of Bohemian origin, first brought out in Paris in 1844; the *lancers*, introduced by Laborde in 1836; the *waltz*, originally Bavarian, now considerably modified; the South American *tango*, also modified in Paris. Society everywhere in Europe has followed the lead of the French, and latterly of the Americans (*two-step*, *fox-trot*, &c.). The people, however, have preserved their own old national dances, and these are still danced in every corner of Europe, stamped everywhere with as distinct an impress of nationality as the grave Basque *mutchiko*, or the *cachucha*, the *fundango*, and *bolero* of southern Spain. Characteristic again of particular races or merely of classes of people are such forms as the Scottish *reel*, *Highland-ling* and *strathspey*, the Irish *jig*, *nigger break-downs* and *cake-walks*, sailors' *hornpipes*, *step-dances*, *morris-dances*, and the like. In ballet dancing Adeline Genée predominated for many years, but her method was eclipsed by Isadora Duncan and then by the Russian ballet, represented by Nijinsky, Fokine, Pavlova, and Karsavina, helped by the art of Bakst.

See BALLET, WALTZ, STRATHSPEY, &c.; Crawford Flitch, *Modern Dancing and Dancers* (1911); Giraudet, *Traité de la Danse* (1900); W. A. Propert, *The Russian Ballet* (1921), Cecil Sharp and A. P. Oppé, *The Dance* (1925); Soria, *Histoire de la Danse* (1897); E. Scott, *Dancing in all Ages* (1899); Vuillier, *The History of Dancing* (trans. 1897).

**Dancing Mania**, an epidemic disorder allied to Hysteria (q.v.). Imposture was often present, and the consequences often clearly showed impure motives; but there is also evidence that in many cases the convulsive movements were really beyond the control of the will, whatever may have been the original character of the motives that prompted them. Epidemics of this sort were common in Germany during the middle ages, and are formally described as early as the 14th century; in Italy, *tarantism*, a somewhat similar disease, was ascribed

to the bite of a spider called the *Tarantula* (q.v.); and similar convulsive affections have been witnessed in Abyssinia and India, and even in comparatively modern times and in the most civilised countries in Europe, under the influence of strong popular excitement, especially connected with religious demonstrations. But the true dancing mania of the middle ages had its theatre chiefly in the crowded cities of Germany.

In July 1374 there appeared at Aix-la-Chapelle assemblies of men and women, who, excited by the wild and frantic, partly heathenish, celebration of the festival of St John, began to dance on the streets, screaming and foaming like persons possessed. The attacks of this mania were various in form, according to mental, local, or religious conditions. The dancers, losing all control over their movements, continued dancing in wild delirium, till they fell in extreme exhaustion, and groaned as in the agonies of death; some dashed out their brains against the walls around. When dancing they were insensible to external impressions, but haunted by visions, such as of being immersed in a sea of blood, which obliged them to leap so high, or of seeing the heavens open, and the Saviour enthroned with the Virgin Mary. The frenzy spread over many of the towns of the Low Countries. Troops of dancers, inflamed by intoxicating music, and followed by crowds, who caught the mental infection, went from place to place, taking possession of the religious houses, and pouring forth imprecations against the priests. The mania spread to Cologne, Metz, and Strasburg, giving rise to grave disorders, impostures, and profligacy. These countries were generally in a miserable condition; and arbitrary rule, corruption of morals, superstition, and insecurity of property, had already prepared the wretched people, debilitated by disease and bad food, to seek relief in the intoxication of an artificial delirium. Exorcism had been found an efficacious remedy at the commencement of the outbreak; and in the beginning of the 16th century, Paracelsus, that great reformer of medicine, applied immersion in cold water with great success. At the beginning of the 17th century it was already on the decline; it still occurs in single cases as a sort of nervous affection, and an epidemic outbreak was reported from the Troad in 1911. See CHOREA, CONVULSIONARIES, EPIDEMIC, TARANTULA, VITUS (St).

**Dancourt**, FLORENT CARTON, a French dramatist, born in 1661. At one time an actor and a favourite of Louis XIV., he became devout in his old age, which he spent in retirement in the country. He died in 1725. He was a prolific author, and excelled in depicting the stupidity of the peasantry and the follies of the *bourgeoisie*. Of his plays the best are *Les Bourgeoisies de Qualité*, *Le Chevalier à la Mode*, *Le Galant Jardinier*, and *Les Trois Cousines*.

**Dandelion** (*Taraxacum officinale*, formerly *Leontodon Taraxacum*) is a ligulifloral composite, common in several varieties or sub-species throughout Britain and the whole of Europe, in pastures and by waysides, and now also so perfectly naturalised in many parts of North America as to be there one of the most familiar spring-flowers. The names *Dandelion* and *Leontodon* (Fr. and Gr., 'lion's tooth') both have reference to the form of the leaves. The whole plant abounds in a milky juice, containing a peculiar crystalline principle called *Taraxacin*; has a bitter taste, and valuable medicinal properties. Roasted and ground, dandelion-root is sometimes used as a substitute for coffee. *Dandelion Coffee*, however, is usually a mixture of ordinary coffee and the powder or extract of dandelion-root; and *Dandelion Chocolate* is composed of

one part of common chocolate and four parts of the powder of dandelion-root. The young leaves, when blanchéd, are a good salad, resembling lettuce or endive.

**Dan'dolo**, a famous Venetian family, which gave four doges to the republic. The most illustrious of its members was Enrico, born about 1110 or 1115 A.D. Eminent in learning, eloquence, and knowledge of affairs, he ascended from one step to another, until, in 1173, he was sent as ambassador to Constantinople, and in 1192 was elected doge. In this latter capacity he extended the bounds of the republic in Istria and Dalmatia, defeated the Pisans, and, in 1201, marched at the head of the crusaders. He subdued Trieste and Zara, the coasts of Albania, the Ionian Islands, and Constantinople, 17th July 1203. When the Emperor Alexius was murdered by his own subjects, Dandolo laid siege to Constantinople, and took it by storm, 13th April 1204. He established there the empire of the Latins, and caused Count Baldwin of Flanders to be chosen emperor. By his exertions Venice obtained possession of several Greek islands and large territories in Greece. Dandolo died at Constantinople, 1st June 1205. See CRUSADES, VENICE.—Giovanni Dandolo was doge, 1280-89; Francesco, 1328-39; Andrea, 1342-54.

**Dandriff**. See PITYRIASIS.

**Dandy**, or **DANDIE**. See TERRIER.

**Dandy Fever**. See DENGUE.

**Danebrog** ('Danish banner'), the second of the Danish Orders of Knighthood (q.v.).

**Danegeld**, a tax levied on land, originally to buy off the Danes. It was first raised by Ethelred II., was abolished by Edward the Confessor, reimposed at a higher rate by the Conqueror, and finally abolished under Henry II.

**Dane-lagh** (*Danelaw* or *Denalagu*), the name applied to that part of England in which Danish influence was at one time paramount, and which still shows in popular place-names a distinct Danish impression. At various times it ranged along the coast counties from Yorkshire to Essex. The southern part of Deira was the most thoroughly Danish part of the whole, and here the typical Danish endings for place-names, *thorpe*, *caster*, and *by*, are still the most common. Next to Yorkshire came Lincoln, with Lindsey for its centre. The least Danish part was East Anglia and Essex. Deira and Lindsey were divided into *ridings*, and these into *wapentakes*. See NORTHMEN, ENGLAND.

**Danes' Dyke**. See FLAMBOROUGH HEAD.

**Dangerfield**, THOMAS (1650-85), false witness, and inventor of the Meal-tub Plot (q.v.).

**Dángs**, THE, a hilly tract in the Surat Political Agency (area, c. 1000 sq. m.; pop. 18,000, of wild forest tribes). Densely wooded and shut in by steep hills, with heavy rainfall and close atmosphere, it is singularly unhealthy. The Bhils (q.v.), the most important tribe, are the police, and have charge of the district treasuries. The products are teak and other timber.

**Daniel**, THE BOOK OF, claims to give an account of the career and prophetic utterances of Daniel, who had been carried as a captive to Babylon after the fall of Jerusalem in 586 B.C., during the reigns of Nebuchadnezzar, Darius, and Cyrus. There is a reference to a Daniel in Ezek. xiv. 14-20 and xxviii. 3, who is held up along with Noah and Job as an example of righteousness, but as these two chapters are generally dated in 594 B.C. and 588 B.C. respectively, it is difficult to see how the Daniel of Ezekiel can be identified with the hero of the Book of Daniel, as according to the latter he would have been quite a youth in 588 B.C., and

could not possibly have attained sufficient renown to be ranked with Job and Noah. The Book of Daniel is written partly in Hebrew and partly in Aramaic. It is composed of two elements—narrative and prophecy. The prophetic sections constitute the kernel of the book, and form the first example of pure apocalyptic in Jewish literature. They give under various symbols and figures a rough outline of the characteristic features of the Babylonian, Median, Persian, and Greek empires, and cover in their outlook a period of more than 400 years from 586 B.C. to 165 B.C. The traditional view that the Book of Daniel is a contemporary record of the life and teaching of its hero is now abandoned by the majority of modern scholars on the following grounds. (1) If the traditional theory had been true the book would have been placed in the second canon of the Old Testament—i.e. the prophetic writings—whereas it was assigned a place in the third canon—i.e. the Hagiographa (see BIBLE, 'The Formation of the Old Testament Canon'). (2) The style is much later than the Babylonian period. The use of Aramaic, the introduction of Persian and Greek 'loan-words,' the frequent occurrence of later Hebrew forms and constructions, all seem to make the traditional view impossible. (3) In the earlier part of history, during the period when Daniel was living at the Babylonian court, the writer is guilty of several flagrant historical blunders. He assumes, for instance, the existence of a Median empire between the Babylonian and the Persian, whereas the evidence of all our other authorities regards the Persian empire as the immediate successor of the Babylonian. The figure of 'Darius the Mede' seems to be purely mythical. Belshazzar was never king of Babylon, as the book frequently describes him. On the other hand, when the writer approaches the Greek period his utterances are wonderfully accurate even in the smallest details. All these facts point to the conclusion, which is now generally accepted, that the book is the product of the Maccabean age, and was written between 168 and 165 B.C. to encourage the Jewish nation in its resistance to Antiochus Epiphanes. Read in the light of the facts connected with Antiochean persecution, the book becomes luminous, and we are able to appreciate the influence which it must have exerted, and to understand the reasons which led to its inclusion in the canon.

The most useful English commentaries are Bevan's, Driver's, Charles's. The best representatives of the traditional view are Pusey, *Daniel the Prophet* (1864); Wright, *Daniel and its Critics* (1906). See APOCALYPTIC WRITINGS.

**Daniel**, SAMUEL, poet, was the son of a music-master, and was born in 1562 near Taunton, Somersetshire. He entered Magdalen Hall, Oxford, in 1579, but 'his glory being more prone to easier and smoother studies than in pecking and hewing at logic,' quitted the university without taking a degree. He was some time tutor at Wilton to William Herbert, son of the Earl of Pembroke and Sir Philip Sidney's sister; afterwards at Skipton to Anne Clifford, daughter of the Earl of Cumberland. In 1603 he was appointed to read new plays, and twelve years later he had for some time charge of a company of young players at Bristol. In 1607 he became one of the queen's grooms of the privy chamber. Towards the close of his life he retired to a farm which he possessed at Beckington, in his native county, where he died in October 1619. Daniel was highly praised by his contemporaries, as Lodge, Carew, Drummond of Hawthornden, although Ben Jonson described him as 'a good honest man . . . but no poet,' and Drayton quotes the opinion of some wise men that he was 'too much historian in verse.'

besides saying for himself that 'his manner better fitted prose.' Of modern critics, Coleridge, Lamb, and Hazlitt unite in praising him. As a sonneteer Daniel is altogether admirable. Some of the 'Delia' series rank near the best examples of this form in English. Daniel is indeed an elegant if not a great poet. His writings are pervaded by a moral thoughtfulness and purity of taste remarkable indeed, but lacking that vital energy of movement and memorableness of expression which spring from genuine inspiration. The 'well-languaged Daniel' is therefore not the most interesting of the Elizabethans, although his style is quite modern. His works include sonnets, epistles, masks, and dramas; but his chief production is a poem in eight books, entitled *A History of the Civil Wars between York and Lancaster*. His *Defence of Ryne* (1602) is written in admirable prose. Dr Grosart reprinted Daniel's works in the Huth Library (5 vols. 1885-96).

**Daniell**, JOHN FREDERIC, scientist, was born in London, March 12, 1790. He was for a time engaged in a sugar-refining work, but was elected a Fellow of the Royal Society in 1814, and devoted himself to chemistry and meteorology. In 1823 he published his *Meteorological Essays*, and in 1824 the Horticultural Society awarded him their silver medal for an essay on artificial climate. In 1831 he was appointed professor of Chemistry in King's College, London; and in 1839 published his *Introduction to Chemical Philosophy*. He invented a hygrometer (1820), and a new pyrometer (1830), as well as the electric battery known by his name; and he wrote many valuable papers. He died March 13, 1845.

#### Danish Literature. See DENMARK.

**Danites**, or DESTROYING ANGELS, a secret society founded by Joseph Smith in 1838, professedly merely for the defence of the Mormon sect against the mob. The members, originally some 300 in number, were bound by an oath, under penalty of death, to sustain the 'first presidency' and one another in all things, and special 'destruction companies' were appointed for the purpose of burning and destroying, at first by way of reprisal. Remembrance of the society's operations was revived by the trial, conviction, and execution of Bishop John D. Lee, in 1877, for instigating the massacre of a train of 140 non-Mormon emigrants at Mountain Meadow, twenty years before.

**Dannecker**, JOHANN HEINRICH VON, a sculptor who in respect of date and art stands between Canova and Thorwaldsen, was born at Waldenbuch, in the district of Stuttgart, 15th October 1758. His parents were in very humble circumstances; but through the favour of the Duke of Württemberg, he received a good education at the military academy at Ludwigsburg. His artistic talents were rapidly developed. In 1780 he obtained the prize for the best model of 'Milo'; and in 1783 went to Paris, where he studied for two years; after which he returned to Rome, where he met Goethe, Herder, and Canova. At Rome Dannecker remained till 1790, becoming afterwards professor of sculpture in the Academy of Stuttgart. He died 8th December 1841. 'Ariadne on the Panther' (1816; at Frankfurt), a Christ at Moscow (1824), and his busts of Schiller, Gluck, and others are masterpieces.

**Dannevirke** ('Danes' work'), the rampart built by the Danes about 808 across Sleswick, just north of the Eider; the scene of fighting in 1849, and razed by the Germans in 1850.

**D'Annunzio**, GABRIELE, novelist and poet, was born of Dalmatian stock in 1863, at Francavilla, near Pescara, and began to write verse while

still at school in Tuscany; publishing between 1879 and 1886 half-a-dozen volumes of verse and of stories, which attracted by their grace and staid by their voluptuousness. Settling in Rome, he became a journalist on the staff of the *Tribuna*, and in *Il Piacere* (1889) produced a notable novel, showing the influence of Maupassant and Bourget. *L'Innocente* (1891), translated into French, made him known abroad, and was followed by *Il Trionfo della Morte*, *Le Vergini delle Rocce*, and *Il Fuoco* (1900); *Il Poema Paradisiaco*, *Odi Navali*, and *Laudi*, in poetry; in drama, *Il Sogno* (1897), *Otta Morta*, *La Gioconda*, *La Gloria*, and *Francesca da Rimini*—the last hailed by the best Italian critics as one of the greatest of Italian dramas—*La Figlia di Iorio*, *Le Nave*. His creative gift is powerful but narrow; in grace and richness of style he outshines all Italian contemporaries. He urged Italy's participation in the Great War (of which he was official chronicler); and in 1919 led a private expedition which seized Fiume (until Dec. 1920), and later Zara, in defiance of Europe and America. He was created Prince of Montenevoso (1924).

**Dante Alighieri** (also written ALDIGHIERI, ALAGHIERI, and otherwise), 'that singular splendour of the Italian race,' as Boccaccio, his first biographer, calls him, was born in May 1265, the exact day being unknown. The house in which he was born is still shown in the Piazza di San Martino at Florence. His father was a lawyer, his mother, who was his father's second wife, was named Bella, but her surname is not known. The future poet was baptised with the Christian name of Durante, afterwards contracted into Dante, in the beautiful baptistry of Florence, towards which in his later years the tenderest thoughts of the hopeless exile turned (see *Inf.* xix. 17; *Par.* xxv. 1-12). The fancy of the old biographers loved to dwell on the appropriateness of both names, 'the much-enduring,' and 'the giver.' As with many other great men, a halo of legend surrounds the circumstances of his birth and early years. But the curtain is first lifted on his actual history, and that by himself, in his *Vita Nuova*, the New (i.e. probably Early) Life, when he relates how he first set eyes on 'the glorious lady of his heart, Beatrice,' he being then about nine years of age, and she a few months younger. To Boccaccio, and to his statement alone, we owe the generally accepted fact that she was the daughter of Folco Portinari, for Dante himself never gives the slightest clue as to her family name. Owing to his reticence on this point, combined with the extraordinary and, to modern notions, almost unintelligible amount of idealisation in Dante's language about her, some critics have (as might be expected) denied that she was a real person at all. That chance meeting in May 1274 determined the whole future course of the poet's life. The story of his boyish but unquenchable passion is told with exquisite pathos in the *Vita Nuova*. There is no evidence that any similar feeling was aroused in the heart of Beatrice Portinari. She was married at an early age to one Simone de' Bardi, but neither this nor the poet's own subsequent marriage interfered with his pure and Platonic devotion to her. This became even intensified after her death, which took place on June 9, 1290, when she was in her 24th year. Shortly after this Dante married Gemma Donati, a member of one of the most powerful families of the Guelph faction at Florence. According to Boccaccio, this marriage was recommended by his friends, alarmed at the condition of his health through overmuch sorrow. It has commonly been assumed that the marriage was an unhappy one. This, however, is merely a conjecture, supported mainly by the fact that after Dante's exile in 1301 he never appears to have seen, or cared to see, his wife again.

In 1289 Dante took part in the battle of Campaldino, in which the Florentines and their Guelphic allies defeated the Ghibelline league of Arezzo. The flight and death of Buonconte, who fought on the opposite side, is the subject of one of the most splendid episodes in the *Divina Commedia* (*Purg.* v.). Later in the same year he was present at the capitulation of Caprona, as he himself tells us in *Inf.* xxi. 94. With these experiences his military life seems to have closed. Soon after, we find him beginning to take part in politics, and according to the custom of the times, he first became registered in one of the city guilds—viz. that of the Apothecaries, he being then thirty years of age. It is interesting to note that he is there entered as 'Dante d'Alighieri, poeta.' It should, perhaps, have been mentioned that we know little of his early education, except that he is said to have studied at the then celebrated university of Bologna. According to some he was for a time a pupil of Brunetto Latini, of whom he speaks with the utmost veneration and affection, though a stern sense of justice compels him to place him in Hell (*Inf.* xv.). At the outset of his public life his sympathies were with the Guelph party, to which he would naturally have been attached by family ties both through his father and his wife. After filling minor public offices, and possibly going on some embassies abroad (though, doubtless, not all of those which later writers in their admiration have attributed to him), in the ever-memorable year 1300, the *mezzo cammino* of his own life, when he was thirty-five years old, the eve of a new century, the year of the first Jubilee at Rome, the assumed year of the great poetic vision of the *Commedia*, he attained to the dignity of one of the six priors of Florence. That singular office, lasting for only two months, seems (as Lowell suggests) to have been invented by the Florentines 'apparently to secure at least six constitutional chances of revolution in the year.' It should be explained that this was a very critical and stormy period at Florence. Not only was the eternal feud of Guelph and Ghibelline in full force, but a new excuse for party hatred had been found in the distinction of Black and White Guelphs, the latter being the more moderate party, who tended to verge towards the Ghibellines, and under certain circumstances to make common cause with them. So far as Dante could be called 'a party man' at all (see *Par.* vi. 100-3; xvii. 68-69), it was towards this section that his sympathies tended. His office as prior lasted from June 15 to August 15 in the year 1300. He distinguished his brief tenure of office by procuring the banishment of the heads and leaders of the rival factions by which Florence was torn asunder. He carried out this process with characteristic sternness and impartiality on Guelph and Ghibelline, White and Black alike, unmoved by any considerations of relationship, friendship, or political sympathy. Shortly afterwards the leaders of the Whites were permitted somehow to return. The partiality thus shown was a prominent feature in the accusation against Dante; but he had a complete answer in the fact that he was no longer in office at the time that it occurred.

In the following year, 1301, and probably in the autumn, in alarm at the threatened interference of Charles of Valois, who had now crossed the Alps, Dante was sent on an embassy to Rome to Pope Boniface VIII., under whose instigation Charles was acting. From that embassy he never returned, nor did he ever again set foot in his native city. For meanwhile had occurred the dreaded advent of Charles, nominally as peacemaker, on November 1, 1301. He espoused the side of the *Neri* or Blacks, and for three days the fight raged in the streets of Florence. Finally, the victory of the *Neri* was

complete, their opponents were slain or banished, and their houses sacked. Soon after, in January 1302, the sentence of banishment went forth against Dante and others, nominally on the charge, an utterly baseless one, of *baratteria*, or malversation in the office of prior in 1300. This was followed by a yet severer sentence on March 10, condemning them to be burned alive if ever caught, which was repeated again on September 2, 1311, and yet once more on November 6, 1315. We need not attempt here to follow the wanderings of his exile of twenty years. He made at first one or two hopeless attempts to return, but abandoned them, partly in disappointment at their failure, partly in disgust at the kind of associates with which such proceedings linked him (see *Par.* xvii. 61-69).

His principal halting-places seem to have been—first Verona, under the protection of one of the Della Scala family, described by him as 'gran Lombardo' with much eulogy in *Par.* xvii. 71. Then in succession he sojourned in Tuscany (with Count Salvatico), in the Lunigiano (with Moruello Malaspina), near Urbino (with Ugucione della Fagginola), and then at Verona again. During this period he is said to have visited Paris; but though there seems little doubt that he was actually there at some time of his life, yet some of his biographers connect this visit with the period of his early education. Among these is Serravalle, who wrote, it should be noted, as late as 1417, and who is also the sole authority for Dante's alleged visit to England and Oxford. Those who, like Boccaccio, take him to France during his exile, suppose him to have been recalled to Italy and politics by the election of Henry of Luxemburg as emperor, and his visit to Italy, where no emperor had set foot for more than fifty years (see *Purg.* vi. 105, &c.). The exile's hopes were now roused to the highest pitch, and he addressed an epistle to Henry, couched in language borrowed largely from Scripture, which to our ears sounds extravagant. His hopes were once more and finally crushed by Henry's unexpected death on August 24, 1313, after which Dante took refuge in Romagna, and finally in Ravenna, where for the most part he remained, under the protection of Guido Novello da Polenta, until his death. This took place on September 14, 1321. The precise cause of it is unknown. He was no doubt utterly broken in spirit and in health. He had been employed by his patron in an embassy to Venice, which proved unsuccessful, and he died very soon afterwards, as some biographers say, from grief and annoyance at his failure at Venice, and as others, with more probability, assert, from the effects of a fever, aggravated if not originally caused by the unhealthy marshes which he had traversed on his return to Ravenna by land, the Venetians having harshly refused to allow him to make the journey by sea.

He was buried with much pomp by his friend Guido at Ravenna, and there he still lies. At some unknown period, by unknown hands, and from a motive still unexplained, his body was removed from the sarcophagus in which it lay, and was walled up in the neighbouring church of St Francis, in a rough box, inscribed *Dantis Ossa*. There it was discovered by pure accident on May 27, 1865, and after the bones had been identified beyond possibility of doubt, they were replaced in the sarcophagus, from which it was found they had been abstracted. Dante had seven children, six sons and one daughter, Beatrice, who was a nun in a convent at Ravenna. His family, however, became extinct in the 16th century. His personal appearance is too well known to need much description. Fortunately, a cast was taken from his face after death, so that we have an absolutely

authentic record of his features. Boccaccio also, writing not very many years after his death, has preserved numerous personal details, such as that he was of moderate stature, stooping when he walked, slow and dignified both in gait and speech, reserved and taciturn in habit, but, when he spoke, keen, sarcastic, and often contemptuous. That he was devoted to music and painting appears from many passages in his works, as well as from current tradition.

The dates and sequence of his various works are a matter of conjecture, and are still very much disputed. Doubtless the *Vita Nuova* is the earliest. By far the most celebrated is the *Divina Commedia*, the pre-eminent greatness of which has tended to eclipse his other writings, which do not generally receive the attention they deserve. In this poem he purposes, and assuredly fulfils his purpose, 'to say of Beatrice that which never yet was said of any woman' (end of *Vita Nuova*). In this vision of Hell, Purgatory, and Heaven, we have, as it were, an encyclopedic view of the highest culture and knowledge of the age on philosophy, history, classical literature, physical science, morals, theology. All this, moreover, is expressed in the sublimest and most exquisite poetry, and with consummate power and beauty of language. The *Divina Commedia*, indeed, may be said to have made the Italian language, which was before so rude and unformed that Dante himself hesitated to employ it on such a theme, and is said to have commenced his poem in Latin. No work probably in the world, except the Bible and Shakespeare, has given rise to so large a literature. To say nothing of nearly six hundred MSS. in which it was copied before printing became common, there have been published hundreds of editions; it has been no less than a hundred times translated into various European languages; and of commentaries, introductions, essays, and monographs there is no end. About fifty years after Dante's death, a public lectureship on the *Divina Commedia* was established at Florence, to which Boccaccio was first appointed.

The next most important work (and one throwing much light on the *Commedia*) is the fragment called the *Convivio* or *Convito*. It takes the form of a commentary on some *canzoni*, or short poems, of the author, of which there are only three, though the work, if completed, would have contained fourteen of these 'courses,' as the author calls them. Its contents are almost as encyclopedic as those of the *Commedia*. The *De Monarchia* (written in Latin) expounds Dante's theory of the right, and, as he held, divinely-intended, government of the world, by a universal emperor acting in harmony with a universal pope, respectively administering, without conflict or interference, the temporal and spiritual affairs of mankind. Another work, again unfinished, since it consists of two books only, when four were promised, is the *De Vulgari Eloquentia*. It also is written in Latin, and is a discussion of the origin of language, the several divisions of languages, and the numerous dialects of Italian in particular. A considerable collection of short poems, *canzoni*, sonnets, &c., is also preserved under the title of the *Canzoniere*, and finally, we have about a dozen epistles addressed mainly to leading statesmen or rulers, and dealing with the most urgent political problems of the day. There are also some *Eclogues* and other minor works, as well as several of doubtful authenticity which are sometimes assigned to him.

Of editions of the *Commedia*, Brunone Bianchi and Fraticelli are the most serviceable for ordinary students; for more thorough and critical studies, Scartazzini (3 vols.) and Mario Casella; for the *De Monarchia* and the *Vita Nuova*, also the *Commedia*, Witte; for all the works,

Fraticelli, Barbera (Florence, 1921), and the Società Dantesca Italiana; for all except the *Commedia*, Giuliani. The *Oxford Dante*, a complete text (3 vols.), was published in 1894 (4th ed. rev. by Paget Toynbee, 1924) by Dr E. Moore, who wrote *Dante and his Early Biographers* (1890). On Scartazzini's *Prolegomeni della Divina Commedia* (1890) is based the German *Dante Handbuch*, translated by Butler (1894) as *A Companion to Dante*. The invaluable *Bibliografia Dantesca* of Colomb de Batines was continued by Carpellini (1845-65) and by Petzholdt (1865-80). L. G. Blanc's *Vocabolario Dantesco* is very valuable; and Paget Toynbee's *Dictionary of Proper Names, &c., in Dante* (1898). See books by Miss M. F. Rossetti (1871), Butler (1895), Paget Toynbee (1900), Church (1888); Vernon's *Readings* (1906-9); Croce, *La Poesia di Dante* (1920). The principal English translations in verse are by Cary, Wright, Cayley, Pollock, Longfellow, Plumptre, Haselfoot, Shadwell, Langdon, Rossetti, Sibbald, and Musgrave (the last three the *Inferno* only); and in prose by Dr John Carlyle (*Inferno* only), Butler, and Norton.

**Danton**, GEORGES-JACQUES, was born of good farmer-people, at Arcis-sur-Aube, 26th October 1759. The outbreak of the French Revolution found him a quiet and studious man, practising as an advocate in Paris, but ere long its fever filled his veins. It was not till 1792, however, that he became a great leader, as we find no trace of his influence in such movements as the destruction of the Bastille and the forcible removal of the court from Versailles to the Tuileries. Mirabeau quickly detected Danton's genius, and hastened to attach him to himself, but his death in the spring of 1791 removed the last stay to the speedy downfall of the monarchy and the onward progress of a turbulent and infatuated democracy. Along with Marat and Camille Desmoulins, Danton instituted the Cordeliers' Club, which soon became the rallying-point of all the hotter revolutionists. There the tall brawny man—a born Tribune—with harsh and daring countenance, beetling black brows, and a voice of enormous power, thundered with vehement eloquence against the aristocrats, till the passions of the populace rose into ungovernable fury. Meantime the unhappy king stumbled into ever new blunders—most fatal, the attempt to flee from Paris (June 1791), and the affair of the Champ de Mars (July 2, 1791). Assertions have been made that Danton was after these events corrupted by the court, but there is no trustworthy evidence of this, and it is certain that his hostility to the monarchy remained as implacable as ever. 'The Mirabeau of the Sansculottes' was, indeed, says M. Claretie, 'a kind of bourgeois Mirabeau, equally powerful, but neither dissolute nor venal.' Danton's share in the insurrectionary march on the Tuileries (10th August 1792) is very doubtful, but it is certain that immediately thereafter he appears as Minister of Justice. And now the gigantic personality of the man seemed to overshadow all the surrounding figures. He stood forth as the incarnate spirit of the Revolution, manifesting alike its heroic audacity in the presence of danger from without, and its mad suspicion and terror of danger from within. The advance of the Prussians seemed for a moment to strike a panic to the heart of France. On the 2d of September Danton mounted the tribune, and addressed the Legislative Assembly in a speech of tremendous power, which closed with the famous words regarding the enemies of France: 'Pour les vaincre, pour les atterrir, que faut-il? De l'audace, encore de l'audace, et toujours de l'audace.' The heart of Paris was moved with resistless enthusiasm: she poured forth army after army of her sons, whose fiery valour quickly drove the invaders from the sacred soil of France. But the excitement of Paris was not all heroic—the September murders in the prisons were merely an outburst of cowardice and fear. Danton had perhaps no share

in this atrocity, for which Marat was mainly responsible, but he admitted that such excesses were incidental to a revolution, and condoned them as merely morbid and passing ebullitions of forces that would yet flow freely in healthy channels.

Danton voted for the death of the king (January 1793), was one of the nine original members of the Committee of Public Safety, and frequently went on missions to Dumouriez and other republican generals. In the Convention he now bent all his giant strength to crush the Girondists, or moderate party, on whose fall the extremists found themselves supreme. But he could not restrain the forces he had created, and his heart filled with ineffectual pity when the heads of opponents against whom he had thundered in debate fell under the merciless guillotine of the triumphant Mountain (October 1793). Danton was chiefly instrumental in setting up a strong central authority within the Committee of Public Safety and investing it with dictatorial powers, but he elected not to belong to it himself. Henceforth all his energies were devoted at once to fire the hearts of Frenchmen against the foreign enemy, and to conciliate domestic hatreds. He strove with all his might to abate the fanatical and pitiless severity of the revolutionary tribunal, but although Hébert and his party were cut off, Danton's policy of clemency failed to commend itself to the Mountain, whose ferocious instincts saw a more promising leader in the narrow and acrid Robespierre. A fruitless attempt was made to reconcile the two, but their interview left them worse friends than before. Meantime Danton was strangely careless of his fate. He went awhile for rest to his native Arcis, and forgot all the machinations of his enemies in the quiet of domestic happiness with the wife he had just married. 'I prefer being guillotined to guillotining,' he said to a friend—a great saying which history will remember. Soon his friends summoned him to return to Paris. When news was brought him that the warrant for his arrest was made out, he said merely, 'They dare not,' and calmly went to sleep as usual. Arrested at last, he carried his head high until his doom:—'I leave the whole business in a frightful welter. Not one of them understands anything of government. Robespierre will follow me; I drag down Robespierre. Oh, it were better to be a poor fisherman than to meddle with governing of men.'

On the 2d April 1794 he was brought with Camille Desmoulins and a group of his friends before the bar of the Revolutionary Tribunal he had formed a twelvemonth before. Asked his name formally by Fouquier-Tinville, the attorney-general, he replied with more than his customary greatness of phrase: 'My name is Danton: a name tolerably known in the Revolution; my abode will soon be annihilation; but I shall live in the Pantheon of history.' His defence was sublime in its audacity, its incoherence, its mixture of heroism and magnificent buffoonery. 'I sold to the enemy!' he exclaimed, 'A man of my stamp is priceless.' 'Do I look like a hypocrite?' was his only answer to one of the absurdest of the charges. The first two days of his trial his mighty voice and passionate eloquence moved the people so greatly that the Committee of Public Safety in terror hastily concocted a decree that the mouths of men who had 'insulted Justice' should be shut; and only with this shameful outrage upon justice were his enemies able to send to his doom the greatest figure that fell in the Revolution (April 5, 1794). At the foot of the scaffold the thought of his much-loved wife filled his heart, but with the words, 'Danton, no weakness,' he nerved his heart to die as he had lived. To the headsmen he said, 'Thou wilt show my head to the people; it is worth showing.'

The outlines of the Titan of the Revolution in Carlyle's glowing pages are none too heroic; his story is written large on the annals of his time.

See also French works by Bougeart, Robinet, and Madelin (1914); English by Belloc (1899) and Beesly (1899).

**Dantsic.** See DANZIG.

**Danube** (Lat. *Danubius*; in the lower course, *Ister*; Ger. *Donau*; Hung. *Duna*; Slav. *Dunaj*), the second river of Europe, inferior only to the Volga, has its origin in the Brege and Bigach, two mountain-streams issuing in the Black Forest, in Baden, and uniting at Donaueschingen, 2264 feet above sea-level. The Danube has a total length, including windings, of 1740 miles, and drains an area estimated at 300,000 sq. m. It flows first SE. to Gutmadingen, and then NE. to Ulm (1519 feet above sea-level), which may be taken as the limit of its upper course. A few miles above Ulm it receives on its right bank the Iller, from which point it is navigable for boats of 100 tons. At Regensburg (Ratisbon) the river reaches its most northerly point (49° 2'), and from thence its course is generally SE. to the northern frontier of Bulgaria. Between Ulm and Passau, where it enters Upper Austria, it receives, among other tributaries, the three large alpine streams, the Lech, Isar, and Inn, on the right, and the Altmühl and Regen on the left bank. At Passau its width is 231 yards, and its depth 16 feet. The crystalline rocks of the Bohemian Forest mountains follow the stream into Austria, and as far as Aschach its banks are wild and picturesque. It flows E. to Presburg with little variation of course, receiving the Ens from the S., and the March or Morava from the N.; and passing through an opening, called the Carpathian Gate, between the Leitha chain and the Lesser Carpathians, where its width is 320 yards, and its depth 20 feet, it separates Hungary from Czechoslovakia. Between Presburg and Komorn the stream divides, and forms the Great and Little Schutten, or alluvial islands. Near Waitzen it turns directly S., and enters upon the Hungarian plain, a vast sandy alluvial flat, in which it is continually forcing new channels and silting up old ones; it maintains this course for 230 miles, receiving from the N. the Waag and the Gran. Lower, in Yugoslav territory, the Drave from the W. adds considerably to its volume.

After this last accession, the Danube turns again SE., and, increased by the waters of the Theiss from the N., sweeps past Belgrade, where it is joined by the Save, and lower by the Temes. At Semlin, near Belgrade, it is 1706 yards wide and 46 feet deep, but the width is greatly contracted by spurs of the Transylvanian and the Serbian mountains for 75 miles below the plains of the Vojvodina. Within this stretch are eight distinct rapids, shut in by lofty walls, and strewn with rocky shoals of limestone, crystalline schists, and granite. The lower Klissura is the most strikingly picturesque of these, but the most difficult passage is the shortest (1½ mile) of the eight—the 'Iron Gate,' properly so called, below Orsova, where the middle course of the river ends. Here the stream has a breadth of only 129 yards, and the piled-up waters attain a depth of 28 fathoms; ledges of rock lift their tooth-like points above the surface, and all around a seething stretch of whirlpools, cataracts, eddies and counter-eddies, combines with the river's rapid fall to present a serious and formerly impassable obstacle to navigation. Many attempts have been made to improve the bed here, which, under article 57 of the Berlin Treaty of 13th July 1878, Austria bound herself to clear. The mandate was later transferred by Austria to Hungary, and was abrogated by the peace treaties of 1919. From here the Danube enters on the Wallachian depression, and flows in a wide stream, through a district

fertile, indeed, but solitary and poorly cultivated, constantly broadening into a lake, or overspreading its banks with swamps. It drains the country between the Transylvanian mountains and the Balkans, forming the northern boundary of Bulgaria, and running into south-eastern Rumania, past Silistria. Lower it turns northward, skirting the Dobruja, and flows between marshy banks to Galatz, receiving on the way the Jalomitza and the Sereth. From Galatz it flows E., and, after being joined by the Pruth from the N., SE. to the Black Sea. The delta, which begins 5 miles W. of Tulja, is a vast wilderness, covering an area of 1000 sq. m., and resembling an immense green sea of rushes; it is cut up by numerous channels and lakes, and is the haunt of sea-birds, wolves, and buffaloes. The farthest mouths are 60 miles apart. Two-thirds of the Danube's volume passes through the Kilia, but this arm forms a secondary delta near its outlet, and the southern or St George branch also forms two channels; it is consequently by the middle or Sulina mouth that ships enter, although it discharges only 9 per cent. of the river's waters. The improvements (since 1858) of this mouth have increased the depth over the bar from 7 or 11 feet (according to the season) to a minimum depth of 23 feet. And cuttings have shortened the course of the Sulina branch by eleven nautical miles. To defend Vienna against risk of inundation, the course of the Danube skirting it was, in 1868-81, diverted into an artificial channel, and the bed has since been improved, above and below the city, from the mouth of the Isper to that of the March. Similar works have been carried out near Budapest, and a new channel, cut at vast expense, to avoid the impediments to navigation at the Iron Gate, was opened in 1896. Until then any effectual improvements of that passage had never advanced beyond the stage of projects, while throughout Hungary and along the lower course inundations had caused great damage. The operations were actually begun by the Hungarian government in 1890. A great steel cantilever railway bridge across the Danube at Tchernavoda in Rumania (with its approaches, 11,800 yards long) was opened in 1895. It partly rests on the island of Balta. The Danube has about 400 tributaries, 100 of them navigable. Nevertheless, owing to the obstructions and to the shifting course of the stream, the tonnage of the Danube trade is inferior to that of the Elbe. The Danube is connected with the Rhine by means of the Ludwigs Canal (1844), and other canals connecting with the Rhine, Elbe, Oder, Vistula, and Dniester are projected.

The International Danube Navigation Commission was constituted in 1856, when at the Peace of Paris the navigation of the river was declared free to all nations, and was composed of delegates of all the great powers, to whom a representative of Rumania was added from 1878. It was appointed on the express condition that it should dissolve in 1858, but such was its usefulness that it was informally continued till 1866, when the Conference of Paris formally prolonged its powers for five years. In 1871 the Conference of London continued the Commission for twelve years, and in 1883 a second London conference continued it to 1904, and thereafter until denounced. It was revived, with temporary modifications, after the Great War. It exercises almost sovereign power on the mouths of the Danube, where it has conducted the great engineering works already referred to; it has its own flag, uniform, and revenue, and has raised loans, made laws, and maintained its own small army of police. Its jurisdiction, originally limited to the river between Isakcha and the sea, was extended at the Congress of Berlin (1878) as far as Galatz, and after-

wards to the Iron Gate, and later restricted to the portion from Braila to the Sulina mouth. It has its headquarters at Galatz. Its revenue is derived from a tax upon ships leaving the river. The peace treaties of 1919-20 set up another International Commission for the remainder of the Danube, up to Ulm.

**Danubian Principalities**, a name applied to Moldavia and Wallachia. See RUMANIA.

**Danvers**, a town of Essex county, Massachusetts, 4 miles NW. of Salem, with manufactures of shoes, carpets, bricks, &c. It is the seat of the state asylum for the insane. Pop. 11,000. Peabody, 3 miles to the south, was formerly South Danvers.

**Danville**, (1) capital of Vermilion county, Illinois, on the Vermilion River, 124 miles S. of Chicago. It is an important railway junction, and contains railway-shops, besides a number of flour and lumber mills, foundries, &c. Bituminous coal is mined near by. Pop. 34,000.—(2) Capital of Montour county, Pennsylvania, on the north branch of the Susquehanna, 62 miles N. by E. of Harrisburg. The place was first settled in 1768, and the Pennsylvania Ironworks here is the oldest establishment in the United States for the manufacture of railroad iron. There are also numerous blast-furnaces, foundries, and rolling-mills. Pop. 7000.—(3) A flourishing city of Virginia, on both sides of the Dan River, here spanned by an iron bridge, 126 miles SW. of Richmond, with large cotton and other mills, and a very important trade in tobacco. Pop. 21,500.

**D'Anville**, JEAN BAPTISTE BOURGUIGNON, a geographer and map-maker, was born at Paris, 11th July 1697, and devoted himself to mathematical and geographical studies with such zeal and success that in 1719 he was appointed geographer to the king. He died 28th January 1782. He published in all 211 maps; the most notable collections were the *Atlas Général* (1737-80), and the *Atlas Antiquus Major*, with its accompanying three volumes of *Géographie Ancienne* (1769).

**Danzig** (Polish *Gdańsk*), an important seaport, till 1919 capital of West Prussia, now politically a free city (German in population), on the left bank of the western branch of the Vistula, 284 miles NE. of Berlin by rail, and about 4 miles from the river's mouth in the shallow Gulf of Danzig, an inlet of the Baltic. Danzig was an important town in the 10th century, and its possession was contended for by Danes, Pomeranians, Prussians, Brandenburgers, Poles, and the Teutonic Knights, the last of whom held it from 1308 to 1454, when it became a free city under Poland. In 1793 it fell to Prussia, in whose hands, except during the years 1807-14, when it existed as a separate dukedom under Napoleonic rule, it continued till 1919. The Treaty of Versailles separated Danzig, with a small area around it (709 sq. m.; pop. in 1919, 356,740), from Prussia and the German empire, making it a free city under the League of Nations, to be included in the Polish customs area, Poland having rights in the port and control of foreign relations. The town is protected by a wall with twenty bastions, and by wet ditches, and possesses works for laying the surrounding country under water on three sides; its works are strengthened by outlying forts, and a chain of batteries extends to the mouth of the river. The city is traversed by the Mottlau and Radanne, tributaries of the Vistula, the former of which has been deepened and admits vessels up to the *Speicherinsel*, an island forming one of the quarters of the town, retained for the storage of grain. The principal port is Neufahrwasser, at the mouth of the Vistula, below the sand-bars. Many of the streets of Danzig are

narrow and crooked, but the *Langgasse*, intersecting it from east to west, presents a most picturesque appearance, with its lofty gable houses of the 16th and 17th centuries; and there are good suburbs to the west, with wide thoroughfares. Among the most noteworthy buildings are the large church of St Mary (1343-1502), with a noble 'Last Judgment,' painted probably by Memline, and a finely carved altar of wood; the church of St Catharine (1326-30); the fine old Gothic town-hall; the old exchange; and the Franciscan monastery, now used as a museum and art gallery. Danzig was at one time a prominent member of the Hanseatic League, and is still one of the chief commercial cities of northern Europe. Its seaward imports are chiefly herrings, cotton, iron, drugs, coal, coffee, and hides; its exports, sugar, wheat, timber, spirits, &c. The river and railway trade is also important. The manufactures include beer, spirits (Danzig *Goldwasser*), sugar, tobacco, flour, iron-wares, machinery, amber, gold and silver ornaments; and ships are built. The town has a large library, and is well supplied with hospitals, asylums, schools, museums, &c. Oliva Abbey (c. 1200) is the cathedral of the Roman Catholic diocese of Danzig. Pop. (1880) 108,551; (1900) 140,539; (1910) 170,337; (1919) 194,953.

**Daoudnagar.** See DAUDNAGAR.

**Daphne**, a nymph who, chased by Apollo, changed herself into a laurel. The myth is a *point d'appui* of the solar mythologists. Daphne was the name of a famous grove of cypresses and laurels near Antioch, with a temple of Apollo.

**Daphne**, a genus of Thymelaeaceæ, all shrubs or small trees, deciduous or evergreen, acrid and with poisonous berries, but often with deliciously fragrant flowers. The deciduous *Mezereum* (*D. Mezereum*), well known both for the fragrance of its pink winter flowers and for its medicinal uses, is naturalised in some places of England. The only species certainly a native of England is the Spurge Laurel (*D. Laureola*), an evergreen shrub, 3 to 4 feet high, with large, leathery, tufted leaves,



Daphne Cneorum.

and greenish-yellow axillary flowers. It grows well under the shade of trees, and flowers in February, while the nearly allied *D. pontica*, introduced from Asia Minor, flowers a month later. Upon the three species are grafted the rarer or less hardy species. Easily recognised by its trailing and branching habit, with persistent smooth, linear, obtuse, mucronate (box-tipped) leaves, and its fragrant profusion of terminal flowers in early spring, *D. Cneorum* is the best of all species for small gardens; while *D. alpina*, with its varieties *Dauphin* and *Verloti*, is a pretty deciduous form for rock-work.—*D. japonica*, from Japan, has lemon-scented leaves. From the bast of some species of Daphne, and nearly allied genera, useful fibre is obtained, and paper is made in different parts of the East, particularly *Nepal* paper from that of *D. cannabina*. In Tibet *Edgworthia Gardneri* is employed in the same way.

**Daphnia.** See WATER-FLEA.

**Dapsang**, highest peak (28,700 feet) of the Karakorum (q.v.).

**Darabgherd**, or DARAB, a town of Persia, in Farsistan, 115 miles SE. of Shiraz; pop. 4000.

**Daraganj**, a suburb of Allahabad, stands 2 miles distant, on the right bank of the Ganges.

**Darbhangha**, the chief town of Darbhanga district, in Bihar and Orissa, on the little Bagmati River, 78 miles NE. of Patna by rail. It has large bazaars and a handsome market-place, extensive tanks, a hospital, and the maharaja's palace, with fine gardens, menagerie, and aviary. There is an active trade in oil-seeds, food-grains, timber, salt, iron, lime, &c. Population, 63,000.—The district has an area of 3348 sq. m., forming one large alluvial plain, intersected by a network of streams, and covered with wide rice-fields, bamboo, and mango-groves. The rivers flood extensive areas, and fever is endemic. Rice, indigo, linseed, mustard, and tobacco are the chief crops; the manufactures include indigo, sugar, saltpetre, pottery, cloth, and tobacco. Pop. 3,000,000.

**D'Arblay**, MADAME, better known as a novelist by her maiden name of Frances Burney, was born at King's Lynn, 13th June 1752, the second daughter and the third child of the six children of Dr Burney, then organist there. Her father removed to London to teach music in 1760, and on his wife's death next year sent his daughters Esther and Susannah to a school in Paris, but kept Fanny at home from a fear that her great affection for her maternal grandmother, then in France, should make her a convert to Catholicism. Dr Burney's second marriage in 1766 gave her a kind step-mother, but did not end her day-dreams nor her incessant scribbling of stories, plays, and poems, begun at ten, although but two years before she was ignorant of her letters. On her fifteenth birthday, in a fit of repentance for such waste of time, she burned all her papers, but she could not erase from her brain the plot of the story which grew later into *Evelina*, or *a Young Lady's Entrance into the World*. This was sold for £20 to Lowndes, and published anonymously in January 1778, not even her father having seen the manuscript, although he had been dutifully told beforehand of the project. Dr Burney at once recognised his daughter's touch, and soon confided the secret to Mrs Thrale, who, as well as Dr Johnson, petted and flattered the gifted young authoress to her heart's delight. The praises showered upon the book by Johnson, Reynolds, Burke, and the whole world of fashion, might well have turned her head, and are told in delightful detail in her diary. Urged to write a comedy, she had the sense to suppress it in deference to the criticisms of her father and Samuel Crisp, a sagacious old critic, soured to the world but not to her, the 'daddy' of so many of her letters. In 1782 she published *Cecilia*, which was no less successful than her first novel. At Windsor, in the house of her friend the venerable Mrs Delany, she became known to the royal family, and soon received (July 1786) the appointment of second keeper of the robes at court, with a salary of £200 a year. She soon found her menial duties intolerably tedious, and her health began to decline, but her veneration for the queen kept her from resigning until compelled by the remonstrances of Burke, Boswell, Windham, and others of her father's friends. At length in July 1791 she was permitted to retire with a pension of £100 a year, and soon recovered her health and spirits by travelling in England. At Norbury Park, near Dorking, she met General D'Arblay, a French refugee, and married him on nothing more than her pension in July 1793. Her third novel, *Camilla*, was published by subscription in 1796, and brought her, it is supposed, about 3000 guineas, with which she built Camilla Cottage, near Mickleham. It was, however, nothing more than a pecuniary success, while her tragedy, *Edwy and Elvina*, had already been damned in 1795, spite of the acting of Mrs Siddons and Kemble. From 1802 to 1812 she lived at Passy in France with her husband, who

had procured civil employment there, then returned to England with her son, tended her father till his death in April 1814, and in the beginning of the same year published her last novel, *The Wanderer*, another literary failure. At the first Restoration she joined her husband in Paris, was at Brussels during the battle of Waterloo, and soon after returned finally to England with her husband, who died 3d May 1818. Her son was tenth wrangler at Cambridge that year, took orders, became minister at Ely chapel in 1836, and died of decline in 1837. In 1832 Madame d'Ablay published her memoirs of her father, written in a pretentious style, and died 6th Jan. 1840. Five volumes of her *Letters and Diaries* were published in 1842, two more volumes in 1846, and the *Early Diary* in 1890. Spite of its tedious triviality this work is invaluable from the insight it gives us into the very heart of the dull decorous court of George III., and much more from its revelation of English manners towards the end of the eighteenth century. Its stories of Dr Johnson and his group will live in literary history. Croker's ill-tempered attacks on her veracity for allowing an impression to go abroad that *Evelina* had been written at seventeen, printed in the *Quarterly Review* for April 1833 and June 1842, were satisfactorily answered by Macaulay in the *Edinburgh Review* for January 1843. As a novelist, Frances Burney's greatest merit is that she conceived the idea of representing modern society in a manner realistic without ceasing to be feminine and completely artistic. She was the forerunner of Miss Edgeworth and Jane Austen.

See Austin Dobson's *Fanny Burney* (1903), and his four-volume edition (1904-5) of her letters; also Frankfort Moore, *The Keeper of the Robes* (1911).

**Darboy**, GEORGES, an ill-fated Archbishop of Paris, was born 16th January 1813 at Fayl-Billot, in Haute-Marne. He was educated at the seminary of Langres, and four years after his ordination as priest (1836) was appointed a professor there. In 1845 he came to Paris, where his reputation as translator of Dionysius the Areopagite had preceded him. In 1854 he was made protonotary apostolic, in 1859 Bishop of Nancy, and in 1863 Archbishop of Paris. He strenuously upheld the Gallican theory of episcopal independence, and waged a long struggle with the Jesuits that lost him the favour of the holy see. At the Vatican Council he opposed with vigour the declaration of the papal infallibility, but when the dogma was finally adopted, was one of the first to set the example of submission. During the German siege of Paris he was unceasing in labours of benevolence, and during the brief but dreadful triumph of the Commune he refused to leave his flock. Arrested as a hostage by the Communards, 4th April 1871, he was shot in the court of the prison of La Roquette on the 24th of May. He died with the heroic courage of the Christian martyr, words of forgiveness on his lips, and his hands lifted in blessing as he fell. His two immediate predecessors had likewise died a bloody death—Sibour murdered during the celebration of a religious rite (January 3, 1857); Affre shot down on the barricades (June 1848). Darboy's body was reinterred in a stately public funeral, 5th June 1871. See Lives by Foulon (1889) and Price (1915).

**Darbyites**, a name often applied to the Plymouth Brethren (q.v.) from their principal founder, John Nelson Darby (1800-82), of whose collected writings thirty-two volumes have appeared (1867-83). See his *Personal Recollections* (1881).

**D'Arc**. See JOAN OF ARC.

**Dardanelles**, or HELLESPONT, a narrow channel separating Europe from Asia, and uniting the Sea of Marmora with the Archipelago. The name

is derived from the ancient city of Dardanus in the Troad, on the southern shore; and Dardanus was named from the Dardani, an ancient people farther inland. See DARDANUS. The strait extends from north-east to south-west, and has a length of about 40 miles, and a breadth varying from 1 to 4 miles. From the Sea of Marmora a strong current runs through the strait to the Archipelago. Both sides were strongly fortified till 1920. A treaty concluded between the five great powers and Turkey in 1841 arranged that no warship should pass without Turkey's consent, all merchant-ships being also required to show their papers. These provisions were confirmed at London in 1871 and at Berlin in 1878, in which year a British fleet had sailed into the Sea of Marmora. The Dardanelles is celebrated on account of Xerxes and Alexander having crossed, the former in 480 B.C. to enter Europe, and the latter in 334 B.C. to enter Asia. The point at which Xerxes crossed, by two bridges, was near Abydos, on the Asiatic shore, opposite to Sestos. Alexander crossed at nearly the same place; and here also young Leander nightly swam across to visit Hero—a feat performed in 1810 by Lord Byron. In the Dardanelles Lysander defeated Conon (at Ægospotami) in 405 B.C., and Adelaar (q.v.) the Turks in 1654. Admiral Duckworth got through in 1807, but the British and French failed in 1915. See WAR (GREAT). The treaty of Lausanne (1923) provided for the freedom of the straits in time of peace, and for neutrals when Turkey is at war.

**Dardanus**, a son of Zeus and Electra, daughter of Atlas, the mythical ancestor of the Trojans and Romans. Originally a king in Arcadia, he migrated to Samothrace, thence to Asia, where King Teucer gave him the site of his town, Dardania or Dardanus. He married a daughter of Teucer, and his grandson was the eponymous hero Tros, who removed his grandfather's Palladium to Troy.

**Dardistan**, a region of the North-west Frontier Province and Kashmir, consists of lofty mountains and high-lying valleys. It is little known, and its limits are variously given. But its interest depends mainly on the fact that its inhabitants, the Dards, are an Aryan people, speaking a Sanskritic tongue mixed with Persian words. They had been called 'Stray Aryans in Tibet,' and are Moslems converted from Buddhism at a comparatively recent period: the raja of Kashmir is constantly endeavouring to subject them completely to his authority. The chief districts are Hasora, Gilgit, and Tassin; some would also include Chitral (q.v.) in Dardistan. See Leitner's *Tour in Dardistan* (1867-70), and KASHMIR.

**Dar-es-salaam**, a seaport of Tanganyika Territory (q.v.), 45 miles S. of Zanzibar; pop. 25,000.

**Dares the Phrygian**. See TROY.

**Dar-fertit** is the name of the thinly peopled territory south of Dar-Fûr, beyond the Bahr-el-Arab, and north of the Niam-Niam country.

**Dar-Fûr**, a country of Central Africa, one of the divisions of the Sūdān or 'Land of the Blacks,' situated approximately in 10° to 16° N. lat., and in 22° to 28° E. long.; but its limits are not clearly defined. It is hilly in parts, and traversed by a mountainous ridge called Marra, which is the source of numerous streams. Towards the north it is level, sandy, and almost destitute of water. During the rainy season (June—September) it exhibits a rich vegetation. The principal products are wheat, millet, rice, maize, and sesame. Tobacco, which is used by the natives in every form, abounds. Water-melons, also, are abundant during the rainy season. Among the fruits are tamarinds and dates. The chief minerals are copper and iron. The wealth of the inhabitants consists principally in cattle. Horses, sheep, camels,

ostriches, and game abound. The 3,000,000 or so of inhabitants are mainly Fulahs (q.v.). Dar-Für, long a centre of the slave-trade, was annexed to Egypt in 1874-75, but suffered with the rest of the Sudan from the desolating tyranny of the Mahdi (q.v.) and his successor the Khalifa, till the defeat of the latter in 1898. It is part of Anglo-Egyptian Sudan. The sultan took up arms in 1916, but Col. Kelly occupied his capital, El Fasher. See EGYPT, SUDAN.

**Dargai**, a plateau in the Afridi country on the NW. Indian frontier, taken in a fight in which Gurmhas and Gordon Highlanders specially distinguished themselves, 21st October 1897.

**Dargan**, WILLIAM, railway projector, born in County Carlow, 28th February 1799, spent some time in a surveyor's office, and for a time was employed under Telford. He was a successful contractor, and became one of the first capitalists in Ireland. It was he who in 1831 contracted for the first railway ever executed in Ireland (the Dublin and Kingstown), and he was afterwards connected with most great Irish undertakings, such as the making of railways, canals, tunnels, and embankments. He was also an extensive holder of railway stock, a steamboat proprietor, flax-grower, farmer, and the main promoter of the Dublin exhibition of 1853, when he declined a baronetcy. He died 7th February 1867.

**D'Argens**, JEAN BAPTISTE DE BOYER, MARQUIS, born at Aix, in Provence, 1704, at the age of fifteen entered the army, but disabled in 1734 by a fall from his horse, and disinherited for his follies, he went to Holland and tried his fortune in authorship. Frederick the Great, then crown prince of Prussia, was attracted by his writings, and on his accession invited him to the court of Prussia. The king appointed him chamberlain and a director of the fine arts. When almost a sexagenarian he renewed the adventures of his youth by again falling a victim to the charms of an actress, whom he married without Frederick's permission. Deprived of his pension, he returned to Provence, and died near Toulon, 1771. His works fill 38 volumes. See his *Mémoires* (new ed. Paris, 1807).

**D'Argenson**, MARC PIERRE, COMTE, a celebrated French statesman, was born in 1696, the younger son of the Marquis d'Argenson (1652-1721) who created the secret police and established the *lettres de cachet*. After holding a number of inferior offices, he became war minister in 1743, at a time when the very political existence of France was imperilled, and by his vigour and lucky choice of generals changed the fortunes of the war in the course of a single year. After the peace of Aix-la-Chapelle (1748), he devoted himself to the improvement of the military system, and in 1751 established the École Militaire. He was an illustrious patron of literature. Diderot and D'Alembert dedicated to him their great *Encyclopédie*; and to Voltaire, whose fellow-student he had been, he furnished materials for his *Siècle de Louis XIV.* In 1757 he was banished to his estate by the machinations of Madame Pompadour; but on her death he returned to Paris, where he died in 1764.

**Daric**, a Persian gold coin named after Darius, weighing rather more than a sovereign.

**Dariel**. See CAUCASUS.

**Darien**, a name formerly applied to the entire isthmus now generally known as Panamá (q.v.). It is now more properly confined to the heavily-wooded hill-country lying between the Gulfs of Uraba on the north and San Miguel on the south. The former, a principal inlet of the Caribbean Sea, is commonly called the Gulf of Darien; and the inhabitants distinguish San Miguel as the Darien of the South. The southern extremity of the

northern gulf forms the Bay of Choco, into which the river Atrato (q.v.) debouches; the southern gulf receives the Tuira, after a course of 190 miles, of which over 100 are navigable. Little of the district, which is rich in gold, has yet been explored. There is, however, an active trade in tortoiseshell, pearls, and gold-dust, which the Indians readily barter for firearms and rum. These natives are said to number 20,000, are uncivilised, and as expert with the gun as were their ancestors with the bow. The capital of the district is Yaviza.

**Darien Scheme**, a disastrous speculation projected by William Paterson (q.v.), the founder of the Bank of England, was established by act of the Scottish parliament, and was sanctioned by royal authority in 1695. Its object was to plant a colony on the Atlantic side of the Isthmus of Panamá, and so form a commercial entrepôt between the eastern and western hemispheres. An entire monopoly of the trade of Asia, Africa, and America, for a term of thirty-one years, was granted to the Company. At that time, the foreign trade of Scotland had been ruined by the English Navigation Act of 1660, which provided that all trade with the English colonies should be conducted in English ships alone, so that when Paterson opened his subscription-list, the nobility, the gentry, the merchants, and people, royal burghs, and public bodies in Scotland all hastened to subscribe. No less than £400,000 was immediately put down on paper, of which £220,000 was actually paid up. Deputies in England received subscriptions to the amount of £300,000; and the Dutch and Hamburgers subscribed £200,000. The English parliament, however, actuated by a feeling of national antipathy, and the jealous clamours of trading corporations, gave its unequivocal condemnation to the scheme. The British resident at Hamburg, probably with the concurrence of William III., also made various insinuations against it. The result of this interference was the almost total withdrawal of the Dutch and English subscriptions. It must now be admitted that there was one fatal objection to the scheme—viz. the danger of settling on ground claimed by Spain, without coming to a proper understanding with that country beforehand. Unable, however, to see any sort of obstacles, incited by the vehement eloquence of Paterson, and dazzled by the magnificent proportions of the scheme, the Scotch hurried forward their arrangements. Five ships, with 1200 men on board, set sail from Leith for Panamá on the 25th July 1698. They reached their destination in four months, near what is still called Puerto Escoces (in 8° 50' N. lat.), and having bargained with the natives for a country which they called New Caledonia, the colonists fixed the site of what was to be their capital, New Edinburgh, and built a fort in its vicinity, which they named New St Andrews. Having thus constituted their colony, they issued a proclamation of perfect freedom of trade and universal toleration in religious matters to all who should join them. For the first few months they seemed to be on the highway to success. But the climate, which was tolerable in winter, became unbearable in summer, and many sickened under it; their supplies failed before they could derive a return from the soil; and on sending to the British colonies in America for provisions, they learned with the deepest indignation and despair that the British American colonies, having been informed that King William had not given his sanction to the expedition, had resolved to hold no intercourse with the new colony at Panamá.

Sickly and desponding, they waited long for supplies from the mother-country; but the Company at home was not aware of their wretched

condition, and none came. At length, having waited eight months for assistance, the colony broke up. In the meantime, 1300 colonists had set sail from Scotland, but ere they arrived the pioneers had fled. A Spanish force of 1500 men, and a squadron of 11 ships, immediately threatened the new-comers. Captain Campbell marched by night with a body of 200 Scots upon the Spanish camp, which he broke and completely dispersed. On returning to the fort, however, he found it invested by the Spanish squadron. The ammunition of the colonists had now become exhausted, and they were obliged to capitulate, the Spaniards granting honourable terms. Not more than thirty of the colonists, among whom was Paterson, who was rendered for a time insane by his dreadful misfortunes, ever came back to Scotland. The scheme and its collapse caused unprecedented excitement in Scotland from 1695 till 1703, when the last of the adventurers reached home, and contributed to render the union of the kingdoms highly unpopular. It has been fairly contended that, but for the hostility of the king and the jealousy of the English companies, the scheme might have led to enormous extension of British commerce and British territory. And it should be remembered that a Panama Canal was included in the plans of the far-seeing projector. The books and other documents which had belonged to the Company are preserved in the Advocates' Library. See J. H. Burton's *Darien Papers*, printed by the Bannatyne Club (1849), his *History of Scotland*, vol. viii., Warburton's novel *Darien*, and J. S. Barbour's *Paterson and the Darien Company* (1907).

**Dario**, RUBÉN, otherwise Felix Rubén García Sarmiento, Spanish-American poet and prose-writer, was born in 1867 in the Nicaraguan department of Segovia. His wandering career of journalism, amours, and diplomatic appointments began very precociously, and was cut short by pneumonia at León, Nicaragua, 6th February 1916. He had lived much in Chile, Argentina, and Europe. His writings include *Azul* (prose and verse), *Los Raros* (prose, 1893), *Prosas Profanas* (verse, 1896), *Cantos de Vida y Esperanza* (1905), *El Canto Errante* (1907), and an autobiography (1912). Influenced by the Greeks, and especially by the French Parnassians and Symbolists, he gave new metres, a new melody, a new vitality to Spanish poetry, and added to its stores many poems of great beauty, force, and splendour. Sometimes, however, his sumptuousness is overpowering.

**Darius** (*Dāryavus*, Heb. *Dārēyāvesh*), the name of three kings of Persia. **DARIUS I.** (*Hystaspis*), born in 548 B.C., was the son of Hystaspes (Vish-tāspa, in the Babylonian cuneiform *Ustaashpi*), of the family of the Achæmenides, and succeeded to the Persian throne in 521, after putting to death the Magian Gaumâtâ (the Pseudo-Smerdis of the Greeks), who gave himself out to be Bardes, brother of Cambyses. We possess accurate accounts of his reign through a contemporary monument, the great trilingual inscription on the rock of Behistun (q.v.). He is there represented with his foot on the body of Gaumâtâ, and with nine conquered rebels in front of him, the first three from Susiana, Babylon, and Media, the ninth a Scian, with the characteristic pointed hat mentioned in Herodotus, vii. 64. The inscription states that his father, Hystaspes, was the great-grandson of Teispes, who was the son of Achæmenes. Darius had for several years to contend with revolts in all parts of his empire. Babylon resisted him with especial obstinacy under Nidinta-Bel for nearly two years (520-19), and revolting a second time, under Arakha, was again taken (514). He

then reorganised the Persian empire, removing the seat of government to Susa, dividing his dominions into more than twenty satrapies, establishing a regular system of taxation, and providing facilities for communication and trade; while he also pushed his conquests as far as the Caucasus and the Indus. The Indian province paid into the exchequer £1,290,000 a year; Babylonia, £290,000; while other eighteen satrapies contributed altogether £1,674,000. In his expedition against the Scythians in 515, after carrying 700,000 men across the Bosphorus on a bridge of boats, and subduing Thace and Macedonia, he was led on by the retreating Scythians as far as the Volga, and returned to the Danube with the loss of 80,000 of his warriors. He returned to Susa, leaving Megabazos in Thrace with a large part of his army. His first expedition against the Athenians miscarried through the wreck of his fleet at Mount Athos in 492; the second was decisively defeated at Marathon (q.v.) in 490. He died in 485, before the Egyptian revolt (487) had been subdued, and in the midst of his preparations for a third expedition against the Athenians, and was succeeded by Xerxes (q.v.). Darius was a Persian by birth, and bred in the Zoroastrian faith, which under him and his successors became the state religion of the empire. He is mentioned in the Old Testament as permitting (520) the erection of the second temple at Jerusalem, which was completed in the sixth year of his reign (515).

**DARIUS II.** (*Ochus*, called by the Greeks *Nothos*, 'bastard'), illegitimate son of Artaxeies I., in 424 B.C. snatched the crown from Sogdianus, his also illegitimate brother, who had put to death the legitimate brother, Xerxes II. He was entirely under the influence of the eunuchs and women of his harem, especially his cruel and depraved step-sister and spouse Parysatis; and his reign was a long series of miseries and crimes. The numerous revolts were cruelly put down, except that of Amyrteus, satrap of Egypt, who was independent from 414 to his death in 408. After the failure of the Sicilian expedition of the Athenians in 415, Darius seized the opportunity to break the humiliating treaty of 449. Through the satraps of Asia Minor, Tissaphernes and Cyrus, younger son of Darius and Parysatis, he gave so much support to the Spartans against the Athenians in the Peloponnesian war as turned the scale to the side of the former. He died at Babylon in 405, and was succeeded by his eldest son, Artaxerxes II.

**DARIUS III.** (*Codomannus*), the last king of the Persians, son of the Achæmenid Arsanes by Sisymbis, daughter of Artaxerxes II. (q.v.). He is briefly designated as 'Darius the Persian' in Nehemiah, xii. 22, and in the 1st Book of Maccabees is called 'King of the Persians and Medes.' Artaxerxes III. had been poisoned by Bagoas in 338, and the speedy death of his son and successor, Arses, prepared the way for Darius III., who began to reign in the same year as his conqueror Alexander the Great (336). Defeated at the Granicus (334), at Issus (333), and at Arbela (331), the handsome and gentle king was betrayed and slain during his flight by one of his satraps (330). See **ALEXANDER THE GREAT**.

**DARIUS THE MEDE**, mentioned in the Book of Daniel, cannot with certainty be identified with any historical king.

**Darjiling**, or **DARJEELING**, a sanitary station in the Lower Himalayas, and administrative headquarters of Darjiling district, is situated on a narrow ridge, at an elevation of 7167 feet above the sea. It has a fine sanatorium (1883), a good water-supply, and is an increasingly popular summer-resort for visitors and invalids. The fashionable month is October, after the rains, when the clear

atmosphere shows at its best a view of unsurpassed extent and grandeur. Pop. 19,000.—**DARJILING** is the most northerly *district* of the Rajshahi division of Bengal, divided from independent Sikkim by a series of rivers and mountain-torrents; area, 1164 sq. m.; pop. 266,000, mostly Nepalis and other aboriginal or semi-aboriginal tribes, attracted to the district by the increased demand for labour on the railway and in the tea-gardens. With a surface divided between the Lower Himalayas and the marshy sub-montane strip, the scenery of the district is magnificent; up to 12,000 feet the ridges are clothed with valuable forests, and on the higher slopes the rhododendron grows in gorgeous luxuriance. The climate is excessively humid, but not unhealthy. Food-crops are raised, and there is a trade with Tibet and Nepal; but the staple industry is the cultivation of tea. The district suffered from earthquake in 1899.

**Dark Ages.** See AGE.

**Darlaston**, an urban district of Staffordshire, in the parliamentary borough of Wednesbury, with ironworks and coal; pop. 18,000.

**Darley**, FELIX OCTAVIUS CARR, born at Philadelphia 23d June 1822, early gave himself to drawing, and devoted himself especially to book illustration. His earliest important work was a series of drawings for the *Library of Humorous American Works*. He went to New York (1848), where his outline drawings to Washington Irving's *Legend of Sleepy Hollow* and *Rip Van Winkle* spread his reputation. Later works are his illustrations of Judd's *Margaret*, and to Cooper's, Dickens's, and Simms's novels. In 1868, after some years' residence in Europe, he published *Sketches Abroad with Pen and Pencil*. He died 26th March 1888.

**Darley**, GEORGE (1795-1846), poet and mathematician, was born in Dublin, and educated there at Trinity College. Launching himself on literature and on London, he published (1822) *The Errors of Ecstasie*, a blank-verse dialogue between a mystic and a muse. He became one of the writers for the *London Magazine*, in which papers on the English dramatists appeared, as also his best story, *Lilian of the Vale*, with the well-known song, 'I've been roaming.' Some other tales were included in a volume of *Labours of Idleness* (1826). His *Sylvia, or the May Queen* (1827), is mentioned by Lamb as a 'very poetical poem.' And it was about the same date (1826-28) that he produced well-known manuals of geometry, algebra, and trigonometry, as well as a *Geometrical Companion*, with very ingenious illustrations. On the staff of the *Athenæum*, Darley showed himself a severe critic, notably in a savage onslaught on Talfourd's *Ion*. His poems *Nepenthe* and *The Lammergeyer* were circulated privately, and his latter years (clouded by melancholy) saw the publication of two dramas, *Thomas à Becket* (1840) and *Ethelstan* (1841). A profound student of the older English literature, he edited Beaumont and Fletcher's plays in 1840; and so greatly was his style influenced by 17th-century models that Palgrave inserted in the *Golden Treasury* his fine verses, 'It is not Beauty I demand,' as the work of an anonymous writer of that age. His poems were edited by Ramsay Colles in 1908.

**Darling**, a tributary of the Murray River (q.v.).

**Darling**, GRACE, was the daughter of William Darling (1795-1860), lighthouse-keeper on Longstone, one of the Farne Islands, and was born at Bamborough, 24th November 1815. Before dawn on the morning of the 7th September 1838, the *Forfarshire*, bound from Hull to Dundee, with sixty-three persons on board, struck among the Farne Islands, and in fifteen minutes forty-three

persons were drowned. Darling and his daughter, at great risk, brought their boat to where the nine survivors crouched, and with help from the shipwrecked crew, the solitary woman and four men were safely taken to the Longstone; two of the men returned with Darling, and succeeded in bringing the remainder. The brave deed provoked much enthusiasm; father and daughter received medals and large gifts, and Grace became a heroine. But she did not long survive her exploit, dying of consumption, 20th October 1842. See *Grace Darling, her True Story* (1880), and her father's *Journal* (1886).

**Darling**, SIR RALPH (1775-1859), who served in the West Indies and was deputy adjutant-general in the Walcheren Expedition, was governor of New South Wales in 1825-31. He was accused of excessive severity and of favouritism in disposing of crown-lands, was recalled, but acquitted by a parliamentary committee, and knighted. After him have been named the river Darling; the Darling Range, in Western Australia (q.v.); the Darling district in the south-western corner of New South Wales; and the Darling Downs, the richest district of Queensland, an upland country on and about the summit of the Dividing Range.

**Darlington** was in the 12th century known as Dernington, and was later shortened to Dertoun (where the Scottish poet Dunbar in the 15th century describes himself as having preached) or to Darnton. It is a parliamentary and county borough in the south of the county of Durham, on a slight elevation overlooking the Skerne near its junction with the Tees, 23 miles S. of Durham, and 45 NNW. of York. The chief industry of the place is connected with the extensive locomotive works, which give employment to many workers. There are iron and steel works, works for iron and steel bridge-making, for railway wagons, iron and brass foundries, breweries, tanneries, and wool-mills. Pop. (1821) 6551; (1851) 11,228; (1881) 35,102; (1921) 65,866, of whom many are connected with the Society of Friends, long a prominent and influential element amongst the inhabitants. Darlington was in 1867 created a parliamentary borough, sending one member to parliament. Its prosperity dates from the opening, on 27th September 1825, of the Stockton and Darlington Railway, which was the first passenger-line on which a locomotive-engine was employed; and that locomotive now stands on a pedestal inside the station. From the 11th century onwards the town belonged to the bishops of Durham, and till 1867 a borough bailiff, appointed by the bishop, managed its affairs; in that year it obtained a charter of incorporation. St Cuthbert's collegiate church, a very fine specimen of Early English, was founded in 1160 by Bishop Pudsey, and was restored by Sir G. G. Scott in 1869. It has three beautiful sedilia, and a tower 180 feet high. Among the chief modern erections are the other churches (Anglican, Presbyterian, Roman Catholic, and other), the spacious railway station, a grammar-school, a high school for girls, a British and Foreign School Society's college for female teachers, and a technical college. A free library was opened in 1885, for which Mr Edward Pease had bequeathed £10,000. At Oxen-le-field, 3 miles from Darlington, are curious cavities of unknown origin, called Hell Kettles; and near Darlington was the seat of George Allan the antiquary (1736-1800).

**Darlingtonia**, a genus of one species, an American Pitcher-plant, belongs to the family of Sarraceniaceæ (q.v.). See INSECTIVOROUS PLANTS.

**Darmesteter**, JAMES (1849-94), orientalist, was born at Château-Salins, department of Moselle (Lorraine), of a Jewish family originally—as the name indicates—from Darmstadt. He was edu-

cated at Paris, in 1875 wrote a thesis on the Avesta, crowned by the Institute, and became a conspicuous member of the Société Asiatique. He was professor of Zend at the Ecole des Hautes Études (1877) and at the Collège de France (1885). In 1883 he published *Études Iranienues*, followed by works on the Mahdi, on Persian popular poetry, and on Afghan folk-songs (the fruits of a government mission to India). His principal works were a series of books on the Zend-Avesta, including a translation of the great part of it in *The Sacred Books of the East*. He held that much of the Avesta has a late origin (see ZEND). In a volume on the Hebrew Prophets, he advocated a return to Hebrew monotheism. He also wrote *Essais de Littérature Anglaise*, edited two volumes of philological articles by his brother Arsène, and translated into rhythmical French a selection of the poems of Agnes Mary F. Robinson, whom he married in 1888. Mme. Darmesteter was born at Leamington in 1857. In 1901 she married Professor Duclaux, who died in 1904. She has written a long series of books of admirable poetry, lyrical and other, translations from Euripides, a novel (*Arden*), and *Lives of Emily Brontë* (1883), Renan (1897), Hugo (1921), &c.—His brother, ARSÈNE (1846–88), trained to be a rabbi, passed to the study of mediæval French, in which he soon became the recognised authority, and began the great dictionary in collaboration with M. Hatzfeld.

**Darmstadt**, a town of Germany, capital of Hesse, on the small river Darm, 15 miles S. of Frankfurt-on-Main. The streets of the old town are narrow, but those of the new town exhibit many imposing specimens of architecture. Darmstadt has several public squares, and fine public gardens and promenades. Besides the arsenal, the barracks, and the various religious edifices, it possesses two palaces. One of these, the old ducal palace, contains museums of painting, natural history, and archaeology, and a library of 600,000 volumes; in the other, Prince Charles's palace, is Holbein's famous 'Meyer Madonna.' The post-office dates from 1881, the theatre from 1871, the museum from 1905. There are manufactures of chemicals, iron, and machinery; and a trade in iron, petroleum, fruit, flour, and wine. But the place depends more on its government offices than on its industries. Pop., with suburb of Bessungen, (1875) 44,088; (1890) 56,399; (1900) 72,381; (1910) 87,089; (1919) 83,550.

**Darnel** (*Lolium temulentum*), an annual grass of the same genus with Rye-grass (q.v.), common as a weed in cornfields in England and many parts of Europe. Probably the tares of the parable, it is reputed (though some authorities deny the fact) to have a narcotic poisonous seed. See RAPHAŊIA.

**Darnétal**, a town in the French department of Seine-Inférieure, 2½ miles E. of Rouen, with manufactures of cotton and woollen goods, dye-works, bleach-works, &c.; pop. 7300.

**Darnley**. See MARY QUEEN OF SCOTS.

**Dart**, a river of S. Devonshire, flows 35 miles south-eastwards from Dartmoor to the English Channel, which it enters by an estuary on which stands Dartmouth.

**Darter** (*Plotus*), a genus of fresh-water diving birds nearly related to the cormorants, represented in warm regions of America, Africa, Asia, and Australia. As in cormorants, gannets, and pelicans, the four toes are united in a web. The bill is long and sharp, the edges of the mandibles are serrated, and there is a very remarkable spring-like arrangement in the neck—all adaptations to the fish-catching habits. The American species (*Plotus ankinga*) is often called the snake-bird.

The darters have a laboured flight, but swim and dive to perfection. They are sociable birds, and usually nest in colonies, on trees and bushes near the water.

**Dartford**, a thriving urban district of Kent, in the narrow valley of the Darent, 2 miles above its influx to the Thames, and 17 ESE. of London. Edward III. here founded an Augustinian nunnery (1355); St Edmund's chantry was a great place of pilgrimage; and at Dartford Wat Tyler commenced his rebellion (1381). The church, with a Norman tower, was restored in 1863; among its interesting monuments is one to Sir John Spielman, Queen Elizabeth's jeweller, who in 1588 established at Dartford what is said to have been the first paper-mill in England. Paper is still manufactured, besides steam-engines and machinery, gunpowder, &c. The modern buildings include a county court-house (1859), assembly-rooms (1860), a physical training college, and, in the neighbourhood, two great mental hospitals. Pop. (1851) 6224; (1881) 10,163; (1921) 26,005.

**Dartmoor** is a great granitic upland in Devonshire, the source, with two exceptions, of all the principal rivers of the county, remarkable alike for its wild and rugged scenery, its antiquities, its wide, solitary, trackless wastes, and its mineral products. It is upwards of 130,000 acres in extent, the extreme length from north to south being 25 miles, and the extreme breadth from east to west 20 miles. The outline is irregular. The central portion is the ancient royal forest of Dartmoor, and this is surrounded by a belt of open country, once known as the 'Commons of Devonshire,' portions of which have been inclosed. The attempts to cultivate Dartmoor itself have been very few, and the northern quarter for miles shows no trace of man, but the valleys through which the rivers descend to the lowland country are singularly fertile, and at times full of beauty. The moor itself affords valuable mountain pasture to cattle, sheep, and large numbers of half-wild ponies. The forest rights belong to the duchy of Cornwall; but there are rights of pasture exercised by holders of what are called venville tenures in certain parishes bounding the moor, which date prior to the Norman Conquest.

The average height of Dartmoor above the sea is upwards of 1200 feet, but its highest point, High Willhayes, is 2039 feet; and the next, Yes Tor, 2028. The hills are commonly called *tors*, and for the most part have granite crests, weathered into grotesque and picturesque shapes. The whole of Dartmoor is of granite, protruded between the close of the Carboniferous and the opening of the Triassic period. Devonian rocks mantle round its southern extension, and Carboniferous round its northern, associated at various points with gabbros, dolerites, and other intrusive rocks. The granite is chiefly gray, but there are rich red varieties, as at Trowlesworthy. Large quantities of the ordinary stone have been quarried, especially at Hey Tor and King Tor. Dartmoor is rich in minerals. Tin has been raised for many centuries, long before the dawn of history, by streaming in the valleys, and vestiges of the ancient mining operations of the 'old men' abound. Copper, iron, and manganese have also been worked, but mining is now carried on at a few points only. Gold has frequently been found in the river-beds. The tinners of Devon had a quasi-corporate existence in Saxon times, and their rights were confirmed by King John and other monarchs. The Stannary Parliaments, in which they managed their affairs, were held in the open air on Crockern Tor. The most important mineral product of Dartmoor at the present day is china-clay, or kaolin, which is the result of the decomposition of the felspar

of the granite. The largest china-clay works in England are at Lee Moor, and are connected by a tramway with wharves at Plymouth.

The fauna and flora of Dartmoor have many points of interest. Trees are very rare; but there is a very singular group of gnarled and stunted oaks on a slope overlooking the West Dart, near Crockern Tor, of high antiquity and weird aspect, which has been called one of the 'wonders of the moor'—'Wistman's Wood.'

The chief rivers rise at a height of over 1800 feet above the sea, in a wide stretch of peat-bog around Cranmere Pool—the Dart, Teign, Taw, Okement, Lyd, Tavy, and Walkham. From the morasses of the southern quarter spring the Plym, Yealm, Erme, and Avon.

Dartmoor is unrivalled in England in the extent and character of its prehistoric and rude stone antiquities—earthworks, barrows, kistvaens, menhirs, lines or avenues, cyclopean bridges, circles, trackways, and pounds or enclosures of stones, sometimes containing the remains of villages. Many stone implements have been found. On several of the tors there are rock basins, formerly called Druidical, but now assigned to the operation of natural causes.

The chief centre of population is Prince Town, named after George IV. when Prince Regent. Here a prison was built (1806) during the war with Napoleon, for the reception of prisoners of war. When the war ended it was abandoned, and was at one time used for the manufacture of naphtha from peat, which failed. In 1850 the buildings were adapted to the purpose of a convict prison. Attached is a fertile reclaimed farm. A very picturesque railway runs to Prince Town.

See Rowe's *Perambulation of Dartmoor* (1856; 3d ed. 1896); Beatrix F. Cresswell, *Dartmoor and its Surroundings* (1898); Baring-Gould, *A Book of Dartmoor* (1900); and the writings of Eden Phillpotts.

**Dartmouth**, a seaport and municipal borough (till 1867 also parliamentary) in the south of Devonshire, 32 miles S. by W. of Exeter. It is built in picturesque terraces on a steep slope 300 to 400 feet high, on the right bank of the romantic estuary of the river Dart, at a short distance from the sea. The streets are narrow, and many of the houses very old, with overhanging stories, projecting gables, and wood-carvings. St Saviour's Church (*circa* 1372) has a richly sculptured, painted, and gilt stone pulpit, and a beautifully carved rood-loft. A battery, and the remains of a castle built during the reign of Henry VII., stand at the entrance to the harbour. Pop. 7000. Dartmouth has a Royal Naval College (1905) and some trade. It builds yachts and boats, and is a favourite yachting station—the harbour being deep and landlocked. On the other side of the river is Kingswear, the terminus of a branch of the Great Western Railway. At Dartmouth, in 1190, the Crusaders, under Richard Cœur-de-Lion, embarked for the Holy Land. The French burned it in Richard's reign, but were repulsed, chiefly by the women, in an attack in 1404. In 1346 Dartmouth furnished 31 ships for the siege of Calais. In 1643 Prince Maurice besieged and garrisoned it; but in 1646 Fairfax stormed and took it. Sir Humphrey Gilbert, John Davis, and Newcomen may be accounted Dartmouth worthies, as having been born in or quite near the town (see the articles on them). Dartmouth has now a share in training naval cadets (see NAVY).

**Dartmouth College.** See HANOVER (U.S.).

**Daru**, PIERRE ANTOINE, COMTE, writer and financier, born at Montpellier 12th January 1767, entered the army, but was imprisoned during the Terror. Under Napoleon he was Intendant-

general in Austria and Prussia, and a councillor of state, while in 1818 Louis XVIII. made him a peer. Thenceforth he devoted himself exclusively to letters. He died a member of the Institute and of the Academy of Sciences, 5th September 1829. Of his many books the chief are *Cleopédie* (1800), a spirited poem; *Histoire de la République de Venise* (7 vols. 1819-21); and *Histoire de la Bretagne* (3 vols. 1826).—His son, NAPOLEON DARU (1807-90), opposed the *coup d'état*, and was proscribed; but became a member of the National Assembly in 1871, of the senate in 1876.

**Darwaz.** See BOKHARA.

**Darwen**, a municipal borough of Lancashire, on the river Darwen, 3½ miles S. of Blackburn, and 9 N. of Bolton. Cotton is the staple manufacture; then come paper-making and paper-staining; and to these and other industries, with its water facilities, and the neighbouring coal-mines and stone quarries, Darwen owes its rapid growth and its well-being. It was incorporated in 1878. Chief buildings are the free library, market hall, co-operative hall, and the public baths, erected in memory of Sir Robert Peel. Pop. 38,000.

**Darwin.** See PORT DARWIN.

**Darwin**, CHARLES ROBERT, naturalist, the discoverer of the principle of natural selection, was born at Shrewsbury, February 12, 1809. His grandfather was Dr Erasmus Darwin, and his father Dr Robert W. Darwin, F.R.S. His mother was a daughter of Josiah Wedgwood, the celebrated potter. Darwin was educated at Shrewsbury grammar-school, studied at Edinburgh University for two sessions in 1825-6-7, and entered at Christ's College, Cambridge, in 1828. Already at Edinburgh he had become a member of the local Plinian Society; he took part in its natural history excursions, and read before it his first scientific paper—a new contribution to our knowledge of the *Flustra* or sea-mats. It was at Cambridge, however, that his biological studies seriously began. Here he became acquainted with Professor Henslow, the well-known botanist, who encouraged his interest in botany and zoology. His chief taste at this time was for geological research. In 1831 he took his degree of B.A., and shortly after was recommended by Henslow as naturalist to the expedition of H.M.S. *Beagle*, under Captain (afterwards Admiral) Fitzroy, R.N., then about to start for a scientific survey of South American waters. He sailed on 27th December 1831, and did not return to England from his long cruise till 2d October 1836. Meanwhile he visited Teneriffe, the Cape Verde Islands, the Brazilian coast, Monte Video, Tierra del Fuego, Buenos Aires, Valparaiso, and the Chilean region, the Galápagos Archipelago, Tahiti, New Zealand, Tasmania, and the Keeling Islands, in which last he laid the foundation for his famous theory of coral reefs. It was during this long expedition that Darwin obtained that intimate knowledge of the fauna, flora, and geological conditions of many tropical, subtropical, and temperate climates which so admirably equipped him at last for the great task he was afterwards to perform in settling the factors of biological evolution.

On his return to England in 1836, he set to work to co-ordinate the results obtained during his voyage. He formed the friendship of Sir Charles Lyell and other scientific leaders, by whose aid he was appointed secretary of the Geological Society in 1838. A year later, he was elected to the fellowship of the Royal Society, and early in 1839 he married his cousin, Miss Wedgwood. In the same year he published his *Journal of Researches into the Geology and Natural History of the various Countries visited by H.M.S. Beagle*. From 1840 to 1843 Darwin was occupied with the publication of the *Zoology of the*

*Voyage of the Beagle*, under government auspices, to which great work (compiled by the leading specialist authorities of the day) he himself contributed an introduction and many notes. In 1842 appeared his work on *The Structure and Distribution of Coral Reefs*; in 1844, *Geological Observations on Volcanic Islands*; and in 1846, *Geological Observations on South America*. These works placed him at once in the front rank of contemporary scientific thinkers. In 1851-53 appeared his valuable treatise on barnacles, *A Monograph of the Cirripedia*.

Three years after his marriage Darwin settled at Down, near Beckenham, in Kent, where for the rest of his days he passed his time as a country gentleman among his conservatories, his pigeons, his garden, and his fowls. The practical information thus gained (especially as regards variation and interbreeding) was of invaluable use to him in his later researches. Private means enabled him to devote himself unremittingly henceforth, in spite of continuous and distressing ill-health, to the pursuit of science. It was at Down that Darwin began to occupy himself with the great work of his life—the problem of the origin of species. In 1837 he had already set out to accumulate facts and observations for this purpose. After five years' unremitting work, he 'allowed himself to speculate' on the subject, and drew up some short notes, which he enlarged in 1844 into a sketch of conclusions for his own use. These conclusions embodied in embryo the famous principle of natural selection, the germ of the celebrated Darwinian Theory (q.v.). With constitutional caution, however, Darwin delayed publication of his hypothesis, which was only at length precipitated many years later by an accidental circumstance of a romantic character. In 1858 Mr Alfred Russel Wallace, the distinguished explorer, sent home from the Malay Archipelago a memoir addressed to Darwin himself, for presentation to the Linnean Society. On opening this packet, Darwin found to his surprise that it contained in essence the main idea of his own theory of natural selection. Sir Charles Lyell and Sir Joseph Hooker, to whom he communicated the facts, persuaded Darwin to read a paper of his own concomitantly with Wallace's before the Linnean Society, which was accordingly done on July 1, 1858. Urged forward by this strange coincidence, Darwin set to work seriously at once to condense his vast mass of notes—the labour of a lifetime—and put into shape his great work on *The Origin of Species by means of Natural Selection*, published in November 1859. For an account of the main ideas there promulgated, see DARWINIAN THEORY. The book itself, an epoch-making work, was received throughout Europe with the deepest interest, was violently attacked and energetically defended, but in the end succeeded in obtaining recognition (with or without certain reservations) from almost all competent biologists. From the day of its publication Darwin continued to work on unremittingly at a great series of supplemental treatises, in which his main principles were still further enforced and enlarged, while minor corollaries were brought prominently into view. *The Fertilisation of Orchids* appeared in 1862, *The Variation of Plants and Animals under Domestication* in 1867, and *The Descent of Man* in 1871. The last-named work, hardly less famous than the *Origin of Species*, derives the human race from a hairy quadrumanous animal belonging to the great anthropoid group, and related to the progenitors of the orang-utan, chimpanzee, and gorilla. In this book Darwin also developed his important supplementary theory of sexual selection, which on the whole has been received by scientific thinkers with less favour than his other ideas. His later works are *The*

*Expression of the Emotions in Man and Animals* (1873), *Insectivorous Plants* (1875), *Climbing Plants* (1875), *The Effects of Cross and Self Fertilisation in the Vegetable Kingdom* (1876), *Different Forms of Flowers in Plants of the same Species* (1877), and *The Power of Movement in Plants* (1880). His last work, *The Formation of Vegetable Mould through the action of Worms*, appeared in 1881. In it Darwin showed grounds for believing that the vegetable mould which covers a large part of the globe is mainly due to the castings of earth-worms, without which the greater portion of the land surface of the world must necessarily consist of barren rock or thirsty sand.

It is, however, as the great leader of evolutionary biology that Darwin will be mainly remembered among men. Though not (as is commonly, but erroneously, believed) himself the originator of the evolution hypothesis, nor even the first to apply the conception of descent with modification to plant and animal organisms, Darwin was undoubtedly the first thinker to gain for that conception a wide acceptance among biological experts. By adding to the crude evolutionism of Erasmus Darwin, Lamarck, and others, his own specific idea of natural selection, he supplied to the idea a sufficient cause, which raised it at once from the level of a hypothesis to the grade of a verifiable theory. His kindness was as striking as his honesty and devotion to truth. He died 19th April 1882, and was buried in Westminster Abbey.

See his *Life and Letters* (1887; with *More Letters*, 1903) by his son, SIR FRANCIS, F.R.S. (1848-1925), botanist, president of the British Association in 1908.—An elder son, SIR GEORGE HOWARD, F.R.S., K.C.B. (1845-1912), from 1883 professor of Astronomy at Cambridge, distinguished for his work on tides, tidal friction, the equilibrium of rotating masses, and geodesy, was president of the British Association in South Africa in 1905. See his *Tides* (1898) and *Collected Papers* (1908-11).

**Darwin, ERASMUS**, was born 12th December 1731, at Elston Hall, near Newark; entered St John's College, Cambridge, in 1750, and studied medicine at Edinburgh. After an unsuccessful attempt to establish a practice at Nottingham, he removed to Lichfield, where he married and became a popular physician and prominent figure from his ability, his radical and free-thinking opinions, his poetry, his eight-acre botanical garden, and his imperious advocacy of temperance in drinking. After his second marriage in 1781, he settled in Derby, and then at Breadsall Priory, where he died suddenly 18th April 1802. Darwin had once a great reputation as a physiologist, but his system is, for the most part, inconsistent, baseless, and untenable. At the same time, many of his ideas are original, suggestive, and contain within them the germs of important truths. His strength and his weakness lay in his faculty for seeing analogies in nature. Sometimes he is exceedingly happy in his discoveries; at other times he is quite fantastical. The same remarks hold good as regards his verse, where, amid the frequent extravagance and incomprehensibility of his notions, there burst forth strains of genuine poetry. *The Loves of the Plants* (1789), a part of his chief poem, the *Botanic Garden*, was happily burlesqued in the 'Loves of the Triangles' in the *Anti-Jacobin*. Interest in Darwin's speculations has been revived by the recognition of his partial anticipation of Lamarck's views on evolution, and so of his own famous grandson's. His chief works are *Zoonomia* (1794-96), and his *Phytologia* (1799). See his *Life* by Charles Darwin, prefixed to Krause's essay (1879), and works by Brandl (1902 and 1909). By his first wife he was grandfather of Charles Darwin; by his second, of Francis Galton.

**Darwinian Theory**, the explanation of the evolution of forms of life on our planet, offered by the great naturalist, Charles Darwin (q.v.). From the very outset we must carefully guard against the confusion, still widely popular, of 'Evolution' with 'Darwinism.' Evolution must clearly be retained to denote the entire drama of cosmic change; Darwinism, therefore, must as clearly be restricted to one particular interpretation of the mechanism and plot of this cosmic drama, of many which have been thrown out by reflective spectators. Darwin expressed the mode of the evolutionary process in a classic phrase, the title of his great work—*The Origin of Species by means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. That explanation is not only in itself peculiarly shrewd and well reasoned, luminous and widely applicable, but has been of the very greatest importance in awakening biologists and students of all other sciences, and thus ultimately the intelligent public, to the facts of the case—to the consciousness of this evolutionary drama. On the promulgation of this new hypothesis as to the mode of occurrence of evolutionary changes in the organic world, the whole discussion as to the occurrence of evolutionary change at all speedily came to centre round it; although in view of the powerful arguments for the occurrence of evolution which had been independently adduced by Spencer and others, it may be admitted this was not quite logical. The fact, however, remains. Moreover to the new standpoint afforded by the clear acceptance of both ideas—evolution and this through natural selection—and to the energetic application of these, first by Darwin himself, but soon by a multitude of zealous workers, we owe a progress which it would as yet be premature to estimate, but which has pervaded the whole field of biology, and even the fields of all the higher sciences, mental and social, which so largely utilise biological methods and generalisations. Whatever may be the subsequent development of our evolutionary conceptions, the epoch-making importance of the Darwinian theory will be unaltered. Hence the expediency of the present comparatively full exposition of its main positions and of their bearings, apart from the larger and more general argument under EVOLUTION.

To the statement of Darwin's theory, therefore, we may at once proceed, postulating no more than that general acquaintance with the aims and results of biology which is now becoming so commonly current, or which may readily be gained by help of the articles BIOLOGY and BOTANY. Nor need any statement of the general doctrine of evolution, or of evolutionary theories before Darwin, here detain us, since these find more fitting place in the general article EVOLUTION.

The failure of pre-Darwinian theories to gain any very general acceptance among naturalists was no doubt largely attributable to established prejudice, backed as this was by the predominant authority of Cuvier. This was by no means the whole explanation. For while those theories rendered it extremely probable that modification had occurred, they all fell short, as Darwin pointed out, in one most important particular. They failed to show how the modification of one species from another could take place, 'so as to acquire that perfection of structure and co-adaptation which justly excites our admiration;' since the hypotheses of the potency of external conditions, of habit, of the volition of the organism itself, and so on, alike successively broke down.

Darwin was especially struck by the distributional phenomena he witnessed during his 'Naturalist's Voyage,' and thereafter devoted himself primarily to the problem of the origin of

species, specially concentrating himself upon what seemed to him the weakest point of the preceding theories, the explanation of adaptations. Commencing in 1837, 'after five years' work, I allowed myself to speculate on the subject, and drew up some short notes; these I enlarged in 1844 into a sketch of the conclusions which then seemed to be probable; from that period to the present day I have steadily pursued the same object.' This was written as late as 1859, and even then because he had received a paper from A. R. Wallace (at that time exploring the Malay Archipelago), in which views identical with his own were expressed, and thus was compelled to proceed to the publication of his results. He did so first in a brief outline read, by advice of Lyell and Hooker, simultaneously with Wallace's paper (see *Jour. Linn. Soc.*, 1858); and in the following year in that fuller abstract, as at first he merely regarded it, which soon became so famous—the *Origin of Species*. Its substance may with advantage be briefly summarised, so far as further compression of such 'intellectual pemmican' is possible. For details and explanations the reader must consult the work itself (7th ed. 1880).

*Outline of 'Origin of Species.'*—In order to gain insight, then, into the means of modification, Darwin commences with a study of the variation of plants and animals under domestication (later expanded into a separate work; 2d ed. 1876).

*Variation and Heredity.*—While all plants and animals exhibit some degree of variation, this is greatest among domesticated species, owing to their new and less uniform conditions of life. These may act directly on the whole organisation, or on separate parts, and the variation, though rarely, is sometimes definite, as when size increases with quantity of food, or colour changes with its quality; or the conditions may act indirectly by influencing the reproductive system, which is peculiarly sensitive. Changed habits produce an inherited effect—e.g. the leg-bones of the common duck weigh proportionally more, and its wing-bones less, than in the wild variety, because it flies less and walks more. So, too, tame mammals acquire drooping ears, since these are rarely pricked in alarm. One variation is usually correlated with others, thus long-beaked pigeons have small feet, and conversely. All variations tend to be inherited. The popular belief that domestic races simply revert to the aboriginal stock is unsupported by facts.

Save that domestic varieties are less uniform than wild species, often differ more widely in some single part, and are fertile when crossed, there is no well-marked distinction between these and so-called true species. If, therefore, such varieties as the different breeds of the dog can be shown to be descended from a single wild species, there necessarily arises great doubt as to the immutability of closely allied natural species, such as the foxes. While, however, the many breeds of dog appear to have arisen from several wild species, and those of cattle also from two or three, our fowls, ducks, rabbits, &c., all certainly arise from a single ancestral species. The case of pigeons is of peculiar importance, since pouter, carrier, fantail, and tumbler differ so thoroughly, externally and internally, that any ornithologist would be compelled to assign to them not merely specific but generic distinctness, if he had discovered them in the wild state. There is at least as much difficulty in believing that such breeds can have proceeded from a common ancestor, as there is in the case of any group of birds in nature; and every breeder of these has been firmly convinced of their descent from distinct species. Yet all these breeds are proved to come from the common rock-dove (*Columba livia*; see PIGEON),

and thus those who admit the unity of domestic races should be cautious in deriding the unity of wild ones.

Domestic races all exhibit adaptations to man's use or fancy, rather than to their own good. The key to this is man's power of selection: nature gives successive variations, man accumulates these, so making for himself useful breeds, and often (e.g. in sheep, cattle, roses, dahlias) profoundly modifies their character even in a single human lifetime; so that in all characters to which he attends, they may differ more than the distinct species of the same genera. Again, that unconscious selection which results from every one trying to possess and breed the best animals is yet more important than conscious selection. Two flocks of Leicester sheep, kept equally pure, appeared of quite different varieties after fifty years. Such slowly accumulated change explains why we know so little of the origin of domestic races; and its absence in regions inhabited by uncivilised man explains why these yield no plants worth immediate culture. Human selection is facilitated (1) by the keeping of large numbers, since variations will be more frequent, and (2) by preventing free-intercrossing; some species vary, however, more than others.

*Variation under Nature.*—All similar organisms in nature present individual differences, more considerable than is usually supposed. No two blades of grass are alike, and far more marked differences often occur, several castes or varieties sometimes existing in the same sex. Between these castes, and much more frequently between forms which systematic botanists and zoologists rank as true species, perfectly intermediate forms may occur. No agreement about the definition of species (the amount of difference necessary to give any two forms specific rank) has ever been come to; thus, in the British flora alone, there are nearly two hundred disputed forms, and individual opinion is in these cases the only criterion. As long as a genus is imperfectly known, and its species founded upon few specimens, they appear clearly limited. But with fuller knowledge, intermediate forms come in, and doubts as to specific limits augment. The terms species and variety are thus arbitrarily given to sets of individuals more or less closely resembling each other. See VARIATION, SPECIES, GENUS.

Individual differences are thus of the highest importance, as the first steps towards the slightest varieties worth recording, these in turn towards more distinct and permanent varieties, these varieties again towards sub-species, and in the next stage to species; though extinction may often arrest the process.

The species which present most varieties are those which have the greatest geographical range, or the widest diffusion in their own territory, or which possess the greatest number of individuals. In the larger genera of each country the species vary more frequently than in the smaller genera; and in many respects the species of large genera present a strong analogy with varieties, which analogy is intelligible chiefly on the view that they once existed as mere varieties themselves.

*Struggle for Existence.*—All organic beings tend to increase with extreme rapidity, so that if they were not kept down, the earth would soon be covered by the progeny of a single pair. This is evidenced not merely by calculation, but by actual observation of the extraordinary rapidity with which plants and animals have spread, when introduced into new and favourable circumstances (e.g. thistles and rabbits into Australia).

Since organisms then are reproducing themselves so rapidly, and since all their offspring cannot escape their enemies, get food, and live, much less

leave progeny in turn—since, in other words, the doctrine of Malthus applies to animals and plants with manifold force (for these can have no artificial increase of food, and no prudential restraints on reproduction)—there must in every case be a *struggle for existence*, either of one individual with another of the same species, or with the individuals of distinct species, or with the physical conditions of life; often, indeed, with all these at once, and that more or less intensely throughout the whole of life.

The checks which prevent increase are most obscure, and vary in each case. In all cases the amount of food, of course, gives the extreme limit. The youngest organisms generally suffer most; seedlings, for instance, are destroyed in vast numbers. Thus, even in a patch of ground purposely dug and cleared, where no choking from other plants could take place, 295 out of 357 seedling-weeds were destroyed, chiefly by slugs and insects. So, too, the stock of game on an estate depends chiefly upon the destruction of vermin. Climate, however, is highly important, and periodic seasons of extreme cold and drought seem the most effective of all checks—a severe winter sometimes destroying four-fifths or more of the birds of a locality. Epidemics, too, may occur, especially where numbers have inordinately increased. On the other hand, a large number of individuals of the same species is essential for its continued preservation.

The complex relations of all animals and plants to each other require illustration. The planting of part of a heath with Scots pine leads to a profound alteration of its flora and fauna, while the growth of these pines again is wholly dependent upon the exclusion of cattle. Many flowers depend for fertilisation on the visit of a special insect—e.g. red clover on humble-bees. But bees are destroyed by field-mice, and consequently protected by cats; hence, not only no bees, no clover, but also the more cats, the more clover! The struggle for life is most severe between type forms and varieties of the same species, and between the species of the same genus, since these tend to fill the same place in the economy of nature; hence we see the brown rat supplanting the black, and the hive-bee supplanting its Australian congener. The structure of every being is related to that of the others with which it competes, or from which it seeks to escape, or on which it preys; as is alike evident in the structure of the tiger and of the parasite which clings to his hair. So, too, the endosperm of a seed is chiefly useful in favouring the young plant's struggle for light and air against the adult plants around.

*Natural Selection.*—But how will the struggle for existence act with regard to variation? Can the principle of selection, so potent in the hands of man, apply under nature? Most efficiently so. Let us bear in mind (1) the constant occurrence of variation; (2) the infinite complexity of the relations in which organisms stand to each other, and to the physical conditions of life; and consequently (3) what infinitely varied diversities of structure might be useful to each being under changing conditions of life. Can it then be thought improbable, seeing that variations useful to man have undoubtedly occurred, that other variations useful in some way to each combatant in the great and complex battle of life should also occur in the course of many generations? And if such do occur, can we doubt (remembering that many more individuals are born than can possibly survive) that individuals having some advantage, however slight, have the best chance of surviving and of reproducing their kind, while injurious variations are destroyed? This preservation of favourable variations, and the destruction of injurious ones,

is termed Natural Selection, or less figuratively, the Survival of the Fittest.

Taking the case of a country undergoing a change of climate, the proportional numbers of its denizens would change, some species probably becoming extinct—and these changes would in many ways affect the survivors. A further disturbance would come from the immigration of new forms; or if that were prevented, we should have places in the economy of nature which might be better filled up. Any slight favourable modification of the old species would tend to be preserved, and we have seen that changed conditions increase variability.

Nor are such changes necessary in order to leave places for natural selection to fill. No country can be named where the native inhabitants are perfectly adapted to their conditions and competitors, for as some foreigners have taken firm possession in every country, we may safely conclude that the natives might have been modified with advantage to resist them.

And when human selection has produced such great results, why may not natural? Human selection acts only for man's own good, on mere external and visible characters, and irregularly throughout a short period; natural selection acts for the good of the being itself, on the whole machinery of its life, and incessantly on the species, throughout almost infinite time. (It is important here to remember that the objection to this agency on the ground of its presumed insignificance, is identical with that so long but unsuccessfully employed against Lyell's explanation of the origin of the physical features of the globe by summing up the existing natural changes.)

Natural selection thus leads to the improvement of each creature in relation to its organic and inorganic conditions of life, and consequently in most cases to what must be regarded as an advance in organisation. Nevertheless, low and simple forms will long endure, if well fitted for their simple conditions.

Natural selection may modify the egg, seed, or young, as easily as the adult, and these modifications may affect through correlation the structure of the latter, and conversely.

Besides Natural, we have to consider Sexual Selection—i.e. not merely do individuals struggle for existence, but the males struggle for the females, and the most vigorous thus tend to leave most progeny. Special weapons, offensive and defensive, like the cock's spurs, the stag's horns, or the lion's mane, are used in this struggle, and the most useful variations are those which are transmitted. Again, just as man can in a short time give beauty to his domestic birds, so there is no good reason to doubt that female birds in thousands of generations, by selecting, as they are observed to do, the most melodious or beautiful males, might produce a marked effect, and many sexual differences are thus explained.

The theory of natural selection may be applied in special cases—e.g. (1) to explain the evolution of swift greyhound-like varieties of wolves; (2) to explain the origin and the excretion of nectar in flowers, its use to insects, the action of insects in transferring pollen from flower to flower, with its advantage in intercrossing; and the resultant modification and adaptation of flower and insect to each other by the preservation of advantageous variations.

The circumstances favourable to the production of new forms through natural selection are also reviewed. These are chiefly, great variability; large numbers of individuals; the complex effects of intercrossing; isolation in small areas, yet also extension over continental ones, especially if these

vary in altitude; and considerable lapse of time. Rare species are shown to be in process of extinction. The *divergence of character* in domestic breeds, largely due to the fact that 'fanciers do not, and will not, admire a medium standard, but like extremes,' applies throughout nature, from the circumstance that the more diversified the descendants from any one species become in structure, constitution, and habits, by so much will they be better enabled to seize on many and widely diversified places in nature, and so to increase in numbers. Thus, taking a carnivorous animal which has reached the maximum numbers its territory will support, it is evident that it can succeed in increasing only by its varying descendants seizing places hitherto occupied by other animals. This must hold equally of all species, and is separately demonstrated for plants. The greatest amount of life can be supported by help of proportionally great diversification of structure; hence, in small areas where competition is severe, the inhabitants are extremely varied.

The probable effects of the action of Natural Selection, through divergence of character and extinction, on the descendants of a common ancestor are then discussed in detail by Darwin with an illustrative diagram. This takes the form of a genealogical tree—the great tree of life, which fills with its dead and broken branches the crust of the earth, and covers the surface with its ever-branching and beautiful ramifications.

*Laws of Variation* (see VARIATION).—Of the cause of most variations we are still ignorant, but the same laws appear to have acted in producing the lesser differences between varieties of the same species and the greater differences between species of the same genus. Changed conditions sometimes induce definite and permanent effects: habit, use, and disuse are potent in their effects. Specific characters are more variable than generic, and varietal than either. Rudimentary organs and secondary sexual characters are highly variable. Species closely related of similar constitution and similarly influenced, present analogous variations, and frequently exhibit characters which can only be explained as reversions to those of their ancient progenitors—e.g. zebra-like stripes on horses, or wood-pigeon's markings on fantails, tumblers, &c.

*Difficulties and Objections*.—In four chapters all the miscellaneous objections raised against the theory between 1859 and the appearance of the latest edition are successively stated, weighed, discussed, and met, as well as the much more serious difficulties pointed out by Darwin himself. These latter are, (1) the definiteness of species and the rarity of transitional forms; (2) the enormous degree of modification in habits and structure assumed by the theory, and the seeming improbability that Natural Selection should produce on the one hand an organ of such trifling importance as the tail of a giraffe, and on the other, an organ so wonderful as the eye; (3) the acquirement and modification through Natural Selection of such marvellous instincts as those of the bee; (4) the sterility of crossed species, and the fertility of crossed varieties. For these discussions, however, the reader must consult the work itself.

*Imperfection of the Geological Record*.—On the assumption of the extermination of an enormous number of intermediate varieties, which were the links between existing and remote ancestral forms—why, then, is not every geological formation charged with such links? Why does not every collection of fossils afford plain evidence of the gradation and mutation of the forms of life? Geology, assuredly, does not reveal any such finely graduated organic chain, and this is one of the most obvious and plausible objections to the

theory. The explanation offered is the extreme—the almost incredible—imperfection of the geological record. Only a small portion of the globe has been geologically explored with care; only certain classes of beings have been fossilised; and the number, both of specimens and species yet discovered, is absolutely as nothing compared with the number which must have passed away during even a single formation. The Malay Archipelago equals in area the formations best known to us; its present condition represents that of Europe while Europe's strata were being deposited; its fauna and flora are among the richest on the globe, yet, even if all the species were to be collected which ever lived there, how imperfectly would they represent the natural history of the world! Only few species are preserved at all, and most of these in an imperfect manner; moreover, subsidence being almost necessary for the accumulation of rich deposits, great intervals of time must have elapsed between successive formations, so that during periods of elevation, when variation would be most frequent, the record is least perfect. Moreover, geological formations have not been continuously deposited; the duration of specific forms probably exceeds that of each formation; migrations have largely taken place; widely ranging species are most variable, and oftenest give rise to new species; varieties have been at first local; and finally, it is probable that periods of modification are short as compared with periods of permanence. Hence we cannot find innumerable varieties, and any linking variety between two forms is, of course, ranked as a distinct species, for the whole chain cannot be permanently restored. Thus the geological record is a history of the world indeed, but one imperfectly kept, and written in a changing dialect; of this history we possess the last volume only, relating to two or three countries. Even of this volume only here and there has a short chapter been preserved, and of each page only here and there a few lines.

*Geological Succession of Organic Beings (Distribution in Time).*—The preceding difficulties excepted, the facts of palæontology agree admirably with the theory. New species come in slowly and successively; they change in different rates and degrees; old forms pass through rarity to extinction, and never reappear; dominant forms spread and vary, their descendants displacing the inferior groups, so that after long intervals of time the productions of the world appear to have changed simultaneously. The most ancient forms differ most widely from those now living, yet frequently present characters intermediate between groups now widely divergent, and they resemble to a remarkable extent the embryos of the more recent and more highly specialised animals belonging to the same classes. These laws, and, above all, the important law of the succession of the same types within the same areas during the later geological periods, and most notably between the Tertiary period and the present time (e.g. fossil and recent marsupials in Australia, and edentates in South America), cease to be mysterious, and become at once thoroughly intelligible on the principle of inheritance, and on that alone.

[Since the publication of the *Origin of Species* in 1859, palæontological research has been constantly furnishing the most triumphant verification of these views. The imperfection of the geological record was so far from overestimated that Huxley (*Science and Culture*, 1880), in comparing our knowledge at that time of the mammalian Tertiary fauna with that of 1859, stated that the results of the investigations of Gaudry, Marsh, and Filhol are 'as if zoologists were to become acquainted with a country hitherto unknown, as rich in novel forms of life as Brazil or South Africa once were to

Europeans.' Gaudry found the intermediate stages by which civets passed into hyenas; Filhol discovered still more remote ancestral carnivores; while Marsh obtained a complete series of forms intermediate between that, in some respects, most anomalous of mammals, the horse, and the simplest five-toed ungulates (see MAMMALS). Again, Darwin's belief that the distinctness of birds from all other vertebrates was to be accounted for by the extinction of a long line of progenitors connecting them with reptiles, was in 1859 a mere assumption; but in 1862 the long-tailed and intensely reptilian bird *Archæopteryx* (q.v.) was discovered, while in 1875 the researches of Marsh brought to light certain Cretaceous birds, one (*Hesperornis*) with teeth set in a groove, the other (*Ichthyornis*) with teeth in sockets, and with bi-concave vertebræ. Besides these reptilian birds, bird-like reptiles have similarly been forthcoming, and the hypothesis of Darwin is thus admirably verified. Considerable light, too, has been thrown on the pedigree of crocodiles; ammonites, trilobites, and other invertebrates have been arranged in series, while important collateral evidence is also furnished by 'persistent types' such as *Ceratodus*, *Beryx*, *Nautilus*, *Lingula*, &c., which have survived—we must assume by ordinary generation—almost completely unchanged since remote geological periods. On such grounds, therefore, Huxley asserted (*op. cit.*) that 'on the evidence of palæontology, the evolution of many existing forms of animal life from their predecessors is no longer an hypothesis, but an historical fact; it is only the nature of the physiological factors which is still open to discussion.'

*Geographical Distribution.*—Neither the similarity nor the dissimilarity of the inhabitants of various regions, whether of land or sea, can be accounted for by identity or differences of climate, or other physical conditions, but both are related in the most striking degree to the absence or presence of barriers to migration between those regions. Within the same area there exists the most marked affinity among the species, though these differ from place to place. Species appear to have arisen in separate definite centres, the few apparent exceptions being accounted for by migration and dispersal, followed by climatic and geographical changes. But for a summary of our knowledge of the existing mode of distribution of organic life, and of the way in which that distribution has been effected, as well as of the very important bearing of these facts upon the theory of evolution, which they may be said, indeed, more than any other class of facts, to have suggested, see the article GEOGRAPHICAL DISTRIBUTION.

*Morphological Arguments.*—The physiological and distributional lines of argument being summarised, those furnished by morphology, although not less numerous and highly important, can only be very briefly outlined. These are mainly four, and are derived from (a) Classification, (b) Homologies, (c) Embryology, (d) Rudimentary Organs.

(a) *Classification.*—Naturalists arrange the species, genera, and families in each class, on what is called the Natural System. But what is meant by this system? Is it, after all, merely an artificial scheme for enunciating general propositions, and of placing together the forms most like each other? or does it, as many believe, reveal the plan of creation? The grand fact of classification is, that organic beings, throughout all time, are arranged in groups subordinated under other groups—individuals under varieties, and these again under species; species under genera; genera under sub-families, families, and orders; and all under a few grand classes. The nature of all these relationships—the rules followed and the difficulties met

by naturalists in their classifications—the high value set upon constant and prevalent structures, whether these be of great or little use, or, as with rudimentary organs, of none at all—the wide opposition in value between such misleading resemblances of adaptation, as, for instance, the fish-like form of whales, and such characters of true affinity as are afforded by the structure of their circulatory or respiratory system—all these receive a simple and natural explanation on the view of the common descent of allied forms with modification through variation and natural selection; while it is to be noted that no other explanation has ever even been attempted. The element of descent, too, is already used in linking all the sexes, ages, forms, and varieties of the same species, widely though these (e.g. Cirripedes) may differ from each other in structure: and we have only to extend it to understand the meaning and origin of the Natural System.

(b) *Homology*.—The members of the same class, independently of their habits of life, resemble each other in their general plan of organisation. Thus, the hand of man, the digging-paw of the mole, the leg of the horse, the paddle of the porpoise, and the wing of the bat, are all constructed on the same pattern, bone corresponding to bone. Similarly with the hind-limb. Again, the mouths of insects are of innumerable varieties of form and use—witness the long spiral trunk of a moth, and the great jaws of a beetle—yet these are formed by modifications of an upper lip, mandibles, and two pairs of maxillæ. And so it is with the limbs of crustaceans, or the flowers of plants; in fact, with the organs of every class of beings.

This *conformity to type* is ‘powerfully suggestive of true relationship, of inheritance from a common ancestor;’ it admits, in short, as no one indeed denies, of a simple explanation in terms of the evolutionary theory, and thus strengthens that theory not a little. Attempts have been made to explain this unity of plan in two other ways—first, by assuming it due to utility, which is negatived by the facts, since organs of identical use (e.g. the wings of a bird and those of a butterfly) very frequently do not conform to the same type at all; secondly, by attributing it to a unity of design, which, however, (a) instead of being always maintained, as it should be, on the theory, is not unfrequently quite lost in highly specialised forms; and which, even if it always existed, (b) would directly suggest the unity of descent, the design thus serving only to mislead the anatomist.

*Serial Homology*, too, has to be accounted for—that unity of type which is found on comparing the different parts and organs in the same individual, so that the wonderfully complex and varied jaws and legs of a lobster, or the widely different leaves, sepals, petals, stamens, and pistils of a flower, are all found to be modifications of a simple limb, and a simple leaf-organ respectively. Not only are such metamorphoses apparent on comparison, but they can be actually observed to occur during the development of each individual; is then the term metamorphosis to have a mere metaphorical meaning when applied to the species, or has it not actually arisen in past time, through the natural selection and transmission of advantageous variations?

(c) *Development*.—It has been already indicated that the serially homologous parts in the same individual are alike during an early embryonic period, as also are the homologous organs in animals which, like bat, horse, and porpoise, may be widely differentiated in adult life. So closely, too, do the embryos of the most distinct species belonging to the same class resemble each other, that even Von Baer was unable to distinguish whether two un-

labelled specimens were lizards, birds, or mammals. This law of embryonic resemblance holds very widely—e.g. with young crustaceans. The embryo often retains within the egg or womb structures which are of no service to it, either at that or at a later period of life, like the transitory gill-arches of birds or mammals; while, on the other hand, larvæ (e.g. of insects), which have to provide for their own wants, undergo complete secondary adaptation to the surrounding conditions. The process of development goes from the general to the special; thus there is generally an advance in organisation. In peculiar conditions, however, degeneration may occur. All these facts are readily explained on the principle of successive slight variations not necessarily or generally supervening very early in life, and inherited at a corresponding period; hence it is in the highest degree probable that most embryonic stages show us more or less completely the progenitor of the group in its adult state; and embryology thus rises greatly in interest. See EMBRYOLOGY.

(d) *Rudimentary Organs*.—Rudimentary, atrophied, and abortive organs, bearing the plain stamp of intility, are so extremely common that it is impossible to name a higher animal in which none occurs. The mammae of male mammals, the hind-legs of boas, the wings of many birds, or the teeth of foetal whales, and the upper incisors of unborn calves, are familiar instances. Such organs are intelligible on the evolutionary theory, and on that theory alone.

*Recapitulation and Conclusion*.—After tersely summing up the preceding mass of evidence, Darwin concludes by pointing out (a) that the theory of evolution by natural selection is no more inimical to religion than is that of gravitation, to which the same objection was strongly raised; (b) its revolutionary influence on the study of all departments of natural history; (c) on Psychology (q.v.); (d) on the origin of man and his history (see MAN); (e) on our theories of future progress.

*Envoy*.—‘It is interesting to contemplate a tangled bank clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; and Inheritance, which is almost implied by reproduction; Variability from the indirect and direct action of the conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms, or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.’

The stormy reception of the *Origin of Species*, the controversies to which it gave rise, its rapid and widespread acceptance, helped as it was by the independent support, yet generous self-abnegation, of Dr Wallace, and the powerful advocacy of Huxley, Hooker, Asa Gray, and others, are all recorded in Darwin's Life. Of the proposed expansion of the *Origin*, only the first chapter actually

appeared, as *Variation of Animals and Plants under Domestication* (see VARIATION); but in *Fertilisation of Orchids, Forms of Flowers, Insectivorous Plants, Climbing Plants, Movement in Plants*, we have a series which not only greatly developed Darwin's favourite study of adaptations, and with it enormously strengthened his general theory, but gave to the arid field of botany the interest and freshness of a new intellectual spring (see BOTANY). Again, the very difficulties which he felt to be presented to his theory by the complex phenomena of bee and ant society led him onwards, till he reached the problems of mind and language; the obvious and burning question of the origin of man had also to be faced, and thus we had the *Descent of Man* and the *Expression of the Emotions*.

Before conclusion, justice demands, if not discussion, at least mention of some of the more important criticisms which have been urged against Darwin's theory. That which Darwin himself seems to have felt as most serious was made by Fleeming Jenkin, who laid stress on the tendency to swamping any individual variation, however advantageous, through intercrossing. Mivart's *Genesis of Species* next engaged him most; but Darwin's replies to these and other criticisms up to 1872 will be found in the final edition of the *Origin of Species*. In his essay in Darwin's *Life*, Huxley says: 'I venture to affirm that so far as all my knowledge goes, all the ingenuity and all the learning of hostile critics have not enabled them to adduce a single fact of which it can be said this is irreconcilable with the Darwinian theory;' while Sir Ray Lankester assures us that 'since its first publication in 1859 the history of Darwin's theory has been one of continuous and decisive conquest, so that at the present day it is universally accepted as the central, all-embracing doctrine of zoological and botanical science.'

As a matter of fact, however, this 'universal acceptance' is not without its universally distributed exceptions. Some of Darwin's contemporaries withheld their adhesion—e.g. Virchow in Germany, Owen and Cleland in Britain, and the older French naturalists; nor can the critical and controversial writings of Mivart, the Duke of Argyll, Samuel Butler, and others, be thus wholly ignored. Constructive criticism is also busy. On one hand certainly we have the ultra-Darwinian speculations of Weismann, warmly accepted by Lankester and others; but on the other, attempts are again being made, and with increasing frequency, to restate the theory of evolution more or less completely in non-Darwinian terms. Thus, following up the doubt which occasionally troubled Darwin's later years, that he had assigned too little importance to the modifying factors of use and disuse, of environment, &c., we have Herbert Spencer re-entering the field; in America an active Neo-Lamarckian school has also arisen, which lacks neither knowledge nor thoughtfulness; in Germany we owe new constructive efforts to Nageli and Semper, and more recently to Eimer (1890) and Plate (1908); while in Britain complementary hypotheses have been propounded by Romanes, Sutton, Gulick, Geddes, &c. But such proposed positive contributions to the evolutionary theory fall rather to be treated under EVOLUTION.

See BIOLOGY, BOTANY, EVOLUTION, ENVIRONMENT, HEREDITY, GEOGRAPHICAL DISTRIBUTION, ZOOLOGY, and other articles. Besides the works of Darwin himself, and those of Alfred Russel Wallace (from *Natural Selection* in 1870 to *Darwinism* in 1889), with the special treatises referred to under the above-mentioned and minor articles (e.g. FERTILISATION), see F. Darwin's *Life of Charles Darwin*; A. C. Seward (ed.), *Darwin and Modern Science* (1909); American Assoc. Adv. of

Science, *Fifty Years of Darwinism* (1909); Haeckel's *Generelle Morphologie and Natural History of Creation*; Huxley's *Lay Sermons, American Addresses, Science and Culture, Anatomy of Invertebrated Animals*; also his essay *On the Reception of the Origin of Species in Darwin's Life*, vol. II.; 'Obituary Notice of Charles Darwin' in *Proc. Roy. Soc.* (Lond 1888); and 'Struggle for Existence, a Programme' (*Nineteenth Century*, 1888). Weismann's *Studies in the Theory of Descent* (1880-82), and for later developments his subsequent papers (see HEREDITY and WEISMANN), must also be noted. Romanes's *Scientific Evidence of Organic Evolution*, Lankester's *Degeneration* (both 'Nature' series), Schmidt's *Doctrine of Descent and Darwinism*, Fiske's *Darwinism and other Essays*; Eimer, *Organic Evolution* (1890); T. H. Morgan, *Evolution and Adaptation* (1903); Kellogg, *Darwinism To-day* (1907); Thomson, *Darwinism and Human Life* (1909).

Of controversial writings may be cited Mivart's *Genesis of Species, Lessons from Nature*, &c.; the Duke of Argyll's *Unity of Nature*, as well as the review articles of both writers. See also Butler's *Evolution, Old and New*, and *Luck or Cunning*. For the literature of the more constructive attempts referred to, see EVOLUTION. For general bibliography Bettany's *Life of Darwin* is most accessible; also Seidlitz, *Die Darw. Theorie* (Leip. 1875); Romanes, *Darwin and after Darwin* (3 vols 1892-97); Osborn, *From the Greeks to Darwin* (1895); Poulton, *Darwin and Natural Selection* (1896).

**Darwin Sound** and **MOUNT DARWIN** are on the SW. side of King Charles's South Land, Tierra del Fuego. The mountain rises 6800 feet.

**Dasent**, SIR GEORGE WEBBE, was born in 1820 at St Vincent in the West Indies, of which island his father was attorney-general. He was educated at Westminster School and King's College, London; graduated B.A. at Magdalen College, Oxford, in 1840; and was called to the bar at the Middle Temple in 1852, in which year also he received his degree of D.C.L. He was for twenty-five years (1845-70) an assistant editor of the *Times*, and married a sister of its editor, Mr Delane (q.v.). An accomplished linguist, especially in Scandinavian, he acted as examiner in English and modern languages for the Civil Service; he was a Civil Service Commissioner in 1872-92, was knighted in 1876, and died 11th June 1896. In 1842 he published a translation of *The Prose or Younger Edda*; which was followed by an essay, 'The Naismen,' in the *Oxford Essays* (1858); *Popular Tales from the Norse, with an Introductory Essay on the Origin and Diffusion of Popular Tales* (1859), and *Tales from the Efield* (1874), both from the Norwegian of Asbjørnsen; translations from the Icelandic of the *Saga of Burnt Njal* (1861), and the *Story of Gisle, the Outlaw* (1866); and an Introduction and Life of Cleasby, prefixed to Vigfusson's completion of Cleasby's unfinished *Icelandic-English Dictionary* (1874). Sir George Dasent also wrote several fair novels. His famous introduction to Asbjørnsen's *Popular Tales* was a solid contribution to folklore, being an admirable exposition of the Aryan theory of story-transmission as advocated by Grimm and Max Muller.

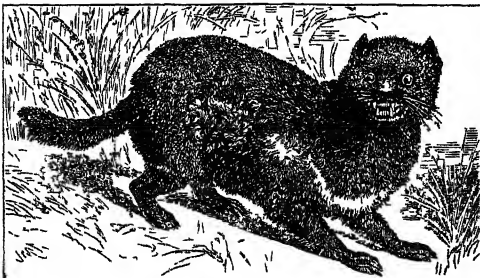
**Dash**, COUNTESS, the name under which Gabrielle Anna Cisterne de Courtiras, Vicomtesse de Saint-Mars, published a series of novels, many of which were readable, if of but slender literary merit. She was born at Poitiers, August 2, 1804, of a noble family, married early, and took to literature for a living after the loss of her property, writing sometimes as many as five or six novels a year. She died 11th September 1872. Her stories deal almost exclusively with the aristocratic world and its more or less illegitimate liaisons. They have a certain brightness and vigour, but lack reality, and are peopled by a crowd of stilted puppets rather than living men and women. Of her numberless books may only be mentioned

*Les Amours de Bussy-Rabutin* (1850), *La Pomme d'Eve* (1853), *Les Galanteries de la Cour de Louis XV.* (1861), *Comment Tombent les Femmes* (1867), and *Les Aventures d'une Jeune Mariée* (1870).

**Dashkoff**, PRINCESS EKATERINA ROMANOVNA, daughter of Count Voionzoff, was born 28th March 1743, at St Petersburg, and from her earliest youth received a careful training. She married Prince Dashkoff when only fifteen years old, but was left a widow three years after. She was an intimate friend of the Empress Catharine II., and one of the heads of the conspiracy formed against Peter III., the success of which secured the throne to Catharine. Soon afterwards quarrelling with Catharine, she obtained permission to travel, and visited Germany, England, France, and Italy, making the acquaintance of many eminent men (among others, Garrick, Dr Blair, and Dr Robertson). The empress and she were reconciled to each other, and the princess was appointed Director of the Academy of Arts and Sciences; and in 1783, President of the Russian Academy, established at her own suggestion in imitation of the French Académie. On the death of Catharine in 1796, she was deprived of her offices, and ordered by Paul III. to retire to her estates at Novgorod. She died 16th January 1810. Besides writing several comedies and occasional papers, the Princess Dashkoff was mainly instrumental in inducing the Russian Academy to draw up a dictionary of the Russian language, and herself executed part of the work. See her very interesting autobiography (trans. 1840).

**Dasyprocta.** See AGOUTI.

**Dasyures** (*Dasyuridae*), a family of carnivorous marsupials, including forms which in the Australian and Tasmanian fauna take the place filled in other regions by carnivores. The large sharp canines, the sharp-pointed cusps on the back teeth, and the clawed toes are among the adaptive carnivorous features, and there are others of a more technical nature. The dasyures are nocturnal and savage animals, and, as one would expect, peculiarly untamable. One of the most pronounced is the Tasmanian Devil (*Sarcophilus ursinus*), a savage animal, about the size of a badger, with a disproportionately large and broad head, and massive crowded teeth. The body is plump; the fur is coarse and brownish-black, with a white band on the chest, and another at the end of the back; the tail is



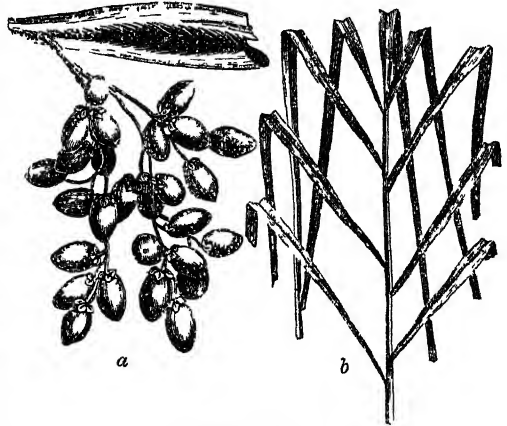
Tasmanian Devil (*Sarcophilus ursinus*).

thick, and about half as long as the body. In Tasmania these 'devils' used to commit great havoc among poultry and even sheep, but are being driven into more and more remote haunts. The Spotted Dasyure (*Dasyurus maculatus*), also Tasmanian, is a much smaller animal, about the size of a cat. Another 'wild cat' of the same country and Victoria is Mauge's Dasyure (*D. maugei* or *viverrinus*). Other species occur in Australia and New Guinea. Also included in the dasyures are

two genera, *Thylacinus* and *Phascologale* (q.v.). The former, the Thylacine (q.v.) or Tasmanian wolf, is the largest carnivorous marsupial; the latter is insectivorous. See MARSUPIAL.

**Date.** See CHRONOLOGY.

**Date Palm** (*Phoenix*), a genus of palms, the most important species of which is the Common Date Palm, the *Palm Tree* of Scripture (*P. dactylifera*), a native of the northern half of Africa, the south-west of Asia, and some parts of India, and of which the cultivation is no less wide, and still extending.



Date Palm :

a, bunch of dates dependent from their spathe; b, portion of leaf.

Some parts of China produce large crops. The stem, which is straight and simple, reaches a height of 30 to 60 feet, and bears a head of 40 to 80 glaucous pinnated leaves, of 8 to 10 feet long, and a number of branching spadices, each of which on the female tree bears 180 to 200 fruits (dates, *dactyli*). A bunch of dates weighs 20 or 25 lb., so that an average year's crop may be reckoned at 300 to 600 lb. per tree, and the yield per acre at about twelve times that of corn. From the earliest times fertilisation has been artificially aided by cutting off the male inflorescences just before the stamens ripen, and suspending them among those of the female tree; so avoiding the risks and losses of ordinary wind-fertilisation. In a palm grove there may be but one male stem to forty or fifty fruit-bearing ones. The Arabs seldom raise palms from seed; to make sure of the sex they take suckers from female trees known to bear good fruit. The tree begins to bear about the eighth year, reaches maturity at about thirty years, and does not decline until about the age of one hundred. This is one of the most important and useful of all the palms. In Egypt, and generally in North Africa, Persia, and Arabia, dates form the principal food, and date palms the principal wealth of the people. The fleshy part of the fruit contains 58 per cent. of sugar, accompanied by pectin, gum, &c. The fruit is eaten either fresh or dried, and in the latter state becomes an article of commerce. Cakes of dates pounded and kneaded together, and so solid as to be cut with a hatchet, are the store of food provided for African caravans on their journey through the Sahara. A sweet juice (date-honey) can be expressed from the fruits, from which a kind of wine is obtained by fermentation; also a sort of vinegar; an ardent spirit is of course also distilled from the fermented juice. Palm-wine is also made from the sap after the terminal bud is removed. The bud is eaten as palm-cabbage, similarly also the undeveloped panicles of flowers. The date

'stones' or seeds are roasted in North Africa as a substitute for coffee, and have also been introduced into Britain for the same purpose. They are also ground and pressed for oil, and the residue used for feeding cattle. From leaf-stalks of the common date palm, all kinds of basket and wicker work are also made, and walking-sticks, fans, &c. The leaves themselves are made into bags, mats, &c.; the fibres of the web-like integuments at the base of their stalks into cordage. The wood is used for building, fences, &c.—The Toddy Palm of the north of India, or Wild Date Palm (*P. sylvestris*), so nearly resembles this species, that it is doubtful if it is distinct. In some places, the trees present a curiously distorted and zigzag appearance, from the practice of yearly tapping the alternate sides for the sap or *toddy*. This forms a grateful and wholesome beverage; readily also fermenting into palm-wine, and by distillation yielding *Arrack* (q.v.); whilst if boiled down it yields the syrup called *jaggery*, from 4 lb. of which 1 lb. of sugar is obtained, a single tree producing about 7 or 8 lb. of sugar annually. The operation of tapping for toddy spoils the fruit of the tree, which is small and much inferior to the African date. It is, however, eaten.—Another species, *P. paludosa*, the most gregarious of Indian palms, growing only 6 or 8 feet high, covers the landscape of the Sunderbunds with the liveliest verdure. *P. aculeis* and *P. farinifera* are also dwarf and closely allied common Indian species. *P. reclinata* is a characteristic palm of the Natal coast, and *P. spinosa* of Sierra Leone, &c. Some derive the origin of the colonnade pillar in architecture to the regular mode of its planting and the use of its stem in building, while in symbolic interest it stands second to no other plant. The symbol of beauty and of victory alike to Hebrews and Hellenes from the earliest times, it passed readily to the suggestion of victory over death and glorious immortality; hence alike the name *Phoenix* from the fabled bird, and the habit of representing angels and the blessed with palms in their hands. It was largely used also for decoration of festivals, and for strewing in processions. Christ's triumphal entry into Jerusalem is still commemorated on Palm Sunday (q.v.).

**Date Plum** (*Diospyros*), a genus of Ebenaceæ, important for timber (see EBONY, IRONWOOD) and fruit. The Common Date Plum or Fishamin, also called the European Lotus and the Date of Trebizond (*D. lotus*), is a tree of 18 to 30 feet in height, with oblong shining leaves and small reddish-white flowers, a native of the coasts of the Caspian Sea, Northern Africa, &c., but cultivated and naturalised in the south of Europe. It can also be grown in the south of England. Its fruit is yellow, sweet, and astringent. It is eaten when over-ripe, like the medlar, or is used for preserves. The Virginian Date Plum, or Persimmon (*D. virginiana*), is a tree of 30 to 60 feet high, with ovate oblong leaves and pale-yellow flowers, a native of the southern states of North America, where one tree often yields several bushels of fruit. The fruit is about one inch in diameter, with six to eight oval seeds. It is not palatable till mellowed by frost, and is sweet and astringent. A kind of beer or cider and an ardent spirit are made from it. *D. Mabola* is cultivated as a fruit-tree in Mauritius. *D. Kaki*, sometimes called the Keg-fig, is a native of Japan, which occasionally is kept in greenhouses in France and England. The sweetmeat called *Figues-caques* is made from this fruit in France. The fruit of some other species is also edible—e.g. *D. decandra* of Cochin-China.

**Datia**, a native state of Bundelkhand, with a pop. of 174,000. The chief town, Datia (pop. 25,000), 125 miles SE. of Agra, on a rocky eminence, has several palaces, some now untenanted.

**Datiaceæ**, a very small order allied to Begoniaceæ, including only four species, of remote distribution. *Datisca cannabina*, a plant much resembling hemp, is cultivated in Crete and Asia Minor for its hemp-like fibre, also as a source of yellow dyestuff. It has tonic properties.

**Dative**. See DECLENSION.

**Dato**, EDUARDO, born at Coruña in 1856, studied law at Madrid, was alcalde of Madrid and several times Conservative prime-minister of Spain. He was assassinated in 1921.

**Datolite**, or DATHOLITE, a mineral, colourless or inclining to grayish, greenish, white, or yellowish-gray colour, occurring both massive and crystallised in rhombic prisms, the edges and angles of which are commonly replaced by planes. It is composed of boracic acid, silica, and lime, with a little water. It occurs generally in basic igneous rocks, as at Salisbury Crags, Edinburgh, and occasionally in schistose rocks.

**Datura, Daturine**. See THORN APPLE, ATROPINE.

**Daub**, KARL, a speculative theologian, was born 20th March 1765, at Cassel, studied philosophy and theology at Marburg, and became in 1795 professor of Theology at Heidelberg, where he died 22d November 1836. An earnest and singularly open-minded seeker after truth, although defective in the true historical sense, and not a robust and independent thinker, Daub laboured incessantly to find a sound basis for a reconciliation between religion and philosophy, and his successive writings reflect the whole development of prevailing philosophy from Kant to Hegel. Thus his *Lehrbuch der Katechetik* (1801) rests completely on Kant's fundamental principles; again, dominated by the influence of Schelling's 'philosophy of identity' are his *Theologumena* (1806) and *Einleitung* to Christian dogmatics (1810); while Schelling's transition to theosophy and to 'positive philosophy' is mirrored in Daub's *Judas Ischarioth* (1816), despite its eccentricities his best work. Hegel was called to Heidelberg in 1816, and henceforth it was his influence which was dominant over the receptive mind of Daub. In his *Dogmatische Theologie* (1833) and *Prolegomena* (1835), he attempts in the darkest language of the Hegelian dialectic a philosophical restoration of the dogmas of the church. Daub's *Theol. philos. Vorlesungen* were collected by Marheineke and Dittenberger in seven volumes (1838-43). See Rosenkranz's eulogistic but uncritical *Erinnerungen* (1837), and D. F. Strauss, *Charakteristiken und Kritiken* (2d ed. 1844).

**Daubenton**, LOUIS JEAN MARIE, naturalist, was born at Montbar in Burgundy, 29th May 1716. He studied theology at the Sorbonne, but soon gave himself up to medicine and anatomy. In 1742 his old schoolfellow, Buffon, invited him to assist him in the preparation of his great work on Natural History, and Daubenton contributed richly to the first fifteen volumes of the *Histoire Naturelle*, until the jealousy of Buffon led to an estrangement. Daubenton now devoted himself almost entirely to his duties in the Jardin du Roi, where he was professor of Mineralogy. He was also for a time professor of Natural History in the College of Medicine. He contributed largely to the first *Encyclopédie*, and wrote many valuable *mémoires*. He died 31st December 1799.

**Daubeny**, CHARLES GILES BRIDLE, chemist and botanist, was born at Stratton in Gloucestershire, 11th February 1795. He devoted himself chiefly to the elucidation of natural phenomena by the aid of chemical science—his great work being *A Description of Active and Extinct Volcanoes* (1826). He also wrote on thermal springs. He

became professor of Chemistry at Oxford in 1822, of Botany in 1834, and was an F.R.S. Other works are an *Introduction to the Atomic Theory* (1831), *Lectures on Agriculture* (1841), and *Lectures on Climate* (1862). Daubeny died December 13, 1867.

**D'Aubigné, JEAN-HENRI MERLE**, a popular ecclesiastical historian, was born at Eaux-Vives, near Geneva in Switzerland, 16th August 1794, studied there and at Berlin—under Neander—and in 1818 became pastor of the French Protestant Church in Hamburg. In 1823 he was appointed court-preacher at Brussels; but after the revolution of 1830, he declined the post of tutor to the Prince of Orange, and returning to Geneva, took part in the institution of the new evangelical church, and filled the chair of Church History in its theological seminary until his sudden death, in the night of October 20-1, 1872. With the exception of some visits to England and Scotland, where he had numerous readers and admirers, and where he received the degree of D.C.L. from Oxford and the freedom of the city of Edinburgh, he remained constantly at Geneva. The work which has given him a widespread reputation is his *Histoire de la Réformation au Sixième Siècle* (1835-53); it has been translated into most European tongues, and has attracted more notice abroad than at home; it is written with a devout, fervid sympathy that is often eloquent, although the narrative is too graphic to be everywhere exact. Its popularity has been immense. Among his other writings are *Germany, England, and Scotland* (Lond. 1848); a vindication of Cromwell (1848); *Trois Siècles de Lutte en Écosse* (1849); and *Histoire de la Réformation en Europe au Temps de Calvin* (1862-78).

**D'Aubigné, THÉODORE AGRIPPA**, a famous French scholar, was born on 8th February 1550, near Pons in Saintonge. At an early period he exhibited a remarkable talent for the acquisition of languages. Although born of a noble family, he inherited no wealth from his father, and consequently chose the military profession. In 1567 he distinguished himself by his services to the Huguenot cause, and was subsequently rewarded by Henry IV., who made him vice-admiral of Guienne and Brittany. His severe and inflexible character frequently embroiled him with the court; and after Henry's assassination (1610), he betook himself to Geneva, where he spent the remainder of his life in literary studies. He died April 29, 1630, leaving a worthless son, Constant, who was father of Madame de Maintenon. D'Aubigné's best-known work is his *Histoire Universelle, 1550-1601* (Amsterdam, 1616-20), which had the honour of being burned in France by the common hangman. D'Aubigné was possessed of a spirit of biting satire, as is proved by his *Confession Catholique du Sieur de Sancy*, and his *Aventures du Baron de Fenesté*. See his *Histoire Secrète, écrite par lui-même* (1731); French studies by Réaume (1883) and Morillot (1884), German by Winckler (1906).

**Daubigny, CHARLES FRANÇOIS**, landscape-painter and etcher, born in Paris in 1817, studied under his father, who was a miniature-painter, Paul Delaroche, and others, and from 1838 exhibited in the Salon, although his full recognition came only after the artist had reached his fiftieth year. He devoted himself to close and sympathetic study from nature, working much on the Seine in a house-boat, and developed a style of landscape art marked by singularly unaffected fidelity and originality. In 1853 he gained a first-class medal with his 'Pool of Gylion.' In 1857 he produced his 'Spring-time;' in 1861, 'The Banks of the Oise;' in 1872, 'Windmills at Dordrecht;' and in 1877, his large and very impressive 'Rising Moon.' His 'Sluices in the Valley of Optevos' (1855) and his 'Vintage'

(1863) are in the Luxembourg Gallery. He is also known as a book-illustrator and as a vigorous etcher, having produced over a hundred plates, some reproductions, others direct from nature, marked by great frankness of method and free painter-like quality. He died in Paris, 19th February 1878.

**D'Aubusson, PIERRE**, Grand-master of the order of St John of Jerusalem, surnamed 'the Shield of the Church,' was born of a noble French family in 1423. At an early age he entered the service of the Emperor Sigismund, and served under the Archduke Albrecht of Austria against the Turks. Returning to France, he served with the Armagnacs against the Swiss, and covered himself with glory at their defeat near St Jacob (1444). He next joined the order of the Knights of Rhodes, and rose rapidly into power, becoming grand-master in 1476. He laboured to bring about a confederation of all the Christian powers to counteract the triumph of the Turks that followed the fall of Constantinople. Mohammed II.'s career of conquest, which threatened to spread over Western Europe, was stayed alone by the obstinate bravery of D'Aubusson and his little colony of Christian soldiers in the island of Rhodes. In May 1480 an army of 100,000 Turks invested the town, but were forced to raise the siege after a month's desperate fighting, leaving behind them as many as 9000 dead. Mohammed was filled with fury, and a second attack was only averted by his death in 1481. D'Aubusson died in 1503. See HOSPITALIERS.

**Daudet, ALPHONSE**, was born at Nîmes on May 13, 1840. His family had been in trade, but were not in good circumstances. He was, however, well educated at the Lyons Lycée, and was able when quite a boy to take the place of usher in a school at Alais, an employment of which, in *Le Petit Chose* and others of his works, he has given no cheerful reminiscences. He was only seventeen when, giving up his ushership, he set out for Paris after his elder brother, Ernest, who himself became a journalist and novelist of some mark. Alphonse (as also did Ernest) obtained an appointment as clerk or private secretary in the office of the Duc de Morny, of whom he has drawn a famous portrait in *Le Nabab*. Indeed, one of the main characteristics of Daudet's method, and one of the main reasons of his popularity with some, and his unpopularity with other readers, is the manner in which he seems to have utilised almost every circumstance and almost every acquaintanceship of his life in his books. Daudet's literary efforts, however, began with poetry; and his first book, in 1858, was entitled *Les Amoureuses*. He also devoted some not too successful years of experiment to theatrical work, writing by himself, or with a collaborator, *La Dernière Idole* (1862), *L'Éillet Blanc* (1865), *Le Frère Aîné* (1868), *Le Sacrifice* (1869), *Lise Tavernier*, and *L'Arlésienne* (1872), pieces of which the earlier were more successful than the later. Besides this, he contributed to many journals, especially the *Figaro*. In this form appeared some of his best work, the *Lettres de Mon Moulin* (collected 1869), *Robert Helmont* (1874), the *Contes du Lundi*, and others; and it was in these years that he conceived the charming extravaganza of *Tartarin de Tarascon*, a most amusing satire on the characteristics of the natives of the south of France (1872), which he followed up with *Tartarin sur les Alpes* (1886) and *Port Tarascon* (1890).

It was not, however, till many years after his literary beginnings that Daudet hit on the style which made him popular and famous. He had sketched something of the kind in 1868 in *Le Petit Chose*, a book full of pathos and of reminis-

cences of his own early struggles. This pathetic quality is still further developed in *Jack* (1876), the story of an illegitimate child, part of the interest of which turns on the half-malicious sketches of certain literary Bohemians; and in *Fromont Jeune et Risler Aîné* (1874), where the devotion of a man of business to his firm, his wife, and his brother, meets in all three cases with an equally evil return. These were followed by *Le Nabab* (1877), a transparent caricature of Moïny and other well-known personages under the empire; *Les Rois en Exil* (1879), the chief parts in which are supposed to have been played also by actual persons; *Numa Roumestan* (1881), the hero of which was supposed to have some resemblance to Gambetta, and which at any rate is as remarkable in the serious way as *Tartarin* in the comic amongst satires on the 'meridional' type; *L'Évangéliste* (1883), in which the then new craze of the Salvation Army was introduced; *Sapho* (1884), a book somewhat out of Daudet's usual line, in which the mutual infatuation of a young man and a courtesan and artist's model is drawn with remarkable if not very wholesome power; and *L'Immortel* (1888), in which all the author's powers of ridicule, and all his practised skill in attacking individuals under a thin disguise, are employed to throw discredit on the French Academy. The vigour, and within certain limits, the versatility, of this series of novels is not denied by any one; but in addition to the personality already noticed, there has been charged against the earlier ones at least a following of Dickens, which can hardly be accidental, though it has been asserted to be so.

Daudet married early a lady of talent, who rendered him much assistance in his literary work, and he formed for some time part of a coterie of remarkable literary characters, which included Turgénief, Gustave Flaubert, the brothers Goncourt, and Zola. He published autobiographical papers, collected as *Trente Ans de Paris* (1887), and *Souvenirs d'un Homme de Lettres* (1889). Long a sufferer from locomotor ataxy, he died 16th December 1897. See R. H. Sherard's *Daudet* (1894); Diederich's German study (1901); his brother Ernest's *Mon Frère et Moi* (1882); the Memoir by his son Léon (1898); Brunetière, *Le Roman Naturaliste*; Donnicié, *Portraits d'Écrivains*.—His wife, JULIA ALLARD, born in Paris in 1845, published several volumes of poetry and literary sketches, including *Reflets sur le Sable et sur l'Eau* (1903), *Au Bord des Terrasses* (1906), *Souvenirs autour d'un Groupe Littéraire* (1910), *Les Archipels Lumineux* (1913).—Their son, LÉON DAUDET, born in 1868, has written, besides the Memoir above mentioned, novels, *Souvenirs* (1914 et seq.), and much royalist and Germanophile journalism.

**Daudnagar**, a mean-looking town in the Gaya district of Bihar and Orissa, on the Son, 90 miles SW. of Patna. It possesses, however, a considerable river trade, and manufactures coarse fabrics both of wool and of cotton. Pop. 9000.

**Daugavpils**, the Lettish name of Dvinsk or Dinaburg (q.v.).

**Daulatabad** ('fortunate city'), a town and fort in the Deccan, within the Nizam's Dominions, 28 miles NW. of Hyderabad. The fortress consists of a conical rock, 600 feet high, with a wide ditch and an outer wall nearly 3 miles in circumference. The place surrendered to the Mohammedians in 1294, and Shah Muhammad Tughlak (1324-51) thrice attempted to remove the seat of government thither from Delhi. The fortress has not been garrisoned now for many years, and the town has greatly decayed.

**D'Aulnoy**. See AULNOY.

**D'Aumale**. See AUMALE, DUC D'.

**Daumer**, GEORG FRIEDRICH, an able but eccentric German writer, was born in 1800 at Nuremberg, where for a time he was a professor in the gymnasium, and where Kaspar Hauser (q.v.) was committed to his care. Abandoning the pietism of his student days, he passed through Schelling's philosophy to a position of bitter antagonism to Christianity, which he wished swept from the face of the earth; but in 1859 he joined the Ultramontane party, and became one of its foremost champions. His many philosophical writings reflect his varying positions; so late as 1847 he endeavoured to prove that among the ancient Jews and the Christians of the first century human sacrifice obtained; from 1859 he expounded and defended the faith. His poetical works, especially *Mahomet* (1848) and the *Liederbluten des Hafis*, two graceful imitations of Persian poetry, have gained a high reputation. Daumer died at Würzburg, 14th December 1875.

**Daumier**, HONORÉ (1808-79), a celebrated French caricaturist, was born at Marseilles. Fashion, tittle-tattle, scandal, politics, blenishes of figure, and oddities of character in turn inspired his inexhaustible genius for mockery. Few among his illustrious contemporaries escaped his pencil, and his caricatures had always some strikingly truthful feature about them. He made his début in the *Charivari*, in a series of sketches from *Robert Macaire*; and the revolution of 1848 suggested two of his most remarkable series—*Idylles Parlementaires* and *Les Représentants Représentés*. In old age Daumier became blind, and was befriended by Corot. See books by Alexandre (1888), Frantz and Uzanne (1904), Marcel (1906), and Sadleir (1925).

**Daun**, LEOPOLD JOSEPH, GRAF VON, commander-in-chief of the imperial troops during the Seven Years' War, was the son of Count Wierich Philipp von Daun, a distinguished officer in the Austrian service, and was born at Vienna, 24th September 1705. Entering his father's regiment, he acquired a reputation during the Turkish campaigns (1737-39). The war of the Austrian Succession also afforded him many opportunities of displaying that combination of valour and prudence for which he was famous. After the peace with Prussia in 1745, Daun fought against the French in the Netherlands (1746-48), and in 1754 received the dignity of field-marshal. Before this, he had, in spite of many obstacles, introduced into the imperial army a new military system, and reorganised the Military Academy at Vienna. At the commencement of the Seven Years' War he commanded the army of Moravia in 1757, and neutralised the defeat of the Austrians under General Browne near Prague, by driving Frederick the Great, who had beleaguered that city, as far as Kolin, and forcing him, after a hard-fought battle, to evacuate Bohemia. On the 14th of October 1758 he gained another victory over Frederick at Hochkirch, and came near to annihilating the Prussian army. In 1759, at Maxen, he compelled Fink, the Prussian general, with 11,000 men, to surrender. After this, however, he gained no important successes; Frederick began to understand the tactics of 'the Austrian Fabius Cunctator,' and to conduct his campaigns accordingly. Daun died 5th February 1766.

**Dauphin** (Lat. *Delphinus*), a title, perhaps originally a proper name, borne by the counts of Anvergne and by the sovereign lords of Vienne, who therefore bore a *dolphin* as their crest. The last of the latter, Humbert II., in 1343 bequeathed, and in 1349 sold, his possessions to Charles of Valois, grandson of Philippe VI. of France, on condition that the eldest son of the king of France should bear the title of Dauphin of Vienne, and govern the province. As late as the time of Louis

XI., the dauphin exercised almost sovereign rights; but after his time these were gradually abridged, until Dauphiné was placed under the same laws as the rest of the kingdom, and the title became merely honorary. After the revolution of 1830, it was abolished altogether. See DELPHIN CLASSICS.

**Dauphiné**, formerly a frontier province in the south-east of France, now forming the departments Drôme, Isère, and Hautes Alpes. Its capital was Grenoble, and it boasted its 'seven wonders'—remarkable caves, mountain-peaks, &c. Once the territory of the Allobrogi, after the fall of the Roman empire Dauphiné formed the southernmost part of the kingdom of Burgundy. It then passed under the dominion of the Franks, and after the dismemberment of the Carolingian monarchy, it became a portion of the new Burgundian kingdom of Arles. It then passed by legacy into the possession of the German emperor in 1032, and remained united with Germany till the 14th century. See DAUPHIN. There is a history by Chorier (2 vols. 1883). Auvergne (q.v.) was also a Dauphiné.

**Daurat**, or DORAT, JEAN, a French scholar, who played an important part in determining the course which his country's literature took at the time of the Renaissance. He was born about 1510, and became president of the Collège Coqueret, where he superintended the studies of Ronsard, Du Bellay, Baif, and Belleau. These poets, with whom he was united in the famous coterie of the Pléiade (see PLEIADES), he carefully trained for the task of reforming the vernacular, and ennobling French literature by the imitation of Greek and Latin models. He wrote nothing of importance in French, but devoted himself to guiding and stimulating the other members of the Pléiade, in whose works his learning and enthusiasm bore rich and enduring fruit. He died in 1588.

**Dauria**, a mountainous region of south-eastern Siberia, between Lake Baikal and the river Argun, on the Chinese frontier.

**Dauthendey**, MAX, German symbolist poet, was born at Würzburg, 25th July 1867, and died in Java in 1917. He also wrote plays and novels.

**Dauw**. See HORSE, QUAGGA, ZEBRA.

**D'Avenant**, SIR WILLIAM, English poet and playwright, was born in 1606 at Oxford, where his father kept the Crown Tavern, a house at which Shakespeare was in the habit of stopping when on his journeys between London and Stratford. A story arose later that D'Avenant's birth was due to an intrigue between his mother and the great dramatist, but for this there seems to be no foundation, though apparently D'Avenant himself was willing enough to barter his mother's reputation for the credit of such a parentage. Aubrey tells us that D'Avenant would often say, when pleasant over a cup of wine, that it seemed to him that he wrote with the very spirit that Shakespeare did, and 'seemed contented enough to be thought his son.' In his twelfth year the precocious boy penned an *Ode in Remembrance of Master Shakespeare*, not printed, however, until 1638. After a short period of study at Lincoln College, he became page to Frances, Duchess of Richmond; next passed into the household of the aged poet, Fulke Greville, Lord Brooke, and in 1628 took to writing for the stage. During the next ten years he produced many plays, the least poor of which were *The Cruel Brother* (1630) and *The Wits* (1636). In 1638, at the request of the queen, he was appointed poet-laureate in succession to Ben Jonson. About the same time he lost his nose through an illness—a calamity which laid him open to the merriment of such wits as Suckling, Denham, and Sir John Mennis. He afterwards

became manager of Drury Lane Theatre, but became embroiled in the intrigues of the Civil War, and was apprehended and hung into the Tower. He soon escaped to France, and returning, distinguished himself so much in the royalist cause, that he was knighted by Charles at the siege of Gloucester (September 1643). D'Avenant again got into difficulties, and was confined in the Tower for two years, when he was released, it is said, on the intercession of Milton. Once more he set about establishing theatrical representations, and in 1658 succeeded in opening a theatre. Two years earlier he had given what was practically the first opera in England, with Mrs Coleman as the first actress that ever appeared on an English stage. After the Restoration, D'Avenant was favoured by royal patronage, and continued to write and superintend the performance of plays until his death, April 7, 1668. His epic, entitled *Gondibert*, a feeble reaction from the romanticism of the Elizabethan poets, consists of fifteen hundred four-line heroic stanzas with alternate rhymes—a metre which the genius of Gray's *Elegy* can scarce save from the damning sin of monotony; much bepraised by its contemporaries, it now sleeps securely in the same oblivion with the author's *Madagascar*, and his great opera *The Siege of Rhodes*. A collected edition of his plays, with memoir, was edited by Logan and Maidment (Edin. 5 vols. 1872-74).—CHARLES D'AVENANT, his eldest son, was born in London in 1656, was educated at Balliol College, sat in parliament under James II. and William III., was commissioner of excise and joint-licenser of plays, under Anne secretary to the Commissioners for Union with Scotland, next inspector-general of imports and exports. He died 6th November 1714. Among his writings are *Discourses on the Publick Revenues* and *The Trade of England* (1698), and *A Discourse upon Grants* (1700).

**Davenport**, capital of Scott county, Iowa, on the Mississippi, opposite Rock Island (q.v.), 183 miles W. by S. of Chicago by rail. It is the seat of several Catholic institutions, has extensive manufactures of flour, wooden and iron wares, and woollen goods, and is the shipping depot of a large grain trade. Pop. (1880) 21,831; (1900) 35,254; (1920) 56,727.

**Daventry** (pronounced *Daintry*), an ancient municipal borough of Northamptonshire, at the sources of the Avon and Nene, 12 miles W. of Northampton, and 4 NW. of Weedon by a branch line opened in 1888. It is well built on an eminence, and has two principal streets. Charles I. spent six days here in 1645 before the battle of Naseby. Pop. 3500. A mile to the east is Danes or Bolough Hill, one of the largest Roman camps in the kingdom.

**David**, capital of Chiriquí (q.v.) in Panamá, lies in a fertile plain on the Rio David, which enters the Pacific 8 miles to the south. Stock-raising and the cultivation of tobacco are extensively engaged in, and there is a considerable trade. Pop. 15,000.

**David** (Heb., 'beloved'), the second king over Israel. He sprang from a family of Judah, and was the youngest son of Jesse, a man of some substance at Bethlehem. He is described as a handsome youth, 'red-haired, with beautiful eyes, and fair of face,' when he first distinguished himself in Israel by slaying the Philistine giant Goliath. After this heroic deed, Saul took him to his court, and appointed him to a military command. According to another account (1 Sam. xvi. 14-23) it was his skill in playing the harp, and his being sent for to banish the melancholy of Saul by that means, that first led to his coming into contact with the moody king. He had soon to flee from Saul's court,

as the king's jealousy of his supposed rival led him to seek David's life; but, by the craft of his wife Michal, Saul's daughter, and the friendship of Jonathan, Saul's son, he escaped, and fled to the country of the Philistines, where, however, he found refuge only for a short time. In the cave (or hill-fort) of Adullam, near Gath, he gathered a troop of 400 freebooters, which afterwards increased to 600, and with which he ranged through the country between Philistia and the Dead Sea, never attacking his king or countrymen, but always their enemies on the west and south, and levying contributions from the people of Judah for his protection of their flocks. The expeditions which Saul led against him frequently put him to great straits, and the difficulty of controlling his irregular force without assuming the offensive against 'the Lord's anointed' becoming ever greater, David left Judah, and became a vassal of the Philistine king of Gath, occupying for a year and four months the town of Ziklag in the desert to the south. After the death of Saul and Jonathan at Gilboa, he reigned seven and a half years in Hebron over the tribe of Judah, while Ishbosheth, Saul's son, ruled the rest of Israel with the help of Abner—probably as a vassal of the Philistines. On the death of Ishbosheth, all Israel chose David as king. He conquered the independent city of Jebus (Jerusalem), the strongest natural fortress in the country, and made it the political and religious centre of his kingdom, building, with the help of Tyrian artificers, a palace for himself on its highest hill Zion (the 'city of David'), and placing the Ark of the Covenant (q.v.) there under a tent—to be replaced under his successor by a temple, for which large collections of materials were made in David's reign. The nucleus of his army consisted of his old bodyguard of 600 *gibbōrim* (or 'heroes'), from which the officers of the general levy were drawn. A plan is described in Chronicles by which 24,000 were put under arms each month out of the 288,000 able-bodied men who were the fighting strength of the country. There was an additional regiment of life-guards, mostly foreigners ('*Crēthi* and '*Plēthi*'). In the course of a few years the conquest of the Philistines, Moabites, Arameans, Edonites, and Ammonites reduced the whole territory from Egypt to the Euphrates. During the siege of Rabbah, the Ammonite capital, David committed the greatest sin of his life, his adultery with Bathsheba and indirect murder of her husband. Henceforward 'the sword never departed from his house.' The last years of his long reign of thirty-two years in Jerusalem were troubled by popular disaffection, of which his favourite son Absalom availed himself to attempt a revolution, which nearly succeeded in placing him on the throne, but cost him his life, to David's excessive grief; and shortly before David's death—which was at earliest 1018, at latest 970 B.C.—another such unsuccessful attempt was made by another son, Adonijah, who was aggrieved at the choice of Solomon as his father's successor.

David is by far the greatest of the kings of Israel. The spirit of his rule is beautifully expressed in his 'last (poetic) words,' in 2 Sam. xxiii. 1-7. His personal courage, his skill and unvarying success in war, his foresight and circumspection in government, and his readiness to sacrifice merely personal ends to the welfare of his whole people are especially conspicuous. He 'executed judgment and justice unto all his people.' The foundation of his rich and complex character was his strong faith in Jehovah his God. It was this that distinguished him from Saul as 'the man after God's own heart.' He was no saint in the Christian sense, and in his lapses from veracity, his polygamy, and his cruel treatment of conquered enemies, he followed the customs

of his time. But the same unvarnished history which is the sole authority for the dark sides of his character is equally to be believed in its presentation of the brighter sides, and does not support the unfavourable judgment of David expressed by Bayle, Voltaire, Renan, and others, who would make him out either a licentious, cruel, and hypocritical despot, or simply a child of nature gifted with an equal share of great virtues and great vices.

There can be little doubt that the tradition which describes David as a musician and poet is true to fact—but whether any of his poems have been preserved is a much more debatable point. In the Psalter no less than seventy-eight psalms are ascribed to him, but most scholars are now agreed that they cannot all be his work. Ewald acknowledges only eleven psalms as Davidic, Hitzig fourteen, Delitzsch forty-four; Cheyne denies that any of the psalms are David's, but Driver is ready to admit the possibility. 'It is possible,' he says, 'that Ewald's list may be too large, but it is not clear that none of the psalms contained in it are of David's composition.' The psalms for which the best claims of a Davidic authorship can be made out are iii., iv., vii., viii., xv., xviii., xxiii., xxiv., xxxii.

The reign of David not only determined the political life of Israel, but also its conception of ideal glory. As the succeeding ages grew darker and more troubled, believing hearts in Israel turned back to those days of the kingdom's glory; men felt that only a king like David could restore the theocracy ordained of Jehovah; he formed the prototype for the Messianic hope that Jehovah would send a son of David, who should redeem Israel.

**David**, or DEWI, ST, the patron saint of Wales, first mentioned in the *Annales Cambriae* (10th century) as having died in 601, Bishop of Moni Judeonun, or Menevia, afterwards St Davids. He presided over two Welsh synods, at Brei and at 'Lucus Victoria.' A rich legendary history supplements these meagre but authentic details. Rhgyfarch tells that he was son of the king of Ceredigion, and a pupil of Paulinus, that he journeyed through Wales preaching and working miracles, visited Jerusalem, and denounced Pelagianism at Brei with such triumphant loudness that he was made by acclamation metropolitan Archbishop of Wales. Giraldus follows Rhgyfarch in his life; Geoffrey of Monmouth makes David the uncle of King Arthur, and says he, as archbishop, transferred the metropolitan see to Menevia—pure fables. See J. E. Lloyd's *History of Wales*, vol. i. (1911).

**David I.** (often called ST DAVID), king of Scotland, was the youngest of the six sons of Malcolm Ceanmhor and St Margaret (q.v.). Born about 1080, he was sent in 1093 to England along with his sister Matilda (who in 1100 married Henry I. of England), and remained for several years at the English court—a residence that powerfully affected his after career. There, as his contemporary William of Malmesbury puts it, he was 'polished from a boy' until he 'had rubbed off all the rust of Scottish barbarity.'

In 1107, when his elder brother Alexander succeeded to the throne, David, by express bequest of Eadgar, became Prince of Cumbria, with a territory which, besides part of the modern shire of Cumberland, included the whole district between the Tweed and Solway and the Firths of Forth and Clyde, except the shires of Haddington, Edinburgh, and Linlithgow. Over the greater part of this domain he appears to have held absolute sway. Alexander seems at first to have been inclined to

dispute David's right to the district, but the success of his claim was secured without contest by the influence of the great Norman barons who had by this time acquired extensive possessions in the south of Scotland, and to whom David's English training rendered him peculiarly acceptable. By David's marriage in 1110 to Matilda, widow of Simon de St Liz, and heiress of Waltheof, Earl of Northumberland, he still further increased his power, becoming Earl of Huntingdon and Earl of Northampton.

In 1124 he succeeded his brother on the Scottish throne, but had in 1130, and again in 1137, to fight for his crown against the heus of the old Celtic dynasties supported by the wild tribes of the north and west. On both occasions the Anglo-Norman chivalry which David had gathered around him gave him decisive victories. Having sworn, along with the other great barons of England, to maintain the right of his niece, Matilda, to the English crown, David took up arms on her behalf in 1155 when Stephen mounted the English throne, and penetrated into England as far as Durham, where at a meeting between him and Stephen peace was restored by the grant of the earldom of Huntingdon, and the promise of the earldom of Northumberland, to David's son Henry. In 1138 the war was, however, renewed, and the king of Scots, deserted by Bruce and others of his Anglo-Norman vassals who owned large estates in England as well as in Scotland, was signally defeated at the 'Battle of the Standard,' near Northallerton. The next year, a second peace was concluded, when the promised earldom of Northumberland was bestowed on Prince Henry.

The rest of David's reign—which marks the end of Celtic and the beginning of Feudal Scotland—was devoted to the accomplishment of the great designs begun by his father and mother, and continued by his two predecessors—the union of the different races of Scotland into one nation, and the civilisation of the people. How well he succeeded may be traced in the two centuries of prosperity that followed his reign. By the introduction of the feudal system, and the promulgation and vigorous personal superintendence of the working of wise laws, he endeavoured to secure the peace and safety of the country; and he looked for aid in this work to the Anglo-Normans whom he had brought from the south. By the erection of burghs he promoted the trade, manufactures, and commerce of the nation, and laid the foundations of its freedom. In his civilising efforts he depended also largely on the church, the extension and influence of which he greatly fostered and encouraged. Immediately after he became Prince of Cumbria he restored the fallen bishopric of Glasgow, and after his accession he founded and endowed the bishoprics of Ross, Aberdeen, Caithness, Brechin, and Dunblane; besides enriching the previously established sees of St Andrews, Moray, and Dunkeld, and reviving the old see of Galloway (Whithorn). He also founded or restored the abbeys of Kelso, Jedburgh, Melrose, Newbattle, Holyrood, Cambuskenneth, and Kinloss, as well as a number of minor religious establishments. So far indeed did this process of endowment go, that according to Bellenden, 'the crown was left indigent throw ampliation of gret rentis to the kirk,' a state of matters that led James I. (of Scotland) to remark, while standing by David's tomb at Dunfermline, that 'he was ane soir sanct for the crown.' On the other hand one who was a hard judge of monarchs—George Buchanan—said with much more truth, that 'if men were to set themselves to draw the image of a good king, they would fall short of what David showed himself throughout the whole course of his life.' Though King David

is often called St David, he was never formally canonised; but his name was inserted in the calendar prefixed to Laud's Prayer-book for Scotland, printed at Edinburgh in 1637.

King David died at Carlisle, 24th May 1153. His son Henry had died in the previous June, and he was succeeded by his grandson, Malcolm, then in his twelfth year.

The oldest Scottish painting now known to exist—an illuminated charter to the monks of Kelso, written in 1159—preserves rude miniatures of the young king Malcolm and his saintly grandfather. It is preserved at Floors Castle, and engraved in fac-simile in the *Liber S Marie de Calchou* (Bannatyne Club, 1846). See also Innes's *Scotland in the Middle Ages* (1860); Robertson's *Scotland under her early Kings* (1862); and Skene's *Celtic Scotland* (1876). The remains of David's legislation, including the interesting code of the *Leyes Burgorum*, have been carefully collected in the first volume of *The Acts of the Parliaments of Scotland* (1844).

**David II.**, only son of King Robert Bruce, was born at Dunfermline, 5th March 1324, and was married in 1328 to Edward II.'s daughter, Joanna. In June 1329 he succeeded his father, and in November 1331 was crowned, with his child-queen, at Scone. In 1334 the success of Edward Baliol (q.v.), and Edward III.'s victory at Halidon Hill (1333), forced David's guardians to send him and his consort to France, whence by the triumph of the national party he was permitted to return in 1341. Five years later, in fulfilment of his alliance with France, he invaded England, but at the battle of Neville's Cross, near Durham, was utterly routed by the Archbishop of York, 17th October 1346. For eleven years he remained a prisoner, in or near London, and at Odiham, in Hampshire; at length, in 1357, he was released on promise of a heavy ransom (100,000 merks), whose non-payment involved him in shameful dependence on England. In 1363 he actually proposed to his parliament that Edward III.'s second son should succeed him on the Scottish throne; and though the proposal was curtly rejected, the intrigue between the two kings was ended only by David's death at Edinburgh Castle, 22d February 1371. He was not forty-seven years old, yet his reign had lasted more than forty-one years—a reign as inglorious as it was long, but still of great moment to Scotland, since, 'from a war of conquest and patriotic resistance, the struggle had died into a petty strife between two angry nations, a mere episode in the larger contest which it had stirred between England and France.' Queen Joanna dying in 1362, David next year had married Margaret Logie, a comely widow, whom he divorced in 1369. By neither marriage had he any issue, so was succeeded by his sister's son, Robert II.

**David, FÉLICIEN**, a French composer, was born 8th March 1810, at Cadenet, in the department of Vaucluse. He was first a chorister in the cathedral of Aix, then at the age of twenty entered the Paris Conservatoire. He threw himself earnestly into the social speculations of his day; became an ardent disciple of St Simon, and afterwards of *Enfantin*; and finally, on the break-up of the brotherhood in 1833, he betook himself, along with several of his fellow-dreamers, to the East. The little knot of enthusiasts reached Constantinople, whence they made their way to Smyrna and Cairo. As they had no means, they suffered greatly from want, sickness, and ill-usage. In 1835 he returned to Paris, and published his *Mélodies Orientales* for the pianoforte. They were unsuccessful; and David remained in obscurity till 1844, when he brought out at the Conservatoire his *Désert*, a grand *Ode-symphonie*, as he called it, the words of which were furnished by his friend and fellow-wanderer, Auguste Colin. Its success was sudden

and complete. David was declared a master at once, and his *Désert* was performed in all the theatres. Subsequently, he travelled through Belgium and Germany, and was everywhere greeted with applause. Less successful works were—*Mose au Sinai* (1846), *Christophe Colomb* and *Le Paradis* (1847), *La Perle du Brésil* (1851), *Herculeum* (1859), and *Lalla Rookh* (1862). He composed also a quartette for strings, a nonette, a symphony, and songs. Appointed an officer of the Legion of Honour in 1862, and in 1869 librarian to the Paris Conservatoire de Musique, David died 29th August 1876.

**David, FERDINAND**, a distinguished violin virtuoso, born 19th June 1810, at Hamburg, was from thirteen a pupil of Spohr at Cassel, and became in 1836 concertmeister at Leipzig, which place he kept till his death at Klostern in the Grisons, 19th July 1873. His remarkable talent for teaching his instrument he showed after the establishment of the Leipzig Conservatorium, and many of the best violinists of his time were his pupils. His compositions were equally esteemed.

**David, GERHARD**, painter, born about 1450, at Oudewater in Holland, in 1484 entered the Painters' Guild of Bruges, of which he became dean in 1501. He died in Bruges in 1523. The National Gallery, London, contains an admirable example of his work in 'A Canon and his Patron Saints,' a wing from an altarpiece; and among his other pictures are a Madonna, in the museum at Rome; a Crucifixion, in Berlin; and a Baptism of Christ and a Descent from the Cross, both at Bruges.

**David, JACQUES LOUIS**, historical painter, was born at Paris, 31st August 1748. He received his first instruction from Boucher, his uncle, and at the age of twenty-one became a pupil of Vien. After several unsuccessful attempts he gained the 'prix de Rome' in 1774, and in the following year he settled in Rome, where Vien had been appointed director of the French Academy. Here he produced little in colour, but devoted himself to making accurate drawings from the antique. Six years later he returned to France, and his 'Belisarius' (1780) procured his admission to the Academy. Soon afterwards he married, and again visited Italy and also Flanders. It is in the works executed during this period, such as the celebrated 'Oath of the Horatii' (1784), 'The Death of Socrates' (1788), 'The Loves of Paris and Helen' (1788), and 'Brutus condemning his Son' (1789), that the classical feeling—founded upon sculpture and possessing much of its hardness as well as its clear-cut accuracy of form which was the painter's chief characteristic—is first clearly visible. During the Revolution David entered with enthusiasm into the political conflicts of the period. In 1792 he became a representative for Paris in the Convention. He voted for the death of Louis XVI., and was a member of the Committee of Public Safety; and he was the artistic director of the great national fêtes of the republic, which were founded on classical customs. After the death of Robespierre he was twice imprisoned, and narrowly escaped with his life. On his release in 1795 he devoted himself to his art, producing 'The Rape of the Sabines' (1799), which is usually ranked as his masterpiece. He was an original member of the Institute, and in 1804 was appointed court painter by Napoleon. After the restoration of the Bourbons, he was banished in 1816 as a regicide, and retired to Brussels, where, having declined an invitation to undertake the directorship of Fine Arts at Berlin, he died, 29th December 1825.

David's productions are distinguished by a certain austere dignity of conception and by elaborate

accuracy of form. On the other hand they are often cold and unreal in sentiment, unpleasantly monotonous in colouring, and defective in their arrangements of light and shade. His art and example exercised the most powerful effect upon the French school of painting; among his pupils were Girodet, Gros, Léopold Robert, Ingres, and Gérard; and the classicism which he introduced reigned supreme until the rise of the Romantic school headed by Géricault and Delacroix. The influence which in his later days he exercised upon the school of Belgium was hardly less marked and powerful. Fourteen of his works are in the Louvre, and five—including 'Bonaparte crossing the Alps' (1805)—are at Versailles. See *Le Peintre David*, by his grandson, J. L. Jules David (1880).

**David, PIERRE JEAN**, a French sculptor, known as David d'Angers, was born at Angers, 12th March 1789. In spite of the opposition of his father, a talented wood-carver, he resolved to become an artist; and after studying in the art schools of his native town, he made his way on foot to Paris in 1808, and placed himself under Jacques Louis David, the painter. In 1811 his 'Death of Epaminondas' gained the 'grand prix,' and David proceeded to Rome, where, though he became intimate with Canova, he preserved his own individuality, and produced works modern in feeling and full of strongly marked character. In 1816 he returned to France. A statue of the Great Condé, which he executed about this time, established his reputation. In 1826 he became a member of the Institute, and a professor in the School of Fine Arts; in 1828, and again in 1834, he visited Germany. During the July revolution he fought in the ranks of the people. For the new government he executed the pediment of the Panthéon (1835-37), by many thought his *chef d'œuvre*. In 1848 his well-known republicanism procured him a seat in the Constituent Assembly. After the *coup d'état* he was sent into exile, and went to Greece, but soon after returned. He died 5th January 1856. In the Museum of Angers about two hundred of David's works in relief and the round are preserved, as well as some four hundred of his medallions and many of his drawings.

**David ap Gwilym.** See GWILYM.

**Davidson, ANDREW BRUCE** (1831-1902), born in Aberdeenshire, was educated at Marischal College, Aberdeen, and at the Free Church College, Edinburgh, where in 1863 he was appointed to the chair of Hebrew and Old Testament exegesis. In this capacity he exercised a quite unusual personal influence upon his students, and through them did much to leaven the Free Church with a critical spirit fearless in method, but in the best sense conservative of the real essentials of faith. Beyond an occasional sermon or article in the *Expositor*, Dr Davidson seldom spoke outside his lecture-room, and published little, and that rather suggestive than demonstrative of his power as an exegete. A member of the Old Testament Revision Committee, he contributed to *Chambers's Encyclopædia*; among his books are a short treatise on Hebrew accentuation (1861), an unfinished commentary on Job (1862), an *Introductory Hebrew Grammar* (1874), admirable short Commentaries on Job, Hebrews, and Ezekiel; and a posthumous volume of sermons, with a prefatory memoir by Taylor Innes. See *Life* by J. Strahan (1917).

**Davidson, JOHN**, born at Barrhead in 1857, went to London in 1890, established his reputation with *Fleet Street Eclogues* (1893), and continued to publish ballads, plays, romances, &c. till his suicide (due to difficulty in making a living) in 1909.

**Davidson, SAMUEL** (1807-98), one of the ablest of English exegetes, born near Ballymena

in Ireland, educated at the Royal College of Belfast, entered the Presbyterian ministry, and was called in 1835 to the chair of Biblical Criticism in his own college. Becoming a Congregationalist, he was called in 1842 to the chair of Biblical Literature and Oriental Languages in the Congregationalist College at Manchester, but, regarded as too 'advanced,' resigned in 1857. He was a member of the Old Testament Revision Committee. See his *Autobiography* (1899).

**Davies, Sir Henry Walford**, born at Oswestry in 1869, studied and taught at the Royal College of Music, was an organist, conducted the Bach Choir, and became professor at Aberystwyth and Director of Music for the University of Wales. He composed many cantatas, song-cycles, &c.

**Davies, Hubert Henry**, playwright, born at Woodley, Cheshire, was a journalist in San Francisco, returned to England in 1901, lost his health by war-work, and disappeared in 1917. His plays—*The Mollusc*, *A Single Man*, *Doormats*, *Outcast*, &c.—show a touch that has been compared with Jane Austen's. They have been collected, with a memoir by Hugh Walpole (1921).

**Davies, Sir John**, poet and statesman, was born of a good family at Tisbury, Wiltshire, in 1569. At sixteen he entered Queen's College, Oxford, whence he passed to the Middle Temple. He was called to the bar in 1595, but was disbarred three years later for breaking a stick in the dining-hall over the head of a wit whose raillery had provoked him. He returned to Oxford, and there wrote his long didactic poem on the immortality of the soul, *Nosce Teipsum*, in 1599. Spite of the difficulties of a formal poem upon such a theme, it is a fairly successful performance, clear, vigorous, and sincere, though quite devoid of passion or imagination. The verse is that of the *Annus Mirabilis* and Gray's *Elegy*. Davies had already published in 1595 his *Orchestra*, or a *Poeme of Dancing*, 'a sudden rash half-capreol of my wit.' It is written in seven-line stanzas in imitation of Spenser, and is a graceful and harmonious poem on the conceit that all natural phenomena are subject to a regulated motion here called dancing. In 1599 Davies published also his *Hymns to Astraea*, a collection of clever acrostics each making the name Elizabeth Regina. He contributed also to *England's Helicon* and to Francis Davison's *Poetical Rhapsody*. In 1601, after ample apologies, Davies was readmitted to the society of the Middle Temple, and was returned to parliament for Corfe Castle. On the death of Elizabeth he accompanied commissioners in their journey to the Scottish court, and quickly came into favour with James I., who sent him in 1603 as solicitor-general to Ireland. Three years later he became Irish attorney-general, serjeant-at-law, and a knight. He sent many statesman-like letters and reports to Cecil, supported severe anti-Catholic and repressive measures, and took an important part in the plantation of Ulster. He sat in the Irish parliament for Fermanagh, and was for some time its speaker; but was returned to the English parliament in 1614 for Newcastle-under-Lyme, and resigned his office at Dublin in 1619, continuing to practise as king's serjeant in England. He was nominated chief-justice in November 1626, but died suddenly of a fit of apoplexy about a month after. He collected his three chief poems into one volume in 1622. His complete works were collected by Dr Grosart in 1869-76.—His widow, Eleanor Touchet, daughter of Baron Audley, whom he had married in 1609, married again, and survived till 1652. She was crazy enough to imagine herself a prophetess; but her exertations brought her nothing save fine, imprisonment, and ridicule (see ANAGRAM).

**Davies, John** (1565-1618), 'of Hereford,' not to be confounded with Sir John Davies (q.v.), was a writing-master, whose poetry is not without merit, although prolix and tedious. His chief long poems are *Murum in Modum*, *Microcosmus*, and *Summa Totalis*. In his collection of three hundred poor epigrams (about 1611) is one addressed 'To our English Terence, Mr Will. Shake-speare.' His works were collected by Dr Grosart in 1873.

**Davies, William Henry**, born in 1870 at Newport, Monmouth, was a tramp in America for six years, sometimes crossing the Atlantic with cattle, then a pedlar and street-singer in England for eight years. Afterwards he wrote, besides *The Autobiography of a Super-tramp* (1908) and other prose books, many volumes of verse which gained him a foremost place among the lyrical poets of his time, especially as a poet of nature. Two series of *Collected Poems* appeared, 1919-23; *True Travelers: an Opera*, in 1923; and *Later Days* in 1925.

**Davila, Enrico Caterino**, a celebrated Italian historian, was born at Pieve di Sacco, in the vicinity of Padua, in 1576. When seven years old he was taken to France for his education, and at the age of eighteen he entered the service of Henry IV., which he afterwards exchanged for the military service of Venice. In 1631 he was assassinated while on his way to Crema. Davila has been rendered famous by his work, entitled *Storia delle Guerre civili di Francia* (1630; trans. Aylesbury and Cotterell, 1647). See also BALBOA, ÁVILA.

**Da Vinci.** See LEONARDO DA VINCI.

**Davis, Jefferson**, president of the Confederate States, was born in Christian county, Kentucky, June 3, 1808. He studied at Transylvania College, and at the United States military academy at West Point, where he graduated in 1828. Entering the army, he served in several frontier campaigns, but resigned his commission in 1835. He entered congress in 1845 as a representative from Mississippi, and served in the Mexican war (1846-47) as a colonel of volunteers, in which capacity his bravery won high commendation. He was appointed to the United States senate in 1847, and re-elected in 1848 and 1850; in 1851 he made an unsuccessful canvass for the governorship of Mississippi. From 1853 to 1857 he was Secretary of War under the presidency of Franklin Pierce. After this he returned to the senate, where he succeeded Calhoun as the leader of the extreme State Rights party. He was the author of the seven resolutions passed in May 1860 by the senate, in which it was virtually asserted that neither congress nor the legislature of any territory could prohibit slavery in such territory, but that both were bound to protect property in slaves; that the people of no territory could prohibit slavery until after the adoption of a state constitution; and that congress could neither prohibit nor permit the institution of slavery in any state applying for admission into the Union. The refusal of the lower house of congress to concur in these resolutions led to great popular agitation in the South. The failure of the Democratic National Convention at Charleston to adopt resolutions embodying substantially the same ideas had already (May 1, 1860) caused the disruption of that body and of the Democratic party; and the election of Lincoln, the Republican candidate, to the presidency was an immediate result of this division of the Democrats. In January 1861 the state of Mississippi seceded from the Union, and as a consequence Davis left the senate. A few weeks later he was chosen president of the Confederate States under their provisional form of government. In the November following he was without opposition elected president of the confederacy for a term of six years. The history of his presidency is that

of the war of 1861-65 (see UNITED STATES). In May 1865, after the collapse of his government, Davis was captured by a force of Union cavalry. After two years' imprisonment in Fortress Monroe he was released on bail, and though he had been indicted for treason, was never brought to trial, a *nolle prosequi* being entered in his case in 1868. After 1879 he resided on an estate bequeathed to him in Mississippi; and in that year he was specially excepted in a bill to pension veterans of the Mexican war. In 1881 he published *The Rise and Fall of the Confederate Government*; he dedicated a soldiers' monument at Montgomery; and he died 6th December 1889. See his *Life* by Alfriend (1868), Pollard (1869), and his widow (1891); also Craven, *The Prison-life of Jefferson Davis* (1866).

**Davis, JOHN**, an English navigator, was born at Sandridge, near Dartmouth, about 1550, and is principally distinguished for having undertaken in 1585 and the two following years three voyages to the Arctic Seas in search of a north-west passage. In the last voyage, he sailed with a bark of apparently not over twenty tons, as far north as the 73d degree of latitude, and discovered the strait which bears his name. He next made two ill-fated voyages towards the South Seas, and as pilot of a Dutch vessel bound to the East Indies. In his last voyage as pilot of an English ship of 240 tons he was killed in a brush with some Japanese pirates at Bintang, near Singapore, 30th December 1605. His writings, *The World's Hydrographical Description* (1595) and *The Seaman's Secrets* (1594), were edited for the Hakluyt Society in 1878 by Captain A. H. Markham, with a biographical introduction. Here it is pointed out that Davis is often confounded with John Davis of Limehouse, a navigator to the East Indies, who died at Batavia in 1622, and published in 1618 *A Ruter or Briefe Direction for Readie Sailings into the East India*, which will be found in Part I. of *Purchas his Pilgrimes*.

**Davis, THOMAS OSBORNE**, Irish poet and patriot, born at Mallow, 14th October 1814, son of an army surgeon. At Trinity College, Dublin, he read hard and graduated, and, after spending nearly three years in London and on the Continent, was called to the bar after his return to Dublin in 1838. Next year, though a Protestant, he joined the Repeal Association, and in 1841 became for a short time joint-editor with John Dillon of the *Dublin Morning Register*. In the July of 1842, with Dillon and Duffy, he founded the famous *Nation* newspaper, the chief aim of which was 'to direct the popular mind and the sympathies of educated men of all parties to the great end of nationality.' It was the first time that conspicuous literary ability had been devoted to the cause, and ere long its bright vigorous articles and stirring as well as pathetic songs, many of them from the pen of Davis himself, made the pages of the *Nation* dear to Irishmen all over the island. Davis started a projected series of Irish orators with the *Speeches of Curran* (1844), and wrote a good 'Essay on Irish Songs' for Barry's *Songs of Ireland* (1845). But his bright and promising career was soon closed by his premature death of fever, in Dublin, 16th September 1845. His *Poems* were published in 1846; his *Essays* in 1847; *Literary and Historical Essays* in 1915. See the *Memoir* by Sir C. G. Duffy (1890).

**Davis Strait** washes the western coast of Greenland, and connects Baffin Bay with the Atlantic Ocean. At its narrowest point, immediately north of the Arctic circle, it measures about 200 miles across. In 1888 the identity between Ginnunga Gap, referred to in the Sagas, and the present Davis Strait was demonstrated.

**Davits**, on shipboard, are upright columns of forged iron, curved at their upper ends, which pro-

ject, or may be made to project, over a vessel's side or stern, and are used as a kind of crane to hoist, suspend, or lower a boat. They are arranged in pairs, one for each end of the boat. See *BOAT*.

**Davitt, MICHAEL**, founder of the Irish Land League, the son of a Mayo peasant, was born near Straid, County Mayo, in 1846. Evicted from their small holding, the family emigrated to Hastingsden in Lancashire (1851); and here six years later the boy lost his right arm through a machinery accident in a cotton-factory. Having in 1866 joined the Fenian movement, he was sentenced in 1870 to fifteen years' penal servitude, but released in 1877, and began the anti-landlord crusade which culminated in the Irish Land League (1879). In 1881-82 he was imprisoned in Portland for breaking his ticket-of-leave; his *Leaves from a Prison Diary* were published in 1885. The socialistic views of the 'Father of the Land League,' especially on land nationalisation, did not harmonise with those of the other Home Rulers. In 1892 he was sent to parliament as anti-Parnellite, unseated on the ground of clerical and other intimidation, but immediately returned unopposed for NE. Cork. Having resigned in 1893 and been returned unopposed for S. Mayo, he withdrew finally in 1899. He travelled on the Continent, in America, Egypt, and South Africa during the war, and published a *Defence of the Land League* (1891), *Life and Progress in Australia* (1898), *The Boer Fight for Freedom* (1902), *Within the Pale* (1903), and *The Fall of Feudalism in Ireland* (1904). He died 30th May 1906. See *Life* by Sheehy-Skeffington (1908).

**Davos** (Romansch *Tavau*) is a small valley lying amongst the Alps of the Eastern Gisons, 10 miles SE. of Coire (40 by rail). The valley, enclosed by lofty hills, is famous as a holiday and health resort in winter, especially for such as suffer from chest disease. The air is still and dry, and throughout the winter there is a great deal of bright, warm sunshine. Once out-of-the-way hamlets, Davos-Platz (5100 feet above sea-level) and Davos-Dorfl have now numerous hotels, villas, and chalets, which accommodate tourists and invalids (over 20,000 and 10,000 respectively in some years). Davos is a favourite winter-sport centre (skiing, skating, bob-sleighbing, tobogganing, curling). The 11,200 inhabitants of the valley, which till 1848 was one of the 26 independent republics of the Grisons, are mostly German Protestants. See J. A. Symonds, *Our Life in the Swiss Highlands* (1892).

**Davout** (not DAVOUST), LOUIS NICOLAS, French marshal, was born 10th May 1770, at Annoux, in Burgundy; was educated along with Bonaparte at the military school of Brienne; and in 1788 became lieutenant in a cavalry regiment. During the revolutionary wars he rose to the rank of general. He accompanied Bonaparte to the East, where he mainly contributed to the victory at Aboukir, and otherwise distinguished himself both in Upper and Lower Egypt. On his return to France, he was named general of division in 1800, commander-in-chief of the consular grenadier guards in 1800, and marshal of the empire in 1804. He acted a brilliant part in the great victories obtained by the French at Austerlitz (1805) and Auerstadt, and was created by the emperor Duke of Auerstadt (July 2, 1808). On the renewal of the war with Austria in 1809, Davout rendered useful service at Eckmühl (22d April); and at Wagram, where he commanded the right wing, he succeeded in turning the enemy's left, and so first checked the Austrians' attack. In 1811 he was created Prince of Eckmühl. Appointed governor of Poland, he ruled that country in a spirit of the harshest despotism, and provoked the reproaches of the emperor, but,

nevertheless, did not forfeit his esteem. In the Russian campaign of 1812 he gathered fresh laurels on the fields of Mohilev and Vitebsk (27th July). After the retreat from Moscow, Davout became governor-general of the Hanse towns, and at Hamburg, though hated for his cruelty, resolutely maintained himself till the restoration of the Bourbons. On the return of Bonaparte from Elba, Davout was appointed war-minister, and as such showed a remarkable genius for the rapid organisation of troops and supplies. After the battle of Waterloo, he received the command of the remnant of the French army under the walls of Paris. He would have continued the contest had he not been ordered by the Provisional Government in the capital to conclude a military convention with the Allies. In 1819 he was made a peer of France. His death took place June 1, 1823. Firmness of character and dauntless courage were Davout's leading characteristics; but his military severities often went the length of harshness, and even cruelty, while his rapacity had in it something akin to barbarism. See his *Correspondance* (4 vols. 1885), and his *Life* by Chénier (1886), by his daughter, the Marquise Blocqueville (3 vols. 1879-80), and by Montégut (1882).

**Davy, SIR HUMPHRY**, one of the greatest chemists, was born 17th December 1778, at Penzance, Cornwall, where his father was a carver in wood. At the school at Penzance, and afterwards at Truro, he developed a taste for storytelling, poetry, and angling, and for experimental science, in which he was aided by Dunkin, a saddler. In 1793 he became apprentice to a surgeon and apothecary in Penzance, wrote verses, and indulged in chemical experiments. He at the same time entered upon a course of study all but universal. 'Speculations on religion and politics, on metaphysics and morals, are placed in his notebooks in juxtaposition with stanzas of poetry and fragments of romance.' The study of natural philosophy brought him near to that department which was to be his own; but it was not till he had reached his nineteenth year that he entered seriously upon the study of chemistry. He was then introduced to the notice of Dr Beddoes (q.v.), who in 1798 established a Pneumatic Institute at Clifton, and took him as his assistant. Here he made the acquaintance of the Earl of Durham, of Coleridge, and Southey, and carried on a course of experiments on the respiration of different gases, in which he had more than once nearly sacrificed his life. He thus discovered the singular exhilarating effect of nitrous oxide when breathed. The account which he published in his *Researches Chemical and Philosophical* (1799), although afterwards regretted, established his reputation, and led to his appointment, at the age of twenty-two, as lecturer to the Royal Institution of London. He delivered his first lecture in 1801; and his eloquence, and the novelty and variety of his experiments, soon attracted crowded and brilliant audiences. In 1803 he began researches connected with agriculture, on which he delivered a course of epoch-making lectures, which were published under the title of *Elements of Agricultural Chemistry* (1813). The discoveries, however, on which Davy's fame as a chemist chiefly rests, took their origin in the views which he developed in 1806, in his Bakerian lecture, *On Some Chemical Agencies of Electricity*. This essay was universally regarded as one of the most valuable contributions ever made to chemical science, and obtained the prize of the French Institute. Following out his principle, he was led to the grand discovery that the alkalis and earths are compound substances formed by oxygen united with metallic bases. It was potash that he first suc-

ceeded in decomposing, on the 19th October 1807. When he first saw the globules of the new metal, *potassium*, his delight is said to have been so ecstatic that it required some time for him to compose himself to continue the experiment. He next decomposed soda and the alkaline earths, baryta, strontia, lime, and magnesia; and discovered the new metals, *sodium*, *barium*, *strontium*, *calcium*, and *magnesium*. With regard to the earths proper, he succeeded in proving that they consist of metals united to oxygen. It was reserved for Wohler and others to exhibit the metals by themselves. He lectured in Dublin in 1808-9, and received the honorary degree of LL.D. from Trinity College.

On 8th April 1812 Davy was knighted; he married Mrs Apreece, a lady of considerable wealth, daughter and heiress of Charles Kerr of Kelso, and resigned the chemical chair of the Royal Institution, April 1813. In order to mark the high sense of his merits, he was elected honorary professor of Chemistry. He discovered the talents of Faraday (q.v.), for whom he secured the appointment as assistant in the laboratory of the Royal Institution. That he might investigate his new theory of volcanic action, he received permission from the French government—though the two countries were then at war—to visit the Continent, and was received with the greatest distinction by the scientific men of France. He was accompanied by Faraday. On returning to England in 1815, he entered on the investigation of the nature of fire-damp, which is the cause of explosions in coal-mines. This resulted in the invention of the Safety-lamp (q.v.). A public subscription of about £1500 was collected as a testimonial by those interested in 1817, and he was entertained to dinner, and presented with a service of plate. He was created a baronet, 20th October 1818. On the death of Sir Joseph Banks in 1820, Sir Humphry Davy was elected President of the Royal Society. In 1820-23 his researches on electromagnetism were communicated to the Society. He invented an ingenious plan for preventing the corrosion of the copper-sheathing of ships by altering the electric condition of the copper by means of bands of zinc; but the bottoms of the vessels became so foul from the adhesion of weeds and shells that the plan had to be abandoned.

Early in 1825 Sir Humphry Davy had begun to complain of the loss of strength, and in 1826 he had an apoplectic attack. He made two journeys to the Continent for the recovery of his health, and died at Geneva on the 29th May 1829, at the early age of fifty-one. The Genevan government evinced their respect by a public funeral. He was a member of almost all the scientific institutions in the world. Cuvier, in his *Eloge*, says: 'Davy, not yet fifty-two years of age, occupied, in the opinion of all that could judge of such labours, the first rank among the chemists of this or of any other age.' Another critic has said: 'He was not only one of the greatest, but one of the most benevolent and amiable of men.' His widow placed a tablet to his memory in Westminster Abbey, and a statue was erected to him in Penzance. Besides the works already mentioned, and a great number of contributions to the *Philosophical Transactions*, Sir Humphry Davy was author of *Elements of Chemical Philosophy* (1812); *On the Safety-lamp in Coal-mines* (1818); *Salmonia, or Days of Fly-fishing* (1828); and *Consolations in Travel* (1830)—all included in his *Collected Works* (9 vols. 1839-40).

See *Memoirs of the Life of Sir Humphry Davy*, by his brother, John Davy (1836); his *Fragmentary Remains* (1858); the *Life* by Dr Paris (1831); and that by Dr T. E. Thorpe (1896).

**Davy, JOHN**, musician, was born near Exeter in 1763, and died in London in 1824. Many of his songs were great favourites, and though most are

forgotten, 'The Bay of Biscay' has never lost popular favour.

**Davy Jones**, a sailor's familiar name for a malignant sea-spirit or the devil generally. The common phrase 'Davy Jones's locker' is applied to the ocean as the grave of men drowned at sea. A dubious explanation of the name makes it compounded from *Duffy*, a West Indian negro spirit name, and the scriptural prophet Jonah, in jocular allusion to his somewhat unusual adventures.

**Davy Lamp.** See SAFETY-LAMP.

**Dawalla** (*Hypophthalmus dawalla*), a fish of the family Siluridae, found in the rivers of Guiana, and highly esteemed for the delicacy of its flesh. It is sometimes 2½ feet long, and is brightly coloured. The eye is situated below the angle of the mouth.

**Dawes**, RICHARD (1708-66), Hellenist, born near Market Bosworth, was a fellow of Emmanuel, Cambridge, and schoolmaster in Newcastle (1738-49), and retired to Heworth, in Durham, where he solaced himself with rowing and campanology.

**Dawkins**, SIR WILLIAM BOYD, was born at Buttington vicarage, near Welshpool, Montgomeryshire, 26th December 1838, and educated at Rossall School and Jesus College, Oxford. In 1861 he joined the Geological Survey, became curator of Manchester Museum in 1870, and professor of Geology in Owens College (afterwards Manchester University) in 1872. In 1882 he presided over the anthropological section of the British Association at Southampton, and was elected honorary fellow of his old college. The Channel Tunnel Committee employed him in 1882 to make a special survey of both coasts; and next year he laid down the line for a tunnel under the Humber. Sir W. Boyd Dawkins has contributed numerous papers to learned societies relating especially to fossil mammalia. His books are *Cave-hunting: Researches on the Evidences of Caves respecting the Early Inhabitants of Europe* (1874), and *Early Man in Britain, and his place in the Tertiary Period* (1880), the latter a work of great interest.

**Dawlish**, a pleasant watering-place, on the S.E. coast of Devonshire, backed by the Great Haldon (818 feet), 12 miles S. by E. of Exeter; pop. 4700.

**Dawn.** See TWILIGHT.

**Dawson**, GEORGE, a busy and popular preacher and lecturer, was born in London, 24th February 1821, taught for a time in his father's academy, and studied at Aberdeen and Glasgow. He became pastor of Rickmansworth Baptist Chapel in 1843; of Mount Zion, Birmingham, in 1844, where his eloquence, breadth of view, and entire freedom from conventionality drew crowds to his services. Dawson's doctrinal position, which did not allow of his being fettered by theological forms of belief, led to his resignation; the 'Church of the Saviour' was built for him (1847), which borrowed its ritual from many sources. He took a lively interest in politics; was extremely popular as a lecturer for thirty years; popularised the views of Carlyle and Emerson, with both of whom he was personally acquainted; taught English literature classes at the Midland Institute for six years; advocated free libraries, and was one of the founders of the Shakespeare Memorial Library, Birmingham. Since his sudden death at King's Norton, near Birmingham, 30th November 1876, various works have been published: *Sermons* (4 vols. 1878-82), *Prayers* (2 vols. 1878-83), *Biographical Lectures* (2 vols. 1886-87), and *Every Day Counsels* (1888). See the Memoir by Crosskey (1876).

**Dawson**, SIR JOHN WILLIAM, geologist and naturalist, was born at Pictou, Nova Scotia, October 1820. He studied at Edinburgh, and afterwards devoted himself to researches in the

natural history and geology of Nova Scotia and New Brunswick, aiding Sir Charles Lyell in his investigations in Nova Scotia in 1842 and again in 1852. He was appointed superintendent of education in Nova Scotia in 1850; principal of McGill University, Montreal (1855), and afterwards vice-chancellor. In 1884 he was knighted; and he was an LL.D. of Edinburgh, &c. His *Devonian and Carboniferous Flora of Eastern North America* records the discovery of what he believed to be the lowest known form of animal life, the Eozoon Canadense of the Laurentian limestone (see EOOZON). An anti-Darwinian, he published *Archaia* (1858), *Story of the Earth and Man* (1872), *Dawn of Life* (1875), *Origin of the World* (1877), *Fossil Men* (1878), *Change of Life in Geological Time* (1880), *Egypt and Syria* (1885), *Geology and History* (1894), and *Relics of Primeval Life* (1897). He died 19th November 1899.

**Dawson**, capital of the Yukon territory of Canada, is situated amidst impressive scenery at the junction of the Klondike and Yukon Rivers, and was founded in 1896 on the discovery of gold in the district. Although partly destroyed by fire in 1899, it is a busy and well-equipped town, having good steamer connection with the upper and lower Yukon. It is 1500 miles from the mouth of the great river. Though in winter the temperature falls to -50° or lower, it may in summer be 90° in the shade; and good wheat, barley, and oats have been ripened here. Pop. 1000.

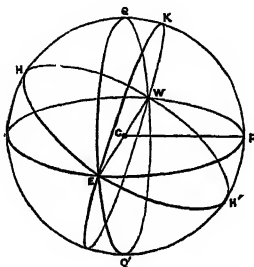
**Dax**, a town in the French department of Landes, on the Adour, 93 miles S. by W. of Bordeaux by rail. It has a 14th-century castle, remains of Roman walls, a cathedral, and is remarkable for its hot sulphur-springs (77°-144° F.), whose waters, known to the Romans as *Aque Tarbellæ*, are used in cases of rheumatism and nervous complaints. In the middle ages it was called Acqs. It has a trade in turpentine, resin, pitwood, horses, and hams. Pop. 11,000.

**Day** originally meant the space of time during which it is light, in opposition to the space of darkness or night; it now more usually denotes a complete alternation of light and darkness. It is the earth's rotation that causes the vicissitude of day and night. The earth being a globe, only one-half of it can be lighted up by the sun at once; to that half it is day, while to the other half, which is in shade, it is night. But by the earth's rotation, the several portions of the surface have each their turn of light and of darkness. This happens because the position of the earth is such that the equator is on the whole presented towards the sun; had either pole been towards the sun, that hemisphere would have revolved in continual light, the other in continual darkness.

One complete rotation of the earth does not make a day, in the usual sense. If the time is noted when a particular fixed star is exactly south or on the meridian, when the same star comes again to the meridian the next day, the earth has made exactly one rotation, and the time that has elapsed is called a *sidereal day*. This portion of time may be regarded as being always of the same length; for the motion of the earth on its axis differs extremely little from absolute uniformity. Hence sidereal or star-time is much used by astronomers. But the passage of a star across the meridian is not a conspicuous enough event for regulating the movements of men in general. It is not a complete rotation of the earth, but a complete alternation of light and darkness that constitutes their day. This, which is called the *civil* or the *solar day*, is measured between two meridian passages of the sun, and is about four minutes longer than the sidereal day. The cause of the greater length is

this : When the earth has made one complete turn, so as to bring the meridian of the place to the same position among the fixed stars as when it was noon the day before, the sun has in the meantime (apparently) moved eastward nearly one degree among the stars, and it takes the earth about four minutes more to move round so as to overtake him. If this eastward motion of the sun were uniform, the length of the solar day would be as simple and as easily determined as that of the sidereal. But the ecliptic or great circle in which the sun apparently moves crosses the equator, and therefore one portion of the sun's apparent path is more obliquely inclined to the equator than another; besides, as the earth moves in her orbit with varying speed, the rate of the sun's apparent motion in the ecliptic must also vary. The consequence is, that the length of the solar day is constantly fluctuating; and to get a fixed measure of solar time, astronomers have to imagine a sun moving uniformly in the celestial equator, and completing its circuit in the same time as the real sun. The time marked by this imaginary sun is called *mean solar time*; when the imaginary sun is on the meridian, it is *mean noon*; when the real sun is on the meridian, it is *apparent noon*. It is obvious that a sun-dial must show apparent time, while clocks and watches keep mean time. Only four times in the year do these two coincide. The difference is called the *equation of time*, because, when added to or subtracted from apparent time, according as the sun comes too soon or too late on the meridian, it makes it equal to mean time. The mean solar day is divided into twenty-four hours, the hours into minutes and seconds. A sidereal day, we have seen, is shorter; its exact length is 23 hours, 56 minutes, 4 seconds of mean solar or common time. Astronomers divide the sidereal day also into twenty-four hours, which are of course shorter than common hours. In the course of a civil year of 365 days, the earth turns on its axis 366 times, or there are 366 sidereal days. Astronomers reckon the day as beginning at noon, and count the hours from 1 to 24. The civil day begins at midnight, and the hours are counted in two divisions of twelve each. The ecclesiastical day was reckoned from sunset to sunset. The Greeks counted their day from sunset, as did also the Hebrews, the Romans from midnight, the Babylonians from sunrise, the Umbrians from mid-day.

The diagram will explain the variation in the relative duration of light and darkness at different times of the year and different parts of the earth's surface. C represents



zon. When the sun is on the equator it is obvious that the arcs EQW and EQ'W are equal—i.e. the sun is as long above the horizon as it is below it. But, if the sun be in the northern half of the ecliptic, its apparent path is a circle parallel to EQW passing through the sun's position; and more of this circle is above the horizon than below it. Similarly we can explain the appearances for other positions of the sun and of the observer.

Day, as opposed to night, varies with the latitude and the season of the year. As we go north from

the equator it *increases* in summer, and *decreases* in winter. At the equator, day is a little more, night a little less than twelve hours; at the poles, day is a little more, night a little less, than six months. For the time of day in different countries, see *TIME*.

A *day*, in Law, includes the whole twenty-four hours from midnight to midnight. In reckoning periods of time from a certain event, the day on which the event occurred is excluded. On the other hand, if it be required to prove survival for a certain number of days, it will suffice if the person be alive for any portion, however small, of the last day. While an obligation to pay on a certain day would therefore be theoretically discharged by payment before midnight, the law requires that reasonable hours be observed—e.g. if the payment (as a bill) is at a bank or place of business, it must be within business hours.

A *lawful day* is a day on which there is no legal impediment to the execution of a writ—i.e. all days except Sundays and fast-days appointed by government. Criminal warrants, and in Scotland warrants against debtors in *meditatione fugæ*, are an exception to this rule, and may be both granted and executed on Sundays and fast-days. By 29 Car. II. chap. 7, all contracts made by persons in their ordinary calling on a Sunday are void. The exceptions to this rule will be explained under *SABBATH*. In England, Christmas-day and Good-Friday generally stand on the same footing with Sundays and fast-days appointed by royal proclamation; but in Scotland there is no exception made in favour of any of the feast or fast days of the church.

*Days of Grace*.—The time at which a bill is actually *due* and payable, except in the case of bills payable on demand or at sight, is three days after the time expressed on the face of it, and these three additional days are called *days of grace*. If the third day of grace fall on a Sunday, Christmas-day, Good-Friday, or a national fast or thanksgiving day, the bill is payable the day before. If it fall on any of the other bank holidays, or if the last day of grace is a Sunday and the second a bank holiday, the bill is payable on the succeeding business day (see *BILL*). Days of grace have now been abolished in many countries, but there are still three allowed in the United States, and ten in Russia.

**Day, JOHN** (1522-84), a native of Dunwich, was an early London printer, his most celebrated production being Foxe's *Book of Martyrs*.

**Day, JOHN**, a dramatist, of whose life hardly anything is known. He is mentioned in Henslowe's *Diary* in 1598 as an active playwright. But few of his earlier works have come down to us save *The Blind Beggar of Bednal Green*. Day collaborated freely with contemporary writers, as Chettle and Dekker. Ben Jonson in his conversations with Drummond of Hawthornden grouped him with some other admirable gentlemen and authors as a rogue and a base fellow. His best works that have reached us are a graceful comedy, *Humour out of Breath*, and *The Parliament of Bees*, a kind of allegorical masque in which all the characters are bees. 'The very air,' says Charles Lamb, 'seems replete with humming and buzzing melodies. Surely bees were never so berhymed before.' An edition of Day's works was privately printed by A. H. Bullen in 1881.

**Day, THOMAS**, the author of *Sandford and Merton*, was born in London, 22d June 1748, and thirteen months later, by his father's death, became heir to £900 a year. From the Charterhouse he passed to Corpus Christi College, Oxford, where he formed a close friendship with Richard Lovell

Edgeworth (q.v.). In 1765 he entered the Middle Temple, in 1775 was called to the bar, but he never practised. A good, clever eccentric, a disciple of Rousseau, he brought up two children, an orphan blonde and a foundling brunette, one of whom should presently become his wife. That scheme miscarried; and, admitted to the Lichfield coterie, he proposed first to Honora Sneyd, next to her younger sister Elizabeth. She sent him to France to acquire the French graces; as acquired by him, they but moved her to laughter. Finally in 1778 he married an appreciative heiress, Esther Milnes, and spent with her eleven happy years, farming on philanthropic and costly principles in Essex and Surrey, till on 28th September 1789 he was killed by a fall from a colt he was breaking in. His wife died broken-hearted two years afterwards. Two only of Day's eleven works call for mention—*The Dying Negro* (1773), and the *History of Sandford and Merton* (3 vols. 1783–89). The poem struck the keynote of the anti-slavery movement; the child's book, like its author, is sometimes ridiculous, but always excellent. See *Lives of Day* by Keir (1791), and Blackman (1862).

**Dayaks.** See DYAKS.

**Dayanand Saraswati.** See ARYA SAMAJ, BRAHMA SAMAJ.

**Day-fly.** See EPHEMERA.

**Day-lily** (*Hemerocallis*), a perennial herbaceous genus of Liliaceæ, so named from the ephemeral flowers, which, however, succeed each other freely upon the peculiar inflorescence (a double bostyx). Several species are cultivated in gardens, especially



Yellow Day-lily (*Hemerocallis flava*).

the fragrant Yellow Day-lily (*H. flava*), a native of warmer Europe, southern Siberia, and northern China, and *H. fulva*, from the Levant. Both species, but particularly the latter, have been recommended as sources of green fodder for cattle.

**Dayton**, capital of Montgomery county, Ohio, sixth city of the state, is situated on the Great Miami, at the mouth of the Mad River, 48 miles NNE. of Cincinnati. The streets are broad, the private residences generally handsome; the public buildings include a court-house of white marble, a large jail, a number of schools, and many churches. Standing on the line of the Miami Canal (opened 1829), the city is the terminus of eight railroads, and the water of the Mad River is brought through its streets by an hydraulic canal,

supplying abundant water-power. It has paper-mills, manufactures of railroad cars, aeroplanes, agricultural machinery, &c. The National Cash Register factory is a very important institution. A tornado, fire and flood, in March 1913 proved very destructive to life and property. Pop. (1870) 30,473; (1890) 61,220; (1900) 85,333; (1910) 116,577; (1920) 152,559.

**D'Azara, FELIX** (1746–1811), born in Aragon, was a commissioner for delimiting the Spanish and Portuguese possessions in South America. He wrote a *Natural History of the Quadrupeds of Paraguay* (1801; trans. 1838), and *Voyages dans l'Amérique Méridionale* (1809).

**D'Azeglio.** See AZEGLIO.

**Deacon**, lit. a 'servant' or 'follower' (and, in that sense, found in classic and also in Hellenistic Greek), became in ecclesiastical usage the name for an office-bearer in the Christian church. In Acts vi. we read of the appointment of seven men chosen by the laity and ordained by the apostles to attend to the finances of the infant church, and to see that its alms are fairly distributed. The name deacon is not applied to them. They are to be spiritually-minded men; they are solemnly set apart from the rest of the congregation; and almost immediately they are found preaching and baptising (Acts, vi. vii. and viii. 38); and the most distinguished of them, St Stephen, dies as the first Christian martyr. In the epistle to the Philippians they are named along with the bishops, and in the pastoral epistles they are recognised as part of the Christian ministry (1 Tim. iii. 8–13) without any special reference to financial duties. Chrysostom suggested that the appointment in the Acts was of a temporary nature, and distinct from the sacred ministry of the diaconate subsequently instituted; and this view obtained some sanction from the sixth General Council. But a great Anglican antiquary, Bingham (supported in this matter by the Roman Catholics Thomassinus and Petavius), takes the opposite side, and is able to appeal to Justin Martyr, Irenæus, Hilary, Cyprian, and other doctors, to the effect that the seven were truly deacons in the later sense, and were authorised by the apostles to undertake these higher functions. The number seven continued to be adhered to in many churches—e.g. at Rome, until the 11th century, when the number was doubled.

During the 2d and 3d centuries, the duties falling to the deacons had considerably increased; and since as confidential attendants and helpers of the bishops, they had risen into consequence, it became necessary to divide the various functions among an arch-deacon, deacons, and sub-deacons. Deacons might now dispense the bread and wine at the communion, but not consecrate them. They had to receive the offerings and presents for the bishop, to keep the sacred vessels, to chant the introductory formulas of public worship, and to take the oversight of the morals of the congregation; and they were allowed, in many cases, with the leave of the bishop, to preach and baptise, and receive penitents into the communion of the church. At an early period, the offices of arch-deacon and deacon were considered to belong to the higher orders of consecration (*ordines majores*): this was not the case with that of sub-deacon till after the 12th century. At the consecration of a deacon, according to the Roman rite, certain sacred vessels may be handed to him as symbols of his office; but this does not seem to be regarded as essential. In the Greek rite the *flabellum* (a fan for driving away flies from the sacred elements) is given to the deacon. The peculiar robes are the dalmatica and the stole, but the stole (both in East and West) is only placed over the left shoulder.

In Protestant churches the position of deacons varies. Among Presbyterians, the elders have the spiritual oversight of the congregations; while deacons (as in the United Free Church of Scotland) and managers in others have the care of the financial affairs. Among Congregationalists, the deacons combine spiritual and financial duties. The Church of England has retained in the main the older form of ordination. The deacon has only the hands of the bishop laid upon him, and not those of any attendant priests also; he cannot consecrate the elements at holy communion or pronounce the absolution or benediction; and he only preaches by special license from the bishop, and not directly by virtue of his office. For this, as well as for holding any benefice or church-preference, priest's orders are necessary. The office is now regarded very much as simply one of probation before admission to priest's orders. But in ancient times it was not uncommon for a man to remain a deacon for life. The cardinal deacons at Rome sometimes remain such, especially if much occupied with secular business. Thus the late celebrated Cardinal Antonelli always remained a deacon. Before a person can be appointed deacon in the English Church, he must have reached the age of twenty-three, and he usually remains in this office one year at least.

DEACONESSSES (*ancillæ, ministræ, viduæ, virgines, episcopæ, presbyteræ*), female ministers or servants of the church or Christian society in the time of the apostles (Rom. xvi. 1). At a later period, they co-operated with the deacons, showed the women their place in the church assemblies, assisted at the baptism of persons of their own sex, instructed those who were about to be baptised as to the answers they should give to the baptismal questions, arranged the *agapæ* or love-feasts, and took care of the sick. In the 3d century it seems to have been also part of their duty to visit all Christian women who were suffering imprisonment, and to be hospitable to such as had come from afar. In very early times they were consecrated to their office by ordination in the same manner as other ecclesiastical or spiritual personages; later, however, they were inducted into their office by prayer without the imposition of hands. Until the 4th century, the deaconesses had to be either maidens or widows who had been only once married, and sixty years of age; but after the Council of Chalcedon the age was fixed at forty. Their assistants were called *sub-deaconesses*. After the 6th century in the Latin Church, and after the 12th century in the Greek Church, the office of deaconess was discontinued; but the former has retained the name. In convents, for example, the nuns who have the care of the altar are called deaconesses. In the Reformed Churches of the Continent there are deaconesses who nurse the sick and tend the poor. The first deaconesses' house at Kaiserswerth on the Rhine, near Düsseldorf, was founded by Pastor Fliedner in 1836; and now scattered over the Protestant world there are numerous similar institutions, with thousands of sisters. The Church of Scotland adopted the office of deaconess in 1887-88. The Diocesan Deaconess Institution, London, was established in 1861; but Sisterhoods (q.v.) have struck a much deeper root in the Anglican communion. See works by Dean Howson (1886) and Cecilia Robinson (1899).

**Deacon of a Trade**, the president, for the time being, of certain incorporations in Scotland, where, prior to the passing of the Burgh Reform Act, 1834, the deacons of trades or crafts represented the trades in the respective town-councils. That act enacted that the deacons shall no longer be recognised as official and constituent members of the town-council, but preserved the power of the crafts to elect deacons and other officers for the

management of their affairs. The deacon-convenor of the trades in Edinburgh and Glasgow is still a member of the town-council. See DEAN OF GUILD.

**Dead**, in *seafaring* language, is very frequently employed as part of a designation or phrase having, in general, a meaning somewhat opposite to that of *active, effective, or real*. The chief of such phrases are the following: *Dead-eyes*, circular, flattish wooden blocks, without sheaves, and having eyes for lanyards, which form a purchase or tackle whereby the shrouds or other fixed rigging are extended or set-up taut; *Dead-flat*, the name for one of the midship-timbers; *Dead-lights*, strong wooden shutters used to close cabin-windows, on the approach of a storm, to protect the glass; *Dead-ropes*, such as do not run in blocks; *Dead-wood* is the term applied to the solid blocks of timber eiected upon the keel throughout the sharp portions of a ship's hull at stem and stern, the chief object being to give solidity and strength to the ends of the ship; *Dead-reckoning*, an estimation of a ship's place without celestial observations, made chiefly by the log-book, and liable to error on account of currents, lee-way, fluctuation of wind, &c. To these may be added *Dead-wind*, a seaman's designation for a wind blowing directly against a ship's course.

Other compounds are *Dead-lock*, a position of matters when they have become so complicated that they are at a complete standstill and progress is impossible; *Dead-freight*, the compensation paid to the shipmaster by the merchant who freights a whole ship for the space which he fails to occupy; *Dead language*, one no longer spoken; and *Dead-letter*, a letter undelivered and unclaimed at the Post-office (q.v.). The *Dead-points* of an engine are when the connecting-rod and the crank are in one line (see CRANK). The impetus of the fly-wheel is necessary to carry the engine over these points, and if it is allowed to stand at either of them, a start is impossible till the fly-wheel is turned by hand sufficiently to permit of the piston acting on the crank.

**Dead, BOOK OF THE**, the great funerary work of the ancient Egyptians, who themselves entitled it *Per-em-Hru*, 'to go forth from (or by) day.' It is 'a collection of prayers and exorcisms composed at various periods for the benefit of the pilgrim-soul in his journey through Amenti (the Egyptian Hades); and it was in order to provide him with a safe-conduct through the perils of that terrible valley that copies of the work, or portions of it, were buried with the mummy in his tomb.' Such copies, hieroglyphic or hieratic according to the age when they were executed, and made some to order, others for sale, constitute fully one-half of the thousands of extant papyri. They are mostly corrupt and faulty; but as the fruit of ten years' toil, a critical text was at last published by Edouard Naville in *Das Aegyptische Todtenbuch der XVIII. bis XX. Dynastie* (Berlin, 1886), whose folio supplement contains 212 plates of texts, vignettes, and variants of vignettes. Dr Birch's English translation (*Egypt's Place in Universal History*, vol. v. 1867) is based on Lepsius' imperfect Turin text (1842), as also is Pierret's French translation (1882). See the articles EGYPT, HIEROGLYPHICS, and AMENTHES; texts, facsimiles, translations, &c., by Sir E. A. Wallis Budge (1895-1913); and a masterly article by Miss A. B. Edwards in the *Academy* for 10th September 1887.

**Dead, PRAYER FOR THE**. See PRAYER, PURGATORY, REQUIEM.

**Deadly Nightshade**. See BELLADONNA.

**Dead-men's Fingers**. See ALCYONIUM.

**Dead Nettle** (*Lamium*), a genus of Labiatae. *L. purpureum* and *L. album*, together with (Gale-

opsis) the closely allied common British weeds.



White Dead Nettle  
(*Lamium album*).

Hemp-nettle, are very common. The commoner species have been somewhat thoroughly naturalised in the long-settled parts of the United States. They are sometimes boiled as pot-herbs in Sweden. The name seems derived from the superficial resemblance to the true or stinging nettles; this is especially marked in *L. album*.

**Dead Sea** is the usual name, dating from the time of Jerome, for a most remarkable lake in the south-east of Palestine, called in the Old Testament *The Salt Sea*, *Sea of the Plain*, or *East Sea*; by Josephus, *Lacus Asphaltites*; and by the Arabs now, *Bahr-Lūt*, 'Sea of Lot.' It is 46 miles long, with a

breadth of from 5 to 9 miles. Its surface, which is lower than that of any water known, is 1292 feet below the level of the Mediterranean. The depth of the greater part, the northern section is about 1300 feet; but at the southern end the water is only from 3 to 12 feet deep. The shape is that of an elongated oval, interrupted by a promontory which projects into it from the south-east. The Dead Sea is fed by the Jordan from the north, and by many other streams, but has no apparent outlet, its superfluous water being supposed to be entirely carried off by evaporation. Along the eastern and western borders of the Dead Sea there are lines of bold, and in some cases perpendicular, cliffs rising in general to an elevation of 1500 feet on the west, and 2500 feet on the east. These cliffs are chiefly composed of limestone, and are destitute of vegetation save in the ravines traversed by fresh-water streamlets. The north shores of the lake form an extensive and desolate muddy flat, marked by the blackened trunks and branches of trees, strewn about and incrustured with salt. The southern shore is low, level, and marshy, desolate, and dreary. On this shore is the remarkable ridge of rock-salt, 7 miles long and 300 feet high, called *Khashm Usdom* ('Ridge of Sodom'). Lava-beds, pumice-stone, warm springs, sulphur, and volcanic slag prove the presence here of volcanic agencies at some period. The neighbourhood of the Dead Sea is frequently visited by earthquakes, and the lake still occasionally casts up to its surface large masses of asphalt. The basin of the sea and the valley of the Jordan seem both to be due to a great fault or crack in the earth's surface of very ancient date. The long-entertained belief that the exhalations from this lake were fatal is not founded upon fact. Within the thickets of tamarisk and oleander, which here and there may be seen upon its brink, the birds sing sweetly, and they fly over and swim about on its surface. But the salinity of the waters is adverse to life, though some lower organisations are found in them.

The water of the Dead Sea is characterised by the presence of a large quantity of magnesian and soda salts. Its average specific gravity is about 1166 (pure water being 1000). The proportion of saline matter is so great that, whilst sea-water contains only 3.5 per cent. of salts, the water of the Dead Sea contains upwards of 26 per cent., or more than seven times as much as that of the ocean. In all

lakes or collections of water without any outflow, the water acquires an infusion of salt from its feeders, while none can go off by evaporation, even when the shores do not as here abound in salt and nitre. The principal salts in the water are chloride of calcium, magnesium, sodium, and potassium, with bromides and sulphates of the same. The evaporation is great as the heat is intense, and the sea rather contracts than increases. Rain hardly ever falls; the water is nearly as blue and clear as that of the Mediterranean; and though it is very hurtful to the eyes, and though it is horribly salt and ill-smelling, a bath in it is refreshing. Owing to the great specific gravity of the water, it is almost impossible for the bather to sink in it. The geological fault in which the Dead Sea and the Jordan valley lie dates probably from the end of the Eocene period; the site of the 'cities of the plain' cannot accordingly be beneath the present sea, as used always to be assumed (see SODOM AND GOMORRAH).—**DEAD SEA APPLES**, or Apples of Sodom, described by Josephus as 'externally of fair appearance, but turning to smoke and ashes when plucked by the hands,' cannot be the *Solanum sodomæum* (see SOLANUM), which botanists call 'Apple of Sodom.' Seetzen, Irby, Mangles, and Robinson identify them with the fruit of *Asclepias gigantea vel procera* (a tree 15 feet high), like a large smooth orange or apple. Being filled mainly with air, the ripe fruit, when pressed or struck, explodes with a puff, leaving in the hand, except fragments of rind and a few fibres, only a central pod, containing, with the seed, a little fine silk, which the Arabs twist into gun-match.

See books quoted at PALESTINE; De Sauley (1853) and the Duc de Luynes (1874) on the Dead Sea; the *Jewish Encyclopedia*; and German works by Tuch (1863), Fraas (1867), and Blanckenhorn (1912).

**Dead's Part**, in Scots law, is that part of a man's movable property which he is entitled to dispose of by testament. If a man dies without leaving widow or children, the dead's part is the whole; if he leave widow but no children, or children but no widow, it is a half; and if he leave both widow and children, it is a third of his movable property. The dead's part may be increased or diminished by marriage-contract, or by wife and children renouncing their legal rights.

**Deaf and Dumb.** Persons who are born deaf, or who lose their hearing in infancy, are dumb also; hence the compound term deaf-and-dumb. But deafness is the primary defect; dumbness is only the consequence of deafness. Normal children hear sounds, and then learn to imitate them; i.e. they learn to repeat what they hear other persons say. It is thus that every one of us has learned to speak. But because the deaf child hears nothing it cannot imitate, and therefore remains dumb. Persons who lose their hearing later in life are not to be classed among the deaf and dumb. Having acquired speech before their hearing was lost, they can still retain that means of communication with others; and if they are educated, there are open to them all the stores of knowledge contained in books, from which the juvenile deaf and dumb, ignorant of all written and spoken language, are utterly excluded. It is this latter class alone which was contemplated in our census enumerations, and for which our institutions for the education of the deaf and dumb were designed.

The term 'deaf and dumb' is somewhat unfortunate, as embodying and repeating the error that the affliction is twofold. It affects two organs, certainly, but only, as above described, in the way of cause and effect. The organ of hearing is wanting, but the organs of speech are present; they merely lack the means of exercise. The ear is the guide and directress of the tongue; and when the ear is doomed

to perpetual silence, the tongue is included in the ban; though, if we could by any means give to the ear the faculty of hearing, the tongue would learn for itself to fulfil its proper office. To correct the error involved in this apparent misnomer, some authorities use the term *deaf* simply, others speak of the *deaf-dumb* and *deaf-mute*. The latter term is common in America, as in France is its equivalent *sourds-muets*. In the Holy Scriptures the same original word is translated 'deaf' in some places (as in Mark, vii. 32), and 'dumb' or 'speechless' in others (see Matt. ix. 33, and Luke, i. 22).

Deaf and dumb persons may be classified under two main heads—viz. (1) the 'congenital' or born deaf, and (2) the 'adventitious deaf,' or those who have lost hearing after birth. Consanguinity of parents has been adduced as a probable cause of a deaf offspring. Among the diseases conducive to post-natal deafness are cerebro-spinal meningitis and other inflammatory diseases of the brain and its membranes, scarlet fever, measles, scrofula, and diphtheria; while children also have become deaf from falls or from teething.

This affliction is very much more common than, for a long time, it was supposed to be. Happily, however, along with the knowledge of its extensive prevalence, has come the means of alleviating it, by education. It was only when the schools now in existence began their useful work, and caused inquiries to be made, that the actual numbers of the deaf and dumb began to appear. In places where it was proposed to establish a school—in Paris, London, Liverpool, Manchester, Yorkshire, and in New York—the objection was immediately raised that children could not be found in sufficient numbers to require such schools. Their promoters, however, knew better than this, and persisted in their design. They soon had the satisfaction of converting the objectors into their warmest supporters. The facts thus ascertained, and the calculations based upon them, continued to be the only statistics upon the subject of deaf-dumbness in Great Britain and Ireland until the census of 1851, when for the first time the number and ages of the deaf and dumb formed a part of the inquiry.

The deaf are spoken of frequently in the writings both of the Old and New Testaments; they are alluded to by the poets, philosophers, and lawgivers of antiquity; yet we have no account of any attempt at educating them until the 15th century; no school existed for them until the middle of the 18th; nor could it be said that education was freely offered, and readily accessible, until the middle of the 19th century.

Some isolated attempts had been made before the 18th century, by different men, in different countries, and at long intervals, to give instruction to one or two deaf and dumb persons, and their endeavours were attended with various degrees of success. These several cases excited some attention at the time; but after the wonder at their novelty had subsided they seem to have been almost forgotten, even in the countries where the experiments were made. Bede speaks of a dumb youth being taught by St John of Beverley (q.v.) to repeat after him letters and syllables, and then some words and sentences. The result was regarded as a miracle, and was classed with others alleged to have been wrought by the same hand. From this time, eight centuries elapsed before any record is given of an instructed deaf-mute. Rodolphus Agricola, a native of Groningen, born in 1442, mentions as within his knowledge the fact that a deaf-mute had been taught to write, and to note down his thoughts. Fifty years afterwards this statement was controverted, and the alleged fact pronounced to be impossible, on the ground that no instruction could be conveyed to the mind of any

one who could not hear words addressed to the ear. But the discovery which was to give the key to this long-concealed mystery was now at hand. In 1501 was born, at Pavia, Jerome Cardan (q.v.), a man of great but ill-regulated talents, who, among the numerous speculations to which his restless mind prompted him, certainly discovered the theoretical principle upon which the instruction of the deaf and dumb is founded. He says: 'Writing is associated with speech, and speech with thought; but written characters and ideas may be connected together *without* the intervention of sounds,' and he argues that, on this principle, 'the instruction of the deaf and dumb, though difficult, is *possible*.' All this, which to us is obvious and familiar, was a novel speculation in the 16th century. It is quite possible for a man to teach himself to read a language, though he cannot speak it, because he has not heard the words pronounced. In fact many persons do acquire this art. It is evident, therefore, that written or printed words do impart ideas independently of sounds, yet this was a discovery which the world owes to Jerome Cardan; and it was for want of seeing this truth that the education of the deaf and dumb was never attempted, but was considered for so many centuries to be a thing impossible.

It was in Spain that these principles were first put into practice by Pedro Ponce (1520–84), a Benedictine monk, and again, in the following century, by another monk of the same order, Juan Paulo Bonet, who also published a work upon the subject. This record of experience was the means of instructing other teachers, and constituted the first step towards making the education of the deaf and dumb permanent. Bonet's book, published in 1620, was of service to De l'Épée, a hundred and forty years later; and it contains, besides much valuable information, a manual alphabet identical in the main with that one-handed alphabet which is now in use in schools on the Continent and in America. His own system of teaching, however, like that of every teacher in every country before De l'Épée, was in the main *oral*. The practicability and adaptability of *signs*, for conversation rather than teaching, had occurred to several of the earlier teachers, but De l'Épée was the first to adopt them as a distinct medium, and the chief medium, of teaching, and so to establish them as a language. Bonet himself says of the manual and written alphabets that they 'should be associated with speech, by pointing to the letter as written with the finger corresponding with the same letter in the manual alphabet and the articulated sound.' He also describes the positions and movements of the vocal organs necessary in pronunciation, as he himself used them, and as, with little variation, Wallis and Amman also in later times used them, believing themselves to have been the original inventors of the methods they employed. From the time of Bonet there was a general awakening of the attention of intellectual men, not only to the importance of the subject, but to the practicability of instructing the deaf-mute. One of Bonet's pupils was seen by Charles I., when Prince of Wales; and the case is described by Sir Kenelm Digby, who met the prince in Madrid during his memorable matrimonial journey to Spain (1623). Of this pupil, a younger brother of the Constable of Castile, Sir Kenelm gives an interesting account in his *Treatise of Bodies*, how he 'would repeat after anybody any hard word whatever'—not Spanish merely, but English, and even Welsh.

When the art died away in Spain it was taken up by Englishmen, and began forthwith to assume an entirely new aspect. Dr John Bulwer published in 1648 his *Philosophus, or the Deafe and Dumbe Man's Friend*, in which he speaks of a 'lip-grammar,

which may enable you to hear with your eye, and thence learn to speak with your tongue.' Bonet also found in the course of his experience that lip-reading reached a much greater utility than he had, at the outset, thought it capable of. Dr William Holder published his *Elements of Speech, with an Appendix concerning Persons Deaf and Dumb*, in 1669; and Dr John Wallis, Savilian Professor of Mathematics in the university of Oxford, taught the deaf and dumb with great success, and also wrote copiously upon the subject. In 1662 one of the most proficient of his pupils was exhibited before the Royal Society, and in the presence of the king. The *Philosophical Transactions* of 1670 contain a description of his mode of instruction, which was destined to bear good fruits long after his death.

Before the close of the 17th century many works of considerable merit appeared, the chief of which are the *Surdus Loquens* (1692) of John Conrad Amman, a physician of Haarlem; and the *Didascalocophus, or Deaf and Dumb Man's Tutor*, of George Dalgarno (q.v.). This treatise, published in 1680, and reprinted in 1834 by the Maitland Club, is eminently sound and practical, which is the more remarkable, as the author speaks of it as being, for aught he knows, the first that had been written on the subject. He is the first English writer who gives a manual alphabet. The one described by him, of which he was the inventor, is, most probably, that from which the present two-handed alphabet is derived. Henry Baker (q.v.) about 1720 introduced an improved system of his own; in 1765 the Abbé de l'Épée established his little school in Paris; and five years previously the first school in Great Britain had been started in Edinburgh by Thomas Braidwood (q.v.). He commenced with one pupil, the son of a merchant in Leith, who had strongly urged him to carry into effect the plan of instruction followed by Dr Wallis, and described in the *Philosophical Transactions* ninety years before. His school, the parent and model of the earlier British institutions, was visited and described by many of the influential men of that day, and its history and associations are imperishable. Its local name of 'Dumbiedykes' suggested to Sir Walter Scott a designation for one of his most popular characters in the *Heart of Midlothian*. A visit paid to it in 1773 by Dr Johnson and his biographer Boswell supplies one of the most suggestive and characteristic passages in the *Journey to the Western Islands*, in which he speaks of Henry Baker and his unpublished work. In 1783 Braidwood removed to Hackney, near London, and the presence of his establishment so near to the metropolis undoubtedly led to the foundation of the London Asylum in 1792. Dr Watson, its first principal, was a nephew, and had been an assistant, of Braidwood; and he states that, some ten or fifteen years previously, the necessity for the establishment of a public institution had been plainly seen, and some few but insufficient steps taken towards the accomplishment of such a design. From its foundation in 1792 until 1829 it was directed with great ability by Dr Joseph Watson, author of *Instruction of the Deaf and Dumb*.

It is to the 19th century that the honourable distinction belongs of having done much for the deaf and dumb. This has not been by inventing the art of teaching, or by raising up the earliest labourers in this field of usefulness, but by founding and supporting public institutions for this purpose. De l'Épée, when he opened his school in 1765, had no foreknowledge of the work he was commencing. As his labours increased he invited others to his assistance, and they were thus enabled to carry the light of instruction elsewhere, and to keep it

alive when he was no more. His death took place in 1789, and his assistant, Sicard, succeeded him. Four years afterwards the school was taken over by the French government, and now exists as the Institution Nationale of Paris. A pupil of this institution, M. Laurent Clerc, went in 1816 to the United States with Mr Thomas Hopkins Gallaudet (1787-1851), the founder and first principal of the American Asylum, who in the New World became, like De l'Épée, 'the father of the deaf and dumb.'

The mental condition of the deaf and dumb is so peculiar—so entirely unlike that of any other branch of the human family—that it is extremely difficult, without very close thought, to obtain an accurate conception of it. While almost every one will readily admit that there is a wide difference between a deaf and a hearing child, very few, who have not had their attention specially drawn to the subject, possess any adequate notion of the difference, or could tell wherein it consists. Sometimes the deaf are compared with the blind, though there exists no proper ground of comparison between them. Except that the blind are more dependent than the deaf and dumb, the relative disadvantages of the two classes do not admit of a moment's comparison. The blind child can be talked with and read to, and thus acquire language on natural lines. He is thus placed in direct intercourse with the world around him; domestic converse, literary pleasures, political excitement, intellectual research are all eventually within his reach. But the born-deaf child is utterly excluded from the early training which leads to such a standard of mental development. The two afflictions are so essentially dissimilar that they can only be considered and spoken of together by way of contrast. Each of them affects both the physical and the mental constitution; but blindness, which is a greater physical affliction, falls less severely on the mind; while the effect of deafness is the extreme reverse of this—it touches only one bodily organ, and that not visibly, but the calamity which befalls the mind is one of the most desperate in 'the catalogue of human woes.' The deprivation under which the born-deaf labour is not merely, or so much, the exclusion of sound. It is, as already indicated, the complete exclusion of all that information and instruction which are conveyed to our minds, and all the ideas which are suggested to them, by means of sound; as it is through sound alone, in the first instance, that we all learn language, the medium of all knowledge. Since speech tells the deaf nothing, because they cannot hear, and books teach them nothing, because they cannot read, their original condition is far worse than that of persons who 'can neither read nor write' (one of our most common expressions for extreme ignorance); it is that of persons who can neither read, nor write, nor hear, nor speak.

It is not to be assumed, however, that before the deaf child comes under instruction he knows practically nothing, or that his mind is a complete blank. Through his remaining senses—and particularly through sight—he has acquired a certain knowledge of things which, to some extent, has exercised his reasoning faculties and enabled him to form ideas. But he has no word symbols by which he may name and have recalled to his imagination the many wonderful objects and acts he sees around him. His curiosity may often be aroused, but he cannot ask the many interesting questions we hear from little children.

At the outset of his school career the deaf-mute is handicapped not only by an entire absence of the vernacular, but by a want of any means of word expression. Two outstanding methods are now employed in the education of deaf-mute children—viz. the oral and the manual alphabet. As

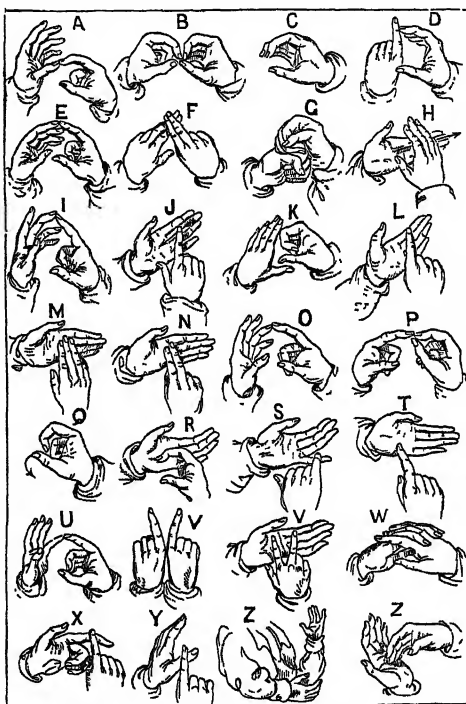
the name implies, the oral method seeks to teach by speech and lip-reading. To give the deaf and dumb speech was long considered an impossible task; and when in some cases success did accompany the effort, the result was looked upon as little short of a miracle. It is possible that this opinion arose from a misconception that dumbness accompanied and permanently remained with deafness. But when it is considered that the emotional cry of the deaf child closely resembles that of the normal, and that he can be induced to babble like an infant, it may readily be conceived how articulate speech can be evolved from such a source. To gain a sense means of reproducing sound the pupil can be led to feel the vibrations by placing the hand on the thorax. The course of instruction may proceed through the various sounds as represented by the letters of the alphabet, the phonetic value being taught—not the name of the letter. The order of presenting these symbols varies to some extent in different countries and schools; but in all the principle prevails of proceeding from the simple to the difficult, regard being had to the ability of perception by the pupil, and the muscular effort required in producing the sound. Although the child is encouraged to learn mainly by imitation, the teacher may require to place the speech-organs in position; while long and continuous practice is necessary before any degree of muscular facility is apparent. As the course progresses, the syllabic combination of sounds leads to the spoken word and sentence, while attention is also paid to the development of accent, emphasis, intonation, and fluency of speech.

Since imitation is the governing principle required of the deaf child in learning speech, his eye is being constantly trained to observe the various positions assumed by the vocal organs, and from this experience there follows the ability to lip-read. Whilst the greatest amount of movement occurs in the labial region, other parts of the face also indicate vocal expression; and the art, therefore, may be termed more correctly speech-reading. But speech-reading does not become a perfect substitute for hearing. It requires favourable conditions with regard to position of speaker and direction of light. And while groups of our language sounds, as *p*, *b*, *m*, show no appreciable variation in position of the vocal organs, the gutturals and nasals, *k*, *g*, *ng*, give little or no visible indication of their utterance. Thus the eye finds it difficult to distinguish such sound elements. When, however, the pupil has gained a knowledge of language, he is able to a large extent to overcome this difficulty by an intelligent inference of the required term in agreement with the context of the matter which is being communicated.

Early attempts at oral instruction were sporadic. The first organised effort to make the method universal in schools was initiated in 1773 by Heinicke of Germany, and thus it has come to be known also as the 'German system.' After the international congress at Milan in 1880—where the oral method became the chief topic of discussion—it was adopted in many countries of the Continent, and its influence was felt in an extension of the movement in schools in the United Kingdom and America. In 1886 the education of the deaf and dumb was made a subject of investigation by a royal commission, whose report was issued three years later. From the voluminous evidence obtained, the commissioners recommended that all deaf and dumb children should be given opportunity of instruction by the oral method. Authorities recognise the justice of this claim. Deafness among the so-called 'born deaf' is a matter of degree; while many children who enter the special schools come from the class of 'adven-

titious deaf,' and have more or less residual hearing or speech, or both. Success in the oral instruction of the 'born deaf' varies according to the ability—physical or mental—of the pupil; but it is recognised as a duty to exercise the remaining speech and hearing of deaf children to the fullest extent. Mention might be made here of a subsidiary method, the auricular, by which the residual hearing is more particularly used for general instruction.

The manual alphabet method may be described as writing in the air by means of the hands. As a medium it is not employed to supersede script or print, but is used conjointly with writing in an association similar to that of writing and articulate speech. There are two forms of the manual alphabet, the single-handed and the two-handed. While the former is used in schools in America,



Two-handed Alphabet.

the continent of Europe, and some parts of Ireland, the latter is preferred by teachers in Great Britain, possibly because of its closer resemblance in form to most of the letters of the script and printed alphabets. Educational authorities differ in the selection of methods. In many schools the oral only is practised; in others a combination of both is in use under the designation the 'combined system.' It may be claimed for finger-spelling (the manual alphabet) that, contrasted with speech-reading, it forms an easier medium of communication with the deaf child, because the eye can perceive every detail of symbol presented to it. Many teachers, therefore, hold that, in the early stages of language instruction, more progress is effected by a use of finger-spelling than by a rigid adherence to speech and speech-reading.

The development of language is the governing factor in the education of the deaf and dumb child. His greatest misfortune is the loss of that training during the invaluable plastic pre-school period of life, when the mind of the normal child is so highly

impressionable, his vocabulary so spontaneously acquired, and his imagination so pleasurably exercised. That is the period of the 'mother's method.' Early attempts at teaching language were generally on grammatical lines. De l'Épée endeavoured to establish the vernacular by translation through a system of natural gestures and arbitrary or conventional signs. But by this procedure the sign, instead of the word, remains the vehicle of thought. Teachers, therefore, condemn any systematic use of conventional signs. Since the school-period of the deaf child in the United Kingdom is limited to nine or eleven years, it is found necessary to accelerate progress in the acquisition of language in order that the pupil may approximate to a normal standard of primary education; and although exercises on grammatical lines are found serviceable, modern opinion recognises the necessity of conforming as closely as possible to the natural processes of acquiring language. In the initial stages a vocabulary is built up by directly associating objects and acts with their names. The object is shown, or the act performed, and the word is spoken or finger-spelled, and written. Pictures are used to give representations outside the scope of a schoolroom. The natural gestures which the little deaf child has used at home are at first recognised as serviceable, but are dispensed with as soon as practicable. Language development gradually proceeds through simple to more difficult sentence structure, introducing idioms, metaphors, and figures of speech. During this course the conversational or colloquial form of expression predominates, because *prima facie* deaf children must be led to recognise the practical value of words as a means of communication with one another. The literary side of language is not ignored, however. Reading exercises are given; books are supplied; and the pupil is encouraged to gain that command of literature which will lead to his self-development as an intelligent and useful unit of the community.

Until the close of the 19th century the work of educating deaf and dumb children was almost wholly dependent on charity. In 1890 there became law the Education of Blind and Deaf Mute Children (Scotland) Act, and in 1893 an act of a similar nature was passed for England. These measures made compulsory the education of deaf-mute children between the ages of seven and sixteen years; and upon School Boards devolved the duty of carrying out the prescribed conditions, which include the payment of moneys from public rates. An efficient elementary education is now required; the schools are reported upon by his Majesty's inspectors, and grants made by the Education Departments.

At the dates above no provision was made for the training of teachers of deaf children. The only movement to establish a standard of professional attainment emanated from the teachers themselves. In 1884 a college was incorporated in London, and a body formed, which comprised the most experienced teachers. This college annually granted diplomas to candidates who passed the following specific test set by the examiners: *Subjects*.—(1) History of the Education of the Deaf and Dumb. (2) The Principles of Education. (3) Intuitive Method of Teaching Elementary Language. (4) Method of Teaching Advanced Language. (5) Practical Instruction of a Class. (6) The Mechanism of Speech with the Anatomy and Physiology of the Organs. (7) The Method of Teaching Articulation.

Two other colleges were formed in London, each granting a diploma similar to the above-mentioned; but the three ultimately combined, and issued a form of certificate approved by the Board of Edu-

cation (England). In the Regulations put in force by the Education Departments of England and Scotland the authorities have provided for the special training and qualification of teachers of the deaf. This training can now be taken at the Victoria University of Manchester. While it is highly desirable that the teacher should be conversant with the principles and methods employed in the education of normal children, a longer, closer, and more intimate study of the deaf is necessary before he can hope fully to grasp the particular educational needs of his pupils.

The first institution in Great Britain was founded at Old Kent Road, London, in 1792—it is now located at Margate; the next in England was that at Edgbaston, Birmingham, in 1812. The Edinburgh Royal Institution dating from 1810, the Glasgow and the Aberdeen Institution from 1819, the Claremont School in Dublin founded in 1816, and the Belfast Institute in 1831 are the earliest in Scotland and Ireland. Donaldson's Hospital (Edinburgh), opened in 1850, is unique in having both normal and deaf children boarded and educated in the one institution. Although the two classes receive instruction in separate rooms, they associate freely in their games and social events. In Denmark is found the most consistent attempt at a scientific classification of deaf and dumb children for the purpose of education. In this small European state, with a population of over three millions, the number of deaf-mute children under instruction is about 400. After attendance for one year at a preparatory school in Fredericia the children are classified on the bases of residual hearing and speech, and mentality. Each class is educated at different schools—one at Fredericia, another at Nyborg, and another at Copenhagen; and, with the exception of the totally deaf of dull intellect, the oral method only is used. Preparatory schools for very young deaf children have been established in America and Great Britain. At the Bala, Philadelphia School, the little ones are admitted at ages ranging from two to seven years. While instruction proceeds on lines analogous to the kindergarten, the aim of the teacher is to enable the pupils ultimately to enter schools for the hearing. The value of such early training is evident. But authorities maintain that the latter course is not the best for the deaf child, because in a normal school he will not obtain that attention necessary to ensure his highest mental development.

During recent years the desire has been evinced for a closer co-operation between the medical and the teaching profession of the United Kingdom with a view to a more scientific classification of deaf children. A step in this direction was the opening by the Glasgow School Board in 1908 of a day-class for semi-deaf and semi-mute children. The oral method only is employed; and the pupils, during the school-day, have no opportunity whatever of associating with those who use 'signs' or finger-spelling.

The education of deaf and dumb children is now carried on in day schools as well as in institutions or boarding schools; and there exists much diversity of opinion which of these better serves the needs of the pupils. The advantages claimed for the institution system are: (1) that the deaf, being an abnormal class of children, and therefore requiring more continuous teaching and maintenance of discipline, are better provided for in institutions, where they are continually under the supervision of trained instructors; (2) that as many of the deaf come from poor homes where medical attendance and regularity and quality of diet are at a minimum, they receive in the institutions the care and attention necessary for the healthy

development of body and mind; (3) that the institution is more fully equipped for physical and industrial training; and (4) that the deaf, being such a widely scattered population, require to be brought to centres in order to admit of proper grading and to ensure regularity of attendance. In fact, many authorities are of opinion that special institutions are a necessity for the great mass of deaf children. On the other hand, advocates of the day-school system claim: (1) that the pupils attending day-classes are not subjected to the dull routine which, they maintain, is characteristic of institution life, and have, by reason of their going to and returning from school, and mixing with friends, a greater variety of topics for the building up and exercise of language; (2) that the pupils can live at home and benefit by home influence; and (3) that home-ties are not weakened.

Day-classes are conducted in several of our large cities where travelling facilities are convenient, and where the number of children in and around their immediate vicinities admits of several classes being formed. In London, where the day-classes are under the County Council, the children go to and return from school under the care of responsible guides or relatives—all travelling expenses incurred being met by the Council. At the age of thirteen these children are transferred to semi-residential schools in the suburbs—Anerley (for boys) and Oak Lodge (for girls). Here, in well-equipped workshops, and under trained instructors, the pupils devote part of the day to industrial pursuits.

In many of the large manufacturing centres of the United Kingdom societies exist for the advancement of the social and religious interests of the adult deaf and dumb. These agencies are ably organised by missionaries, many of whom have been teachers. Through the generosity of a Mr Leo. Bonn there was established in 1911 in London the 'National Bureau for Promoting the Welfare of the Deaf.' While the majority of deaf people find employment in bootmaking, tailoring, dress-making, and domestic service, occupation is also found for them in pursuits such as those connected with agriculture, with wood, with metals, with machinery, and with art-work. Handicapped as they are in having comparatively few industries open to them, their difficulties have been increased by legislative enactment, such as the Workmen's Compensation Act, in which the condition of insurance tends to their disadvantage.

In the United States of America more considerate measures prevail. The institutions are supported by generous grants from each state, and the school course of the pupil extends to his twentieth year. At Washington the deaf student can enter the college established in 1864 under the presidency of the late Dr E. M. Gallaudet, the youngest son of the founder of the American 'Asylum.' Such educational privileges enable deaf persons to enlarge their spheres of usefulness, even to holding positions in government departments of the republic.

See Arnold, *Education of Deaf-mutes* (1888 and 1891); Love and Addison, *Deaf-mutism*; Mygind (1894); Hartmann (1894); Bezold (1906); Report of Royal Commission (1889); Story, *Language for the Deaf* (1905); Kerr Love, *The Deaf Child* (1911); *American Annals of the Deaf*; *The Teacher of the Deaf*.

**DEAF AND DUMB, in Law.** The Roman law held deaf and dumb persons to be incapable of consent, and consequently unable to enter into a legal obligation or contract. Both in England and Scotland they may make contracts or wills if they have the use of reason and understand the nature of their undertaking, and express their consent intelligibly. Although the presumption of law is that a deaf and dumb person is in the same state as an idiot, and

incapable of any understanding, such a one may be subjected to a criminal trial on proof that he knows right from wrong. And, if he understands the nature of an oath, and is possessed of intelligence, he may give evidence as a witness by signs through an interpreter or by writing. It is always a good objection to a jurymen that he is deaf and dumb.

In the United States, in general, the legal presumption of the common law as to the mental incapacity of the deaf and dumb does not exist. They are presumed to be capable of comprehending the nature of crime, the nature and obligation of an oath, and of making any contract; hence they may be indicted, tried, and punished for crime, and may testify as witnesses. The federal courts have no peculiar jurisdiction over persons deaf and dumb, but the act of congress prescribing punishment to be inflicted upon 'every person' who is guilty of certain acts prohibited includes every person possessed of sufficient mental capacity for criminal responsibility, although he or she may be deaf and dumb. The federal courts are governed by the practice of the states in which the cause is pending as to the competency of a deaf and dumb person as a witness, and this competency will be determined in either state or federal court by the judge before whom the cause is pending, upon examination of the individual, and upon testimony of those acquainted with the party. A deaf and dumb person is legally incapacitated to serve as a juror, or for service in the army and navy, but in other respects has the rights of citizenship.

#### Deafness. See EAR, DISEASES OF.

**Deák, FRANCIS**, Hungarian politician, was born in 1803 at Kehida, in the district of Szalad, where, after a course of legal study at Raab, he practised as an advocate, until returned as its representative to the national diet in 1832. He soon took his place as leader of the liberal opposition, and by his firm and moderate policy effected reconciliations between Hungary and the Austrian emperor as her king—temporarily in 1840, and more permanently in 1867. After the revolution of March 1848 he became Minister of Justice in the cabinet of Count Batthyányi, and made every effort to ward off the inevitable war. On Kossuth's coming into power (September 1848), Deák resigned his portfolio, and after the unsuccessful attempt next year at negotiation, withdrew from public affairs, and retired to his estate. He refused to return to public life till 1860, when a constitution was granted to his country.

Returned by Pesth to the diet in 1861, he again became the leader of the moderate party, while the extreme party collected round Count Téli. The death of the latter (8th May) destroyed the only influence which could counterbalance that of Deák; and the diet appointed him to draw up the address to the emperor demanding the constitution of 1848, a Hungarian ministry resident in Pesth, the return, without restriction, of the exiles, and the restitution of their property. The emperor answered it by a hostile rescript, against which Deák protested strongly. Out of the humiliation of Austria in 1866 came the triumph of Deák's policy. He asked nothing more than before, and thus his wise and statesman-like moderation effected a satisfactory constitutional relation between Austria and Hungary in the dual system of monarchy. Deák's party was all-powerful, but he lived to see the rise of a more advanced party under the leadership of Tisza. He died at Budapest, 29th January 1876. See Memoir, with preface by Grant-Duff (1880).

**Deakin, ALFRED**, politician and publicist, born in Melbourne, Australia, in 1856, entered the Victorian parliament in 1879, in 1883 became

minister of public works and water supply, and in 1886 succeeded Sir Graham Berry as leader of the liberal section of a coalition government which ruled the colony till 1890. His most important work during this period was the establishment in Victoria of an extensive irrigation system, in connection with which he visited Egypt, Italy, and India. He next interested himself ardently in the cause of Australian federation, representing his colony not only at the conferences of 1890-91, but also on the Federal Council in 1889, 1895, and 1897, and taking a prominent part in the convention of 1897-98, which framed the federal constitution; and he was one of the delegation from Australia which safeguarded the passage of the Constitution Act through the imperial parliament in 1900. He sat in the federal parliament from its inception to 1913 as member for Ballarat, being Attorney-general in Sir E. Barton's ministry from 1901 to 1903, and Prime-minister in 1903-4, 1905-8, and 1909-10; in 1913 he retired into private life, though in 1914 he accepted the position of Australian commissioner to the San Francisco exhibition. Apart from his work as a pioneer of irrigation methods in Australia, his enduring reputation will rest on his career in federal politics. For the Commonwealth's first ten years he was the originator or inspirer of every important measure or development of policy save one. The compulsory principle in military training he accepted half-heartedly from others; but the bases of Australian naval defence, fiscal policy (including British preference), financial relations between States and Commonwealth, immigration policy (as regards federal action), external (with respect to the islands of the western Pacific) and territorial (Papua and the Northern Territory) policy were all laid by him. In none of his prime-ministerships had he an independent majority; but, whether in or out of office, whether allied with the Labour party or with their bitterest opponents, his only terms of alliance were the acceptance of his programme, which his successors are still engaged in carrying out. His visit to London in 1907, as representative of Australia at the Imperial Conference, set him among the foremost statesmen of the empire, but also seriously injured his health to an extent which in the end forced him to abandon politics. He retired from public life altogether in 1913, and died 7th October 1919. See *Life by W. Murdoch* (1923).

**Deal**, a municipal borough and sea-bathing place, in the east of Kent, on a bold open beach, near the south extremity of the Downs, between North and South Foreland, 89 miles by rail from London, and 6 miles SE. of Sandwich. Till 1885 it was part of the parliamentary borough of Sandwich. A fine anchorage extends 7 or 8 miles between Deal and the Goodwin Sands. Deal has mainly arisen to supply the wants of the numerous vessels which are often detained by the winds in the Downs. The chief branches of industry are connected with maritime pursuits, boat-building, sail-making, piloting or hovelling, victualling and naval stores. The prosperity of the place now largely depends on its sea-bathing, on the military dépôt at Walmer (2 miles S. of Deal), and on the shipping in the Downs. The handsome iron promenade pier was erected in 1864. Pop. (1851) 7067; (1921) 12,990. It has been one of the Cinque Ports (q.v.) since the 13th century. Of the three castles built by Henry VIII. in 1539, Deal Castle is the residence of its 'captain'; Sandown Castle (where Colonel Hutchinson died) to the north, has been blown up (1880-95) as dangerous through the encroachment of the sea; and to the south, Walmer Castle (q.v.) is now the residence of the Warden of the Cinque Ports. See H. S. Chapman, *Deal Past and Present* (1891).

Some maintain that it was near Deal that Julius Cæsar landed in 55 B.C.—The Deal boatmen are, like some of the other boatmen on that coast, locally known as 'hovellers.' They are noted for giving assistance to ships in distress, and were formerly much employed in carrying off provisions to outward-bound vessels, and in bringing ashore mail-bags requiring to be forwarded by express.

**Dealfish** (*Trachipterus*), a genus of deep-sea bony fishes, in the Ribbon-fish (q.v.) sub-order of Acanthopteri. As the name suggests, the elongated body is laterally compressed, and with the exception of a small separate anterior portion, the dorsal fin is continuous along the back. The tail fin is peculiar in being turned sharply upwards. The pectoral fins are well developed. The skeleton is very brittle. Some eight species are known, on European coasts and from the west of South America. They rarely come to the surface. One form (*T. arcticus* or *bogmarus*, the vaagmaer of Icelanders and Norwegians) is occasionally found on North British coasts. It is a large fish, 4 to 6 feet in length, and of a silvery colour. The dorsal and caudal fins are red. A smaller species (*T. tænia*) occurs along with others in the Mediterranean.

**Dean**. The word dean, from the Greek *dekanos*, probably means an officer over ten subordinates, the etymon being *deka*, 'ten.' It is first found as a military grade, being mentioned by Vegetius in the 4th century as an old but then disused term (*De Re Milit.* ii. 8). Somewhat later it appears, still in the 4th century, as a title of certain minor officers in the imperial household (St Ambrose, *Epist.* i. 20; St Chrysostom, *Hom.* 13, in Heb. vii.). With the rise and organisation of monachism, the name was given to a monk placed in charge of ten others, for whose discipline or execution of appointed tasks he was responsible (St Augustine, *De Mor. Eccl. Cath.* i. 31); and in the legislation of Justinian the word has yet another sense, being applied to the public officers having superintendence of funerals (*Novell.* 43, 59). In the Visigothic and Anglo-Saxon codes the *decanus* is a judge of first instance or other legal officer having jurisdiction within a tithing, for every hundred consisted of ten districts, called tithings, and in every tithing was a constable or civil dean. The monastic model was adapted to collegiate and other churches having a large staff of clergy, and the dean in such churches presided over ten canons or prebendaries, though this rule of number does not seem to have been strictly required. In conformity with this, the spiritual governors, the bishops, divided each diocese into deaneries or decennaries (Lat. *decem*, 'ten'), corresponding to tithings, each of which was the district of ten parishes or churches, over every one of which a dean was appointed, who in the cities or large towns was called the dean of the city or town, and in the country, *dean of Christianity*, or *rural dean*. In the English Church there are the following dignitaries who bear this name:

(1) In the province of Canterbury it is part of the dignity of the archbishop to have prelates to be his officers, and of these the Bishop of London is his provincial dean; and when a convocation is assembled, the archbishop sends to him his mandate for summoning the bishops of the province. This is the sole example of the kind.

(2) *Honorary Deans*, as the Dean of the Chapel Royal of St James's. See CHAPEL ROYAL.

(3) *Deans of Peculiars*, as of Battle in Sussex, founded by William the Conqueror in memory of his conquest. There are also the Deans of the Arches in London, of Bocking in Essex, and of Croydon in Surrey, who have jurisdiction, but no cure of souls.

(4) *Deans of Chapters*, as at Canterbury, St Paul's, &c., who are governors over the canons in cathedrals and collegiate churches. Their appointment is in the direct patronage of the crown, which may appoint by letters-patent; and the dean so appointed is entitled to be installed. The dean of a chapter must reside eight months in the year, and he may hold one benefice with his deanery. See CATHEDRAL.

(5) *Rural Deans*.—This is a very ancient office of the church, but custom gradually transferred its duties to the archdeacon, as in the visitation of churches, parsonage-houses, &c. Rural deans, however, may act as deputies to the bishop and archdeacon; and since 1850 the office has been revived with great advantage, and in well-ordered dioceses affords a useful channel of communication between the bishop and his clergy, and a means of joint action in matters affecting the church.

In the universities of Oxford and Cambridge the dean is the officer who superintends the discipline of the college and the chapel services. At Christ Church, Oxford, which is a cathedral, the dean is master of the college.

In the Roman Curia the Cardinal-bishop of Ostia is *ex officio* dean of the College of Cardinals; but while the head of foreign collegiate churches is styled dean, the officer bearing that title in cathedral churches is inferior in rank to the provost in some cases, and in others to the vicar-general; and in feudal times the clerks who acted as deputies for the lay-abbots of impropriated foundations were also styled deans.

**Dean**, FOREST OF, a picturesque hilly tract, 34 sq. miles in extent, in the west of Gloucestershire, between the Severn and the Wye, and within the hundred of St Briavels, is an ancient royal forest. It was almost entirely disafforested by Charles I., on a sale to Sir John Wintour, but was re-afforested by act of parliament very shortly after the Restoration. The greater part still remains crown property; and about one-half is appropriated for the growth of timber for the navy. It is divided into six 'walks,' which contain woods of oak, beech, &c. There are coal and iron mines, and quarries of stone suitable for building and making grindstones, troughs, and rollers. Persons born in the hundred, and residing and working a year and a day in the mines, become, on registration, free miners. Their ancient privileges, entitling them exclusively to grants of the crown mines (subject to the right of the crown to put on a fifth man for every four miners, now commuted for a royalty), and, formerly, to timber for the mines, were regulated and enforced by the Mine Law Court, held at the Speech House, within Dean Forest, where the Verderer's Court is still held; but have, with some variations, been defined and confirmed by several acts and commissioners' awards of the present century. Dean Forest is under the control of the Commissioners of Woods and Forests, one of whom, as 'gaveller,' has the supervision of the mines, and a deputy-surveyor, deputy-gaveller, registrar, four verderers (whose office, since the extermination of the deer in 1854 is almost a sinecure), and other officials.

**Dean of Faculty**. See ADVOCATES, UNIVERSITIES.

**Dean of Guild**, in Scottish burghs, was the head of the mercantile body called the Guild-brethren (see GUILD). In former times (Act 1593, chap. 180) he was a judge in mercantile and maritime causes within the burgh, but for a very long period he has been rather a kind of *Adile* (q.v.). His chief duty is now to see that buildings within the burgh are erected according to law, and, in case of their falling into a ruinous condition, to order them to be pulled down. Though in some of the larger

burghs the dean of guild is still (3 and 4 Will. IV. chap. 76, sect. 22) a member of the town-council *ex officio*, his jurisdiction is altogether separate from that of the baillie-court. In Edinburgh the Dean of Guild Court consists of the dean of guild, seven members of the town-council, and seven registered electors of the city, not being councillors, of whom three must be architects, civil engineers, ordained surveyors, or master-builders. They are assisted by the law assessors of the magistrates of the city. No building can be either erected or demolished, or even materially altered, without a warrant from this court. Ventilation and sanitary arrangements are under the control of this court. Opposition to the granting of the warrant may be offered either by a private party or by the corporation acting for the public interest. The enforcement of the Act 1698, chap. 8, as to the height of buildings, the thickness of the walls, &c., lies within the province of the Dean of Guild Court. The judgments of the Dean of Guild Court may be reviewed by the Court of Session.

**Death**. It is one of the fundamental doctrines of physiology, that every part of the organism has its own definite term of vitality, and that there is a continuous succession of the destruction of old cells and the formation of new ones in all tissues, and especially in those in which the most active vital changes are going on, as, for example, in the nervous and muscular tissues. Even the most solid portions of the animal frame, such as the bones and (to a less extent) the teeth are undergoing a perpetual although a slower change of this nature; and throughout the whole body there is a continuous removal of effete or worn-out tissues, and a corresponding deposition of new matter. Every blow we strike, every thought we think, is accompanied by the death and disintegration of a certain amount of muscular or nervous tissue as its necessary condition; and thus every action of our corporeal life, from its beginning to its close, takes place at the expense of the vitality of a certain amount of organised structure. This is termed *molecular death*, and, within its proper limits, is obviously essential to the life and well-being of the organism.

The cessation of the circulation and respiration may be regarded as constituting *somatic death*, or the death of the entire organism, which must obviously be shortly followed by the molecular death of every portion of the body.

We shall now briefly notice the principal modes in which death occurs. Death happens either from the natural decay of the organism, as in old age, or (and much more frequently) from some of those derangements or lesions of the vital organs which occur in the course of the diseases and injuries to which we are liable. These derangements of the vital organs may occasion various modes of dying. Dr Watson said that life rests on a tripod, whose three vital supports are the *heart*, the *brain*, and the *lungs*; and Bichat, that 'the mode of dying may begin at the head, the heart, or the lungs.' The functions of these organs are, however, so mutually dependent upon each other, that impairment in the functions of one of them may lead to death, though the immediate cause of death is the failure of another.

*Death from failure of heart* may be either sudden or gradual. Sudden failure (death by *syncope* or fainting) may occur from disease or weakness of the heart itself, or from shock conveyed to it through the nerves. Gradual failure takes place when the whole system is enfeebled—e.g. by the action of certain poisons, and by many wasting diseases (death by *asthenia*, Gr., 'want of power'). When death occurs from loss of blood (*anæmia*), the failure of the heart may be either sudden or

gradual, according to the extent of the loss; but in this case the heart ceases to contract, not from inability to do so, but because the blood, its natural stimulus, is insufficient in amount to excite contraction.

*Death from failure of respiration* (Asphyxia, q.v.) occurs when access of the air to the lungs is impeded, or when the actions of the muscles of respiration cease. We have examples of it in drowning, smothering, choking, strangulation, &c. Forcible pressure upon the chest, such as sometimes happens in great crowds, or as occurs to workmen partially buried by the fall of earth, &c., will cause death in a few minutes, if movement of the lungs is prevented by the pressure. Tetanus and the poison of strychnine prove fatal in this way.

*Death by coma*, or beginning at the brain, is caused by obstruction to the circulation through that organ by pressure (as, for example, when there is effused blood within the cranium, or when a portion of bone is depressed in a fractured skull); by clots of blood within the vessels; by various narcotic poisons, such as opium, alcohol in excessive quantity, carbonic acid, &c.

Death may also be due to the profound effect produced upon the system by a number of injuries not involving any essential organ (multiplicity of injuries); or by the shock of a severe damage to an important organ, such as shattering of the kidney and adrenal body by a gunshot wound. Death may then take place within a few hours.

The signs of approaching death require a brief notice. The mind may be affected in various ways; there may be dullness of the senses, vacancy of the intellect, and extinction of the sentiments, as in natural death from old age; or there may be a peculiar delirium, closely resembling dreaming, which usually is of a pleasing and cheerful character.

Dementia or imbecility sometimes comes on shortly before death, and manifests itself by an incapacity of concentrating the ideas upon any one subject, and by an almost total failure of memory. The mental weakness is often exhibited by the pleasure which is derived from puerile amusements. Shakespeare notices 'playing with flowers' as a token of approaching dissolution. In the form of delirium, ocular spectra seem frequently to be present, the patient apparently trying to catch some imaginary object.

There is generally well-marked relaxation and incapacity of the muscular system, and the voice is usually weak and low as death approaches, often dwindling to a mere whisper. The mode in which the action of the heart declines is various; in most diseases of long standing, the cessation of the heart's action is gradual, the rate of the pulsations being much increased, but their energy being very much impaired. In some acute affections, the failure is shown by the irregularity of the pulse, while the force is little altered. In other cases (especially in cerebral diseases) the heart, before finally ceasing to beat, contracts violently, and suddenly stops.

The respiration is sometimes hurried and panting till just before death, while in other cases it is slow, laborious, and stertorous. The accumulation of mucus, &c. in the air-passages increases the difficulty of breathing; the sound known as the 'death-rattle' being produced by the passage of the air from the lungs through the fluid collected in the trachea and upper respiratory passages. There is also a loss of animal heat, beginning at the extremities.

The signs of actual death may be arranged under three heads: (1) Signs of the extinction of the vital functions; (2) Changes in the tissues; (3) Changes in the external appearance of the body.

(1) The arrest of the circulation and respiration

would at first sight appear to afford decisive evidence of death; but these functions, as in the case of hibernating animals, may be reduced to so low a condition that it is by no means easy to decide whether or not they are completely annihilated. In cases of apparent drowning, and in newly-born infants, these functions are frequently suspended and again restored; and cases like that of Colonel Townsend (see any standard work on medical jurisprudence) occasionally occur, in which the patient has the power of voluntarily suspending these functions for a considerable period. The gradual loss of animal heat is an important sign. But it is sometimes delayed; and in exceptional cases a rise of temperature may even take place after death. Loss of contractility of the muscles when a galvanic current is applied to them is a sign of death; but the period at which it takes place is very variable. Distinctive minor signs are the absence of blistering and redness if the skin be burned (Christison's sign); the failure of a ligature tied round the finger to produce, after its removal, the usual change of a white ring, which after some seconds becomes redder than the surrounding skin in a living person; and the absence of bleeding if a vessel be opened.

(2) Among the changes in the tissues, the *rigor mortis*, or rigidity of the muscles, which ensues at a varying period after death, is the most important. It may appear within half-an-hour after death, or may be delayed twenty or thirty hours, according to the nature of the disease; and it usually lasts about two days. It commences in the neck and trunk, then appears in the upper, and lastly in the lower, extremities, and disappears in the same order.

(3) Various changes in the external appearance of the body take place. Of these the most important is the altered colour of the surface. Livid spots (resembling bruises) appear on the dependent parts; and a green tint on the skin of the abdomen, followed by a separation of the epidermis, is a sure sign that life is extinct and putrefaction has begun.

The discrimination of true from apparent death is obviously not a matter of mere physiological interest. The case of Vesalius, the eminent anatomist, who opened an apparently dead body in which the exposed heart was seen to be still beating, is well known; but the belief that the Abbé Prévost (q.v.), having been struck down by apoplexy, was regarded as dead, but recovered his consciousness under the scalpel, has been shown to be unfounded. A French author, Bruhier, in a work *On the Danger of Premature Interment* (1742-45), collected fifty-four cases of persons buried alive, four of persons dissected while still living, fifty-three of persons who recovered without assistance after they were laid in their coffins, and seventy-two falsely considered dead. But when reasonable care is taken such mistakes are hardly possible. See BURIAL, CATALEPSY.

Death, in a legal point of view, is either natural or civil: the former being the cessation both of physical life and of the legal rights which attach to it; the latter, the cessation of the legal rights whilst the physical life remains. A man was said to be civilly dead in England when he had been attainted of treason or felony, or had abjured the realm, or was banished, or became professed in religion by going into a monastery. In these events his property devolved as if he were naturally dead. The doctrine of civil death is now abolished except as to cases of outlawry, in which it seems still to be applicable.

According to the Scottish Law of Death-bed, an heir in heritage was entitled to reduce all voluntary deeds granted by his ancestor to his prejudice, if they were granted by this ancestor on his death-bed. It was necessary that at the time the deed

was granted the ancestor should be suffering from the disease of which he died, and not survive for more than sixty days; nor did the law (repealed 1871) apply if, after granting the deed, he was able to go unsupported to kirk or market.

See also the articles ANNUITY, CAPITAL PUNISHMENT, DANCE OF DEATH, DISEASE, EXECUTION, INSURANCE, LIFE, REGISTRATION.

**Death Duties**, a comprehensive term for the specific duties, levied under various acts of parliament, on the estates of deceased persons. They include legacy, succession, and estate duties, and in general terms may be explained as follows: Legacy duty is payable in respect of any gift by will which shall be satisfied out of the movable property of the deceased, distributed shares of movable property devolving under intestacy, and on shares of residue when payable out of a mixed fund arising from heritable estate directed to be sold, and movable estate. It varies in rate: husband or wife or lineal issue and lineal ancestors pay £1 per cent. (but this is not charged when the total estate does not exceed £15,000, or when the value of the benefit to the individual beneficiary does not exceed £1000, or, if the beneficiary is the widow or a child under twenty-one, does not exceed £2000); lawful brothers and sisters or their descendants pay £5 per cent., and persons of a more remote degree of consanguinity, as well as strangers in blood (including illegitimate children of the deceased), pay £10 per cent. No legacy duty is chargeable when the whole of the movable property does not amount to £100, or when the net value of the heritable and movable property on which estate duty is payable does not exceed £1000. Succession duty (Act of 1853) is payable in respect of succession to heritable or movable property passing upon the death of any person. The three essential characteristics of a succession are a disposition or devolution of property, a gratuitous acquisition, and a death on which the property is transmitted. The rates of succession duty are similar to the rates of legacy duty.

Estate duty, which was introduced by the Finance Act, 1894, is payable upon the principal value of all property, heritable or movable, settled or not settled, which passes upon the death of a person who dies after 1st August 1894, and includes all the property which the deceased was competent to dispose of at his death, whether he actually disposed of it or not; gifts made within three years of his death without reservation; gifts made at any time with a reservation in favour of the deceased, &c. Among the exceptions (which are mainly technical) are the property of common seamen or soldiers, or airmen, who die in the service of the crown, Indian government pensions passing to widows and children, and gifts to the nation. The rates are: above £100 and under £500, £1 per cent.; between £500 and £1000, £2 per cent.; between £1000 and £5000, £3 per cent.; between £5000 and £10,000, £4 per cent.; between £10,000 and £15,000, £5 per cent.; and so on in a graduated scale, rising to £40 per cent. for an estate of over £2,000,000 (Finance Act, 1919, sect. 29). Estate duty, which has practically superseded probate duty and account duty, is chargeable on all property passing on death without regard to the relationship of the beneficiaries to the deceased owner. In determining the rate of estate duty the principle of 'aggregation' is, subject to certain exceptions, applied. This means that where several distinct estates pass on a person's death—for instance, his free estate under his will and settled property under his marriage settlement—it is necessary, in order to determine the rate of duty in respect of any particular estate, to aggregate it with the other estates passing. In the case of

real estate the accountable parties have an option of payment by instalments, viz. by eight yearly instalments, or sixteen half-yearly instalments. Should the owner die before all instalments are paid, the unpaid instalments are still payable, and are a charge on the property in the hands of the successor. Certain deductions are allowed in respect of land or a business where there has been a second death within five years.

Settlement estate duty, which was an additional estate duty charged on settled property, was imposed by the Finance Act, 1894, but was abolished by the Finance Act, 1914, in the case of deaths occurring after 11th May 1914. Under the statutes in force since the abolition of settlement estate duty, estate duty is payable on each passing of settled property, subject to an important exception in favour of married persons.

**Death's-head Moth** (*Acherontia atropos*), a species of Hawk-moth (q.v.), in the family



Death's-head Moth (*Acherontia atropos*) and Caterpillar.

Spingidae, not uncommon in some parts of England and of the continent of Europe. It is widely distributed over the world, being found in Africa, Mauritius, and the East Indies. It is one of the largest of the European Lepidoptera, and measures almost six inches from tip to tip of the extended wings. The general colour is dark, the woolly body yellow, with black markings, the thorax with markings which have some resemblance to a skull, the upper wings mottled with brown, black, and yellow, the hind wings dark yellow with two black bands. The large caterpillar is greenish-yellow, the back speckled with black, with transverse lines partly blue and partly white. The tail end bears an S-shaped horn. In countries where the potato is cultivated it is often to be found feeding on the leaves of that plant. In the pupa stage it is brown, and lies in a hole in the ground. The insect is nocturnal in habit, and is interesting as an audacious plunderer of bee-hives. How it daunts the bees is a mystery. Even more remarkable is the much discussed shrill piping note.

**Death Valley**, a peculiarly desolate depression, 135 miles long by 10 to 20 wide, in the S.E. part of California. Some of it is salt desert, 480 feet below sea-level; vegetation is absent, or very scanty and arid. The summer temperature reaches 122° in the shade.

**Death-watch**, a ticking or rapping noise produced by various insects in houses. Being

oftenest heard in the quiet of sickness and anxiety, it has been superstitiously regarded as a signal of approaching death. In Britain it is generally the love-signal of the small boring beetle (*Anobium*, see BORERS), of a brownish colour, and about  $\frac{1}{2}$  inch in length. Various species frequent wood, furniture, &c. *A. pertinax*, *A. tessellatum*, and *A. striatum* are all common death-watches. Some other insects besides *Anobium* make tapping noises, notably the Giant Cockroach (q.v.) or drummei.

**De Bary, HEINRICH ANTON** (1831-88), a botanist born at Frankfort-on-Main, studied medicine at Heidelberg, Marburg, and Berlin, and from 1855 was professor of Botany at Freiburg, from 1867 at Halle. In 1872 he was appointed the first rector of the newly reorganised university of Strassburg. He vastly extended our knowledge of the fungi and other plants by such works as *Comparative Anatomy of Phanerogams and Ferns*, *Morphology of Plants*, and *Lectures on Bacteria* (1888).

**Debateable Land.** See BORDERS.

**Debenture** is a deed or instrument issued by a company or public body acknowledging a loan of money. As a rule it charges the property of the company with the payment of interest, and the repayment of the principal at some fixed period, usually three, five, or seven years. Debentures vary in their terms, style, and legal incidents according to the statutes under which power is given to issue them. One common and important form is the railway debenture, which is a mortgage issued under the Companies Clauses Acts, &c., and containing an assignment of the whole undertaking and receipts of the company. Debentures of a company registered under the Companies Act, 1908, generally create a charge on the property of the company, but are sometimes merely bonds, or in the form of promissory notes. In many cases the issue of debentures has been superseded by the issue of debenture stock, which, with the interest thereon, is usually a charge on the undertaking of the company prior to all shares or stock of the company. Each debenture is a separate bond, and cannot be divided, whereas the holder of debenture stock has a certificate (which must be registered) entitling him to a definite sum out of a consolidated capital loan, generally secured by a trust or covering deed, and fractions of his holding may be freely transferred.

**Debit and Credit.** See BOOK-KEEPING.

**Deborah** (Hebrew, 'bee'), the 'Mother in Israel,' a Hebrew prophetess, who stirred up the tribes of northern Israel under Barak to destroy a great army of the Canaanites in the plain of Esdraelon. Sisera, the Canaanite leader, fled, and was murdered in his sleep by Jael. For the song of Deborah (Judges, v.), see Ewald, *Die poetische Bucher des alten Testaments*; Cooke, *History and Song of Deborah* (1892); and an eloquent passage on this 'Hebrew Boadicea' in Coleridge's *Confessions of an Inquiring Spirit*.

**De'breczen**, in the midst of a wide plain of Hungary, 130 miles E. of Budapest, is a large straggling place, or rather a collection of villages. Its college is the chief Reformed college in Hungary, and is now a faculty in a university founded in 1912; there are also a Catholic academy, a commercial college, and an agricultural college. There is much trade in cattle, swine, and grain, with manufactures of flour, soap, saltpetre, sausages, hams, and tobacco-pipes. Pop. 93,000, almost all Protestants. The 'Rome of the Calvinists,' De'breczen was long the headquarters of the Reformed faith, and its inhabitants suffered much for their religion. In 1849 it was for some months the seat of the national diet.

**De Brosse.** See BROSSES.

**De Bry, THEODOR** (1528-98), goldsmith and copperplate engraver, born at Liège, established a printing-house at Frankfort-on-Main about 1570, whence issued a famous collection of Voyages to the East and West Indies, published in Latin and German (1590-1634).

**Debs, EUGENE VICTOR**, American Socialist leader and journalist, born at Terre Haute, Ind., 5th November 1855, became secretary and treasurer of the Brotherhood of Locomotive Firemen (1880), and sat in the Indiana legislature. In 1897 he entered the Socialist movement. From 1900 onwards (except in 1916) he was Socialist candidate for the presidency. His pacificism led to a sentence (1918) of ten years in a penitentiary under the Espionage Act. President Wilson refused to allow his release, and he fought the 1919 campaign from prison, securing nearly a million votes. He was released in 1921.

**Debt** is an obligation to pay a definite sum of money. The person who is under the obligation to pay is the debtor; the person who has the right to receive payment is the creditor. Where the sum claimed as due is not definitely ascertained, it is, properly speaking, not a debt, but a claim for damages. A debt which exists (*debitum in presenti*), but which is not exigible till a day or event certain to occur—e.g. the death of a particular person—is termed a 'future' debt. Such a debt is to be distinguished from a 'contingent' debt, which has no existence until the fulfilment of a condition, or the occurrence of an uncertain event. A creditor who, in addition to his right of action and execution against the debtor in virtue of the latter's personal obligation, holds some other right or means for the recovery of the debt is said to hold a right in security for the debt. Such a right may consist in a right over property, real or personal, conveyed to, or acquired by, the creditor (see MORTGAGE, PAWNBROKING, LIEN), or in a right against some third person who has undertaken to see the debt paid (see GUARANTY, CAUTION, SURETY).

In England a debt arising from a contract not under seal is a simple contract debt. A debt created by a deed—i.e. by an instrument under seal—is a specialty debt. An action on a simple contract debt must, under the Statutes of Limitation, be brought within six years; an action on a specialty debt, within twenty years. The time in both cases runs from the date when the cause of action arises; but if a subsequent acknowledgment in writing has been made by the party liable, or his duly authorised agent, or if he has paid the debt in part, or paid interest, the time will run from the date of such subsequent act. Debts of record are debts evidenced by the records of a court. In this category are included recognisances—i.e. obligations entered into before a court or magistrate—and judgment debts. A judgment debt comes into existence whenever in any action in a court of record a sum is adjudged to be due by one person to another. When a judgment has been obtained in respect of a debt, whether a simple contract debt or a specialty debt, or, as it may be, in respect of a claim of damages, the original debt or claim is thenceforth extinguished, being merged in the judgment debt.

On the death of a debtor the claims of practically all creditors now lie against the personal representatives of the deceased, in whom his real, as well as his personal, assets vest (Land Transfer Act, 1897). In administering the estate of a deceased person, the order of preference to be observed by the executor is as follows: (1) funeral expenses, the costs of proving the will and the

like; (2) debts due to the crown; (3) debts rendered preferable by statute—e.g. income-tax, poor-rates; (4) debts of record, including judgment debts and recognisances by the deceased; (5) all other debts of which the executor has notice, whether they are simple contract or specialty debts. It is a prerogative of the crown to take precedence of all other creditors, and, in England, to recover its debts by a summary process called an *Extent* (q.v.). By 33 Henry VIII., chap. 39, this preference is given over all creditors who have not obtained judgment for their debts before the commencement of the crown's process; and the Act 6 Anne, chap. 26, extended the law of England in this respect to Scotland. The rule in Scotland was limited to movable or personal property. In Scotland the Exchequer Act, 1856, introduced new forms of procedure for the recovery of crown debts, which have virtually superseded writs of extent. In a sequestration the crown has a statutory preference for one year's arrears of income and property tax, and other imperial taxes. A similar preference is given for poor and school rates. By statute special methods are provided for the recovery of estate and other death duties. See EXCHEQUER. The advantages which creditors in specialty debts previously enjoyed over creditors in simple contract debts have been abolished by statute, and now, on the death of a debtor, these two classes of debts are payable *pari passu*. Provision must also be made by the executor for payment of future or contingent debts of the deceased. Certain debts—e.g. debts secured on particular property by mortgage—are primarily charged on that property; but none the less the executor or administrator is bound to see that these debts are paid.

On the bankruptcy of a debtor certain kinds of debts are entitled to priority in the distribution of the debtor's assets among creditors. Such preferential debts include parochial and other local rates, income-tax, and other assessed taxes due by the bankrupt, to the extent of one year's assessment; the wages of servants or clerks, not exceeding £50 each, due in respect of the period of four months before the date of the receiving order; wages of labourers or workmen not exceeding £25, due in respect of the period of two months before that date; claims for compensation under the Workmen's Compensation Act, 1906; and contributions due from the employer under the National Insurance Acts, 1911 to 1920, and under the Unemployment Insurance Act, 1920. There are, too, certain debts—e.g. a debt for money lent by a wife to her husband, or by a husband to his wife, to be employed in trade—which are postponed to other debts, so that they are paid only after all other debts for value have been paid in full. Apart from these exceptions, the estate of the bankrupt is distributed rateably among his creditors, no distinction being made between simple contract debts, specialty debts, and judgment debts or other debts of record. A secured creditor—i.e. a creditor who holds a mortgage or lien on any property of the debtor as security for a debt due to him from the debtor—cannot prove in the bankruptcy for the whole of his debt, and at the same time retain his security. He may realise his security, or put a value on it, and prove and receive a dividend *pari passu* with the other creditors in respect of the balance of the debt remaining unpaid after deducting the proceeds or value of the security. Or he may choose to hand over his security to the trustee and prove in the bankruptcy for his whole debt. (See BANKRUPTCY.)

The debtor is bound, in the ordinary case, to find the creditor and offer payment of the debt. When the debtor owes the creditor several different debts, some of which may be secured and others

not, the debtor, on making payment of any sum which is not enough to extinguish all the debts, is entitled to appropriate the payment to any particular debt—e.g. a debt which is secured by mortgage or otherwise; and, if this is clearly done by the debtor at the time of payment, the creditor cannot apply the sum in satisfaction of any other debt—e.g. an unsecured debt. On the other hand, where a sum is paid without any specific appropriation by the debtor, the creditor is entitled to apply it to any debt he pleases, even to a debt on which action is barred by the Statutes of Limitation. (See APPROPRIATION.) A written receipt for the amount of a debt is *prima facie* evidence of payment. Any form of words sufficient to show that the debtor is discharged constitutes a receipt. Where the receipt is for £2 or upwards, it (subject to certain exceptions) must bear a twopenny stamp, which must be cancelled by the person by whom the receipt is given before he delivers it. The creditor is liable to a fine of £10 if, where a receipt is liable to duty, he gives a receipt not duly stamped or refuses to give a receipt duly stamped. When a debt is incurred it may be agreed that interest at a certain rate shall be paid from a particular date, and such an agreement may be inferred from a course of dealing between the parties. Apart from such an agreement, express or implied, interest is not, as a general rule, recoverable on a simple contract debt. Interest, however, is payable on a bill of exchange, a promissory note, and a bond for money; and a judgment carries interest both on debt and costs. Also, by statute 3 and 4 Will. IV. chap. 42, a judge or jury may award interest or damages 'upon all debts or sums certain payable at a certain time or otherwise, . . . if such debts or sums be payable by virtue of some written instrument at a certain time, or, if payable otherwise, then from the time when demand of payment shall have been made in writing.' As to assignment of debt, see ASSIGNATION.

When judgment has been obtained in respect of a debt, it will be enforced, if need be, by 'execution.' The process of execution is, generally speaking, effected by a writ, directed to the sheriff or other proper person, authorising and ordering a sufficient part of the debtor's property to be seized and sold, or otherwise made available for payment of the debt (see EXECUTION; ATTACHMENT; GARNISHEE). Formerly execution might be made against the debtor's person, and he could be kept in prison indefinitely in default of payment. But, since 1869, imprisonment for debt has been abolished in England, except in certain special circumstances (see *Imprisonment of Debtors*, infra).

In the *United States* the classification of debts and the rules as to payment, interest, periods of limitation, priority, and execution are substantially identical with the classification and rules obtaining in English law.

In *Scotland* the classification of debts adopted in English law has no place. In Scots law writing is necessary, in certain cases, to constitute an obligation, and, in other cases, to prove the obligation. Thus, where a loan exceeds £8, 6s. 8d., it can be proved, in an action for repayment, only by the writ or oath of the borrower. Again, a gratuitous obligation to pay a sum of money is binding; but such a debt can be proved only by the writ or oath of the debtor. But debts arising out of any ordinary consensual contracts, such as sale or hire (unless the contract relates to heritage), or any contract of partnership, affieghtment, or deposit, are provable by oral evidence. An IOU addressed to a person and signed by the grantor is an acknowledgment of debt, and imports an obligation to pay the amount. Under a series of old

Scots acts, a debt is extinguished after the expiry of twenty years by what is called the negative prescription, unless, during the currency of that period, the creditor has taken steps by citation, action, or diligence to enforce his claim, or the debtor has acknowledged in writing the existence of the debt, or has paid interest or part of the principal sum. There are also certain shorter prescriptions, in virtue of which the lapse of a certain time, while it does not extinguish the debt, alters the *onus* and method of proof—e.g. the triennial prescription, applicable to debts in respect of the rent of a house, board and lodging, wages or remuneration for professional work, the accounts of shopkeepers and persons engaged in trade, and other like debts, if not founded on written obligations; the quinquennial prescription, applicable to debts in respect of the rent under a lease of house or land after the tenant has left, and debts arising on bargains concerning movables provable by witnesses; the sexennial prescription, applicable to bills of exchange and promissory notes; and the vicennial prescription, applicable to debts founded on holograph writings. In Scotland, as in England, certain debts, including deathbed and funeral expenses, the rent of the debtor's house, and the wages of his domestic and farm servants for the current year or term, and certain taxes, are privileged, so that, on the death or bankruptcy of the debtor, they fall to be paid in priority to other debts. In Scots law, while execution or diligence cannot, as a general rule, be used on a debt which is future or contingent, yet such a debt may be secured by arrestment or inhibition where the debtor is *vergens ad inopiam*, or upon the dependence of an action.

**RECOVERY OF DEBTS.**—In *England*, the jurisdiction of the county court extends to all personal actions when the amount of the debt or damages sought to be recovered does not exceed £100. In many such cases it is also competent to bring an action in the High Court; but, under various statutes, a plaintiff who sues in the superior court, when he might more properly have brought his action in an inferior court, is deprived of costs, or is entitled only to county court costs. Thus, if the plaintiff, in an action founded on contract, brings the action in the High Court and recovers less than £20, he will not be entitled to any costs whatever; and if he recovers £20 or more, but less than £100, he will not be entitled to recover any more costs than he would have been entitled to if the action had been brought in the county court; unless, in either of the cases mentioned, the judge of the High Court certifies that there was sufficient reason for bringing the action in the High Court instead of the county court. There are similar provisions with reference to other inferior civil courts in which debts of limited amount can be recovered. (As to these courts, see *infra*.) In an action in the county court, the same legal or equitable grounds of defence are available as if the action were tried in the High Court, and the defendant may set up, by way of counter-claim against the plaintiff, any right or claim which he may have against him. England and Wales are divided into 566 county court districts, in each of which a court is held at least once in every month of the year, except September; while in many districts the sittings of the court are more numerous than once a month. The vast majority of actions for the recovery of debts are brought in these courts. The procedure in county court actions is regulated by the County Courts Acts, 1888-1919, and by rules and orders made from time to time under these acts. The action must, as a rule, be brought in the court of the district in which the defendant resides or carries on business.

An ordinary action is commenced by the entry of a 'plaint' in a book kept by the registrar for the purpose—there being a registrar appointed by the judge for each court. If the claim for debt exceeds 40s., the plaintiff, at the time of entering the plaint, must also file particulars of his claim. The registrar thereupon issues a summons, under the seal of the court, which contains the names of the parties, a short statement of the cause of action, and the amount of the debt claimed, and also names a day, called 'the return day,' on which the defendant must appear for the trial of the action. The summons must be served by the bailiff of the court at least ten days before the return day. On the day named in the summons the plaintiff must appear to support his claim; and if the defendant does not appear, judgment goes by default. Where the claim is for a debt or liquidated demand, the plaintiff may, instead of the ordinary summons, issue a 'default summons.' For this purpose he must file an affidavit verifying the debt. If the debt claimed exceeds £5, or is for the price of goods sold or let to the defendant in the way of his trade, leave is not required; in other cases, leave must be obtained. A default summons must be served on the defendant personally; and unless the defendant, within eight days, gives a written notice of defence, the plaintiff may, upon proof of service, have judgment for his debt and costs without further proof. In the case of an ordinary summons, it is not, as a rule, necessary for the defendant to give any notice either to the court or to the plaintiff of his intention to defend the action or of his grounds of defence. Where, however, the defendant intends to rely on any special or statutory defence—e.g. that he was a minor at the time the debt was incurred, or that he has a counter-claim against the plaintiff, or that he has been discharged in bankruptcy, or that the action is barred under the Statute of Limitations—he must, five days before the trial, give a written notice of it to the registrar, who will communicate it to the plaintiff. County court actions are usually tried before the judge without a jury; but where the claim exceeds £5 either party may, on giving at least ten days' notice, obtain a jury, consisting of eight persons. Even in a case where the amount of the claim is less than £5, either of the parties, by leave of the judge, may obtain a jury. The verdict of the jury must be unanimous. At the hearing oral evidence is, if necessary, given by witnesses on oath or affirmation. The judge, if there is no jury, decides all questions both of fact and law. At the end of the case, judgment is given and entered in the minutes of the court. If the plaintiff is found entitled to payment of any sum, the judge may direct the sum to be paid at once, or he may direct payment by instalments. In the latter case, the creditor cannot levy Execution (q.v.) till after default has been made in payment of an instalment; but on such default execution can issue for the whole sum due. The costs of the action, which are according to a fixed scale, have, as a rule, to be paid by the unsuccessful party, though the judge in his discretion may order otherwise. In every case tried in the county court, whether with or without a jury, the judge, on application, has the power to order a new trial. A new trial will only be ordered on cause shown, and on such terms as the judge shall think reasonable. The judge, if he thinks fit to grant a new trial, may order that it shall take place before a jury, although the action was not originally so tried. No appeal lies from the finding of the judge or jury on a question of fact; but if either party to the action is dissatisfied with the decision or direction of the judge on any point of law or

equity, or on the admission or rejection of any evidence, he has a remedy by way of appeal to a Divisional Court of the High Court of Justice. Such an appeal, however, can be taken to the High Court only when the point of law has been raised at the trial before the county court judge. Moreover, in some cases an appeal will not lie without the leave of the county court judge. In particular, where the debt sued for is less than £20, neither party can appeal without such leave. The appellant, within twenty-one days from the date of the judgment, must give notice of appeal to the other party, and enter the appeal in the Crown Office of the High Court of Justice.

In addition to the county courts there are, in England, certain other courts which, in particular cases, have jurisdiction in claims for debts of limited amount. The most important of these courts are the Mayor's Court of the City of London, the Liverpool Court of Passage, the Hundred Court of Salford, and the Bristol Tolzey Court.

In *Scotland*, debts not exceeding £20 are properly recovered in the Sheriff Small Debt Court. The procedure is regulated by the Sheriff Court Acts, 1907 and 1913, and the Small Debt Acts, 1837 to 1889. The summons, which is in a statutory form, specifies the date on which the case is to come before the court, and contains warrant to cite the defender and witnesses. It is signed by the sheriff-clerk. The particulars of the claim must be stated in the summons, or in a separate paper or account, to which reference is made in the summons. The defender is cited by serving on him a copy of the summons and of the account sued on, if any. This must be done at least six days before the date of appearance specified in the summons, and may be done either by a sheriff-officer delivering a copy to the defender personally, or at his dwelling-place, or by a sheriff-officer or law-agent sending a copy to the defender in a registered letter. Either of the parties to the action may appear, on the calling of the case in court, by himself, or by one of his family, or by a law-agent, or, if allowed by the sheriff, by some other person. Where the defender intends to found on a counter-claim, he must serve a copy of it on the pursuer at least one day before the day of appearance. If both parties appear, they are heard by the sheriff, and, if necessary, oral evidence is led. No record of the pleadings or the evidence is kept, but the judgment is recorded in a register kept by the sheriff-clerk and signed by the sheriff. If a sum is found due, it is in the discretion of the sheriff to allow it to be paid by instalments. If there is no appearance for the defender, the pursuer obtains decree in absence, with expenses. The fees of law-agents in a small-debt case, if allowed by the sheriff, are regulated by a special scale prescribed by the Codifying Act of Sederunt, 1913. The same act also provides that where the amount claimed in any Sheriff Court action does not exceed the value which may be competently sued for in the Small Debt Court, small debt expenses only shall be allowed, unless the sheriff shall otherwise appoint. A judgment pronounced in the Small Debt Court cannot be reviewed either on law or on fact; but it is competent to appeal to the High Court of Justiciary against the decree on certain special grounds, viz. corruption, or malice, or oppression, on the part of the sheriff, wilful neglect of statutory procedure, and incompetency, including defect of jurisdiction. In addition to the Sheriff Court, the justices of the peace and the magistrates of burghs possess a small-debt jurisdiction, in cases of debts not exceeding £5.

The Debts Recovery Court, constituted by statute in 1867, for the recovery of debts between £12 and £50, has been abolished by the Sheriff Courts Act

of 1907. The Act of 1907, as amended by the Act of 1913, has, however, provided a special procedure for 'summary causes,' which are defined as meaning actions for payment of money not exceeding £50 in amount, exclusive of interest and expenses. The procedure in a summary cause is, in several respects, more simple and rapid than in an ordinary Sheriff Court action. Where evidence is led, it is not recorded unless the sheriff, on the motion of either party, orders it to be recorded.

An action for payment of money exceeding £50 in amount, exclusive of interest and expenses, may be brought either in the Sheriff Court or in the Court of Session, and proceeds as an ordinary action in either of these courts.

**IMPRISONMENT OF DEBTORS.**—Formerly, both in England and in Scotland, if the defendant in a civil action for debt had no property out of which the amount for which judgment had been given could be realised, the person of the debtor could generally be seized in execution. The debtor, in other words, could be imprisoned until payment of the debt.

In *England*, imprisonment for debt was abolished by the Debtors Act, 1869, except in certain cases. Of these exceptional cases, the most important in practice is where the failure to pay a judgment debt is wilful. Under the Debtors Act, the judge of a county court has power to commit to prison, for a period not exceeding six weeks, a judgment debtor who fails or refuses to pay the debt, on proof that the debtor has means to satisfy the order for payment made by the court. The burden of proving that the debtor has the means to pay lies on the creditor. The imprisonment does not extinguish the debt; but the debtor may obtain his release at any time by making payment of the debt. To obtain an order committing the debtor to prison, a judgment summons must be issued and be served personally on the debtor. Such committal orders are very frequent in practice in England, the number of debtors so imprisoned exceeding ten thousand annually. In the Debtors Act, 1869, modified by the Bankruptcy Acts, 1883 to 1914, provision is also made for the punishment of fraudulent debtors. The consolidating Bankruptcy Act, 1914—the statute on which the existing bankruptcy system now mainly rests—enumerates various acts which, if done by a person adjudged bankrupt or in respect of whose estate a receiving order has been made, are misdemeanours punishable by imprisonment for two years. Under sect. 159 of the statute of 1914 it is a felony, punishable with two years' imprisonment, for any bankrupt, after the presentation of a bankruptcy petition, or within six months before that date, to abscond, or attempt or prepare to abscond, from England, taking with him property to the value of £20, unless he proves that he had no intent to defraud. It is also a criminal offence for any person, whether he be a bankrupt or not, with intent to defraud his creditors, to conceal or remove any part of his property since, or within two months before, the date of any unsatisfied judgment, or order for payment of money, obtained against him.

In *Scotland* the severity of the law of imprisonment for debt was, at an early period, mitigated by the introduction of the process of *Cessio bonorum* (q.v.). By the Debtors Act, 1880, and the Civil Imprisonment Act, 1882, imprisonment for debt has been abolished except in case of non-payment of taxes, fines, penalties due to the crown, and rates or assessments lawfully imposed; wilful refusal to pay sums decerned for aliment; and failure to implement a decree *ad factum prestandum*. The maximum period of imprisonment for non-payment of taxes, fines, and crown penalties is a year; and for non-payment of rates and assess-

ments for any year, six weeks. A person who wilfully refuses to pay an alimentary debt may be committed to prison for six weeks, and this punishment may be repeated at intervals of not less than six months. In those cases in which imprisonment for debt is still competent in Scotland, a creditor is entitled to obtain a warrant to imprison a debtor if there is ground to believe that he is *in meditatione fugæ*. Such *meditatio fugæ* warrants were formerly common; but, since the old matter-of-course imprisonment for debt has been abolished, such a warrant can be granted only in the case of those debts in which imprisonment may follow on the decree.

In the *United States* imprisonment of debtors was, as in England, originally recognised at common law as a means of enforcing payment of debts. But at the present time, by provisions in the constitutions of the several states or by laws passed for the relief of 'poor debtors,' imprisonment for debt has been abolished in all the states. The purport and effect of the laws passed for the relief of poor debtors is to relieve the debtor's body from restraint upon a surrender of his goods and estate. While legislation has relieved the honest debtor from imprisonment, it has subjected fraudulent debtors to punishment. Thus, by statutes in force in many states, the secreting of goods with intent to defraud creditors is an indictable offence. To constitute this offence there must be (1) an actual fraudulent secreting, assigning, or conveying of goods, or a fraudulent reception of goods; and (2) an intent to prevent such property from being made liable for the payment of debts, or, in case of reception, a guilty knowledge of such intent.

**ANCIENT LAWS OF DEBTOR AND CREDITOR.**—The Mosaic Law as to the relation of creditor and debtor combined a degree of lenity with a degree of severity which are equally alien to modern views. If an Israelite became poor, it was a duty to lend to him, and no interest was to be exacted either in money or in produce. If he was a foreigner the case was different, and the taking of interest was legal (Exod. xxii. 25; Deut. xxiii. 19, 20; Lev. xxv. 35–38). When the Sabbatical year arrived—i.e. at the end of every seven years—there was a general remission of debts as between Israelite and Israelite; and the near approach of the year of remission was not to be recognised as an apology for declining to lend to an indigent brother (Deut. xv. 1–11). Pledges, it is true, might be taken, but even here the same humane principles prevailed. The upper millstone was sacred, for to take it would be to deprive the debtor of the means of subsistence. If raiment was the pledge, it must be returned before nightfall, when it might be required for a covering (Exod. xxii. 26, 27); and the widow's garment could not be taken in pledge. In strange contrast to this is the provision (Lev. xxv. 39) that a poor Israelite may be sold to one possessed of substance, even when modified by the special provision that he shall serve as a hired servant, not as a bond-servant, and shall be set at liberty when the year of jubilee arrives. Michaelis says that the judicial procedure for debt was quite summary, the most important causes being decided probably in a single quarter of an hour; and he remarks that Moses nowhere thinks it necessary to mention how a debt was to be proved before a judge. There was, however, an extensive system of appeal; from the judge over 10, the case was carried to the judges over 50, 100, and 1000, and finally to Moses himself. As every Israelite was entitled to claim the land of his fathers at the jubilee year, and thus to place matters on the footing on which they were after the settlement in Palestine, debts and burdens on land were limited to claims to the fruits of forty-two harvests; but houses, with the exception of

those of the Levites, might be sold in perpetuity (Lev. xxv. 29, 30, 32, 33). Children were often given in pledge (Job, xxiv. 9), and ultimately into slavery, in payment of debt (2 Kings, iv. 1). Subsequent to the Captivity, the pressure of debts upon the poor became so intolerable that Nehemiah espoused their cause, and insisted on a general remission (Nehem. v.), exacting from the rich an oath that they would never afterwards press for payment.

Both in Greece (Plut. *Vita Solonis*, 15) and in Rome (A. Gell. xx. 1, 19; Liv. ii. 23) the creditor had in early times a right to enforce execution of a judgment for debt against the person of the debtor. Previous to the time of Solon this system, which led to the practical enslavement of insolvent debtors, brought about internal struggles which threatened the existence of the state; and his abolition of it forms one of Solon's many claims to the character of an enlightened legislator. By the Twelve Tables, it was enacted at Rome that if the debtor admitted the debt, or had had judgment pronounced against him for it, thirty days should be allowed him for payment. At the expiration of that period he was liable to be seized by his creditor, who kept him sixty days in chains, exposing him on three market days, and proclaiming his debt. If no *vindex* appeared who made himself responsible for the payment of the debt, if it should prove that there was a valid judgment, the creditor might sell the debtor as a slave. There was also in early Rome a form of contract, known as *nexum*, by which a borrower might 'mancipate' himself to the creditor in security of his debt, the effect being that the creditor, without pursuing any process at law, could, on the failure of the debtor to pay the debt, seize his person and keep him in bondage. Repeated attempts were made by legislation to alleviate the position of *nexi*, the harsh treatment of whom aroused popular discontent. Finally, in 326 B.C., the *Lex Poetilia* liberated all *nexi*, and prohibited the summary seizure of debtors under a nexal contract. It was not, however, till the introduction of *cessio bonorum* by Julius Cæsar in 48 B.C., which permitted a debtor to obtain his discharge on giving up all his property to his creditors, that the relation of creditor and debtor in Rome was put on a satisfactory basis at Rome.

**Debt, NATIONAL.** See NATIONAL DEBT.

**Debussy, CLAUDE ACHILLE**, French composer, was born at St Germain-en-Laye, 22d August 1862. He studied at Paris Conservatorium, where his cantata *L'Enfant Prodigue* won him the Prix de Rome in 1884. Already at this period he brought down upon himself the disapprobation of critics by his disregard of form in *Le Printemps*, a symphonic suite, and in *La Demoiselle Elue*. A visit to Russia brought him under the influence of Russian composers. For long Debussy composed busily without general recognition; but a string quartette and the *Prélude à l'Après-midi d'un Faune* (1894) established his reputation, which was greatly enhanced in 1902 by the production, at the Opéra Comique, of *Pelléas et Mélisande*, founded on Maeterlinck's play. His other works include *Fêtes galantes* (Verlaine), *Poèmes de Baudelaire*, *Images*, *Nocturnes*, and *La Mer*. Debussy deliberately rejects melody as 'almost anti-lyric, and powerless to express constant change of emotion or of life.' He died 25th March 1918.

**Decachord**, an ancient Greek instrument of ten strings (hence the name), triangular in shape; also a kind of large guitar with ten strings.

**Decalogue** (Gr. *dekalogos* = 'the ten words'), the ten commandments. There are two versions of the commandments in the Old Testament—(1) Exodus, xx. 1–17; (2) Deuteronomy, v. 1–21. Though the substance of the commandments is the same

in both these accounts, there are many interesting differences in detail. For instance, the motive for keeping the Sabbath day holy is stated in Exodus thus, 'In six days the Lord God made heaven and earth, . . . and rested the seventh day;' in Deuteronomy, however, the philanthropic motive is introduced, 'that thy man-servant and thy maid-servant may rest as well as thou.' Probably both these versions are derived from an earlier and simpler form which has been lost. It is possible that in this simpler form the Decalogue may have emanated from Moses, but scholars are by no means unanimous upon this point. The Decalogue is universally recognised among Jews and Christians as the embodiment of the fundamental articles of religion and the basal principles of morality. Professor Paterson has described it as 'the charter of ethical piety, the great pre-Christian advocate for righteousness as the highest form of ritual.' Its Divine authority is recognised by Jesus in the Sermon on the Mount (Matt. v. 17), though in many points Jesus deepened and expanded the ethical teaching of the commandments. Moreover, it is quite certain that Jesus did not regard the commandments as exhaustive or as necessarily sufficient by themselves to secure eternal life. When the rich young man, in reply to the question of Jesus, 'Thou knowest the commandments?' said, 'All these have I kept from my youth up,' Jesus did not consider the answer as satisfactory, but added the injunction, 'Sell all that thou hast,' &c. The chief defects of the Decalogue from the point of view of the Christian ideal are: (1) It is too negative. Only two of the commandments are positive, the remaining eight being prohibitions. (2) It is too external. Only the last commandment deals with the motives and inner springs of conduct. The Decalogue is of perpetual value if it be regarded as an elementary guide to religion and conduct. It is a mistake, however, to put it forward as an exhaustive summary of the whole duty of man towards God and his fellows.

There is a diversity of opinion as to the proper division of the commandments. The Greek Church and most Protestant Churches adopt the arrangement in the English Prayer-book. Roman Catholics and Lutherans combine the first two commandments in our ordinary English version into one, and divide our tenth commandment into two. According to the former the ninth commandment runs, 'Thou shalt not covet thy neighbour's wife;' the rest of our commandment constitutes the tenth. According to the Lutherans, however, the ninth consists of the words, 'Thou shalt not covet thy neighbour's house.' See PENTATEUCH; article by W. P. Paterson in *Hastings's Dictionary*; Stanley's *Christian Institutions* (chap. xvii.); Notes on the relevant passages in *Commentaries on Exodus and Deuteronomy*.

**Decameron.** See BOCCACCIO.

**Decamps,** ALEXANDRE-GABRIEL, a celebrated French painter, was born at Paris in 1803. A great portion of his childhood was spent in a lonely part of Picardy among the peasants, which seems to have given him a lifelong distaste for the ways of cultivated society. He studied in a desultory manner under Bouchot, Abel de Pujol, David, and Ingres, but he saw nature in his own way, and stamped the small pictures of animals which he then produced with his own individuality. His want of a thorough grounding in art, and his disinclination for systematic study, told against him, and prevented him from working with perfect ease and mastery. His effects were attained by repeated paintings, and his pictures exhibit a strong impasto, which he scraped with pumice-stone, and again retouched. In 1824 he spent the summer in Switzerland, and in 1827-28 he travelled in Italy and passed to the Levant, where he found

congenial subjects, of the class that Delacroix afterwards treated, which greatly occupied his brush, and which attracted attention in the Salon of 1831. He aspired to treat historical and religious subjects: his 'Defeat of the Cimbri' (1834) attained a great success. He was made a chevalier of the Legion of Honour in 1839, and became officer in 1851. He died at Fontainebleau from a hunting accident, 22d August 1860. His works prove him to have been a powerful colourist; they are effective in composition and the distribution of light and shade, and show a fine appreciation of the wilder and more picturesque aspects of man and nature. Since his death they have realised large prices, his water-colour of 'Children let out of a Turkish School' (1842) fetching 34,000 francs in Paris in 1861. See his *Life* by Moreau (1869).

**De Candolle,** AUGUSTIN PYRAME, an eminent botanist, descended from an ancient noble family of Provence, was born at Geneva, 4th February 1778, and was first drawn to the study of botany by the lectures of Vaucher. In 1796-97 he studied chemistry, physics, and botany in Paris, where in 1797 his earliest work, on lichens, was published. Other works quickly followed, including his *Astragalologia* (1802), and his valuable *Essais sur les Propriétés Médicales des Plantes* (1804). In 1802 he was elected to an honorary professorship in the Academy of Geneva, but remained in Paris, and delivered his first botanical lectures in the Collège de France in 1804. His *Flore Française* appeared in four volumes in 1805. Employed by the government, he visited all parts of France and Italy in 1806-12, investigating their botany and agriculture. The results of his journeys are partly embodied in a supplement to the *Flore*. He was appointed in 1807 to a chair at Montpellier, where he lived from 1810 to 1816; he then retired to Geneva, where a professorship of Botany was founded for him, and where he spent the remainder of his life. He died 9th September 1841. De Candolle was an industrious writer, and the fruits of his valuable studies in systematic botany and the properties and natural affinities of plants are embodied in a considerable number of works. The greatest of these, his *Regni Vegetabilis Systema Naturale* (vols. i. and ii. Paris, 1818-21), was commenced on too grand a scale, and was continued within more reasonable limits in the *Prodromus Systematis Naturalis Regni Vegetabilis* (17 vols. 1824-73, the last ten by his son and others). De Candolle bequeathed his collections—including a herbarium of more than 70,000 species of plants—to his son, ALPHONSE DE CANDOLLE (1806-93), on condition of his keeping them open to the public, and of his carrying on the *Prodromus*. That son, himself a botanist of no mean fame, published several works of note, the most important being *Géographie Botanique* (2 vols. 1855) and *Origine des Plantes Cultivées* (1883). He also edited the *Mémoires* of his father (1862).

**Decapoda.** See CRUSTACEA, CEPHALOPODA.

**Decapolis.** See KERAKE, PALESTINE.

**Decatur,** capital of Macon county, Illinois, on the Sangamon River, 39 miles E. of Springfield, at the junction of several railways. It has woollen, planing, and flour mills, and a vast variety of other factories. Pop. (1880) 9547; (1920) 43,818.

**Decatur,** STEPHEN, American naval commander, was born in Sinnepuxent, Maryland, 5th January 1779, of French descent, and obtained a midshipman's warrant in 1798. He saw some service against the French, and was commissioned lieutenant in the following year; and at the close of the French war in 1801 he was one of the thirty-six officers of that rank retained in

the reduced strength of the navy. In the war with Tripoli (1801-5) he gained great distinction; his brilliant achievement of boarding and burning the captured *Philadelphia* in the harbour of Tripoli, and then escaping under the fire of 141 guns, Nelson pronounced 'the most daring act of the age.' For this he received his commission as captain in 1804; in 1810 he was appointed commodore. In the war with England in 1812 he captured the frigate *Macedonian*, but in 1814 he was obliged to surrender, after a resistance that cost him a fourth of his crew, to four British frigates. In 1815 he chastised the Algerines for their piracy, and compelled the dey to declare the American flag inviolable; and he obtained indemnities for violating treaty stipulations from the bey of Tunis and the pasha of Tripoli. He was appointed a navy commissioner in 1816, and was killed in a duel by Commodore James Barron, near Bladensburg, Maryland, 22d March 1820.

**De Caus.** See CAUS.

**Decazeville**, a town in the French department of Aveyron, 110 miles NNE. of Toulouse by rail, with iron and coal mines and extensive blast-furnaces and ironworks; pop. 14,000.

**Deccan** (*Dakshin*, 'the south'), a term applied sometimes to the whole of the Indian peninsula south of the Vindhya Mountains, which separate it from the basin of the Ganges, and sometimes restricted to that portion of the same which is rather vaguely bounded on the north by the Nerbudda, falling into the Gulf of Cambay, and on the south by the Kistna or Krishna, flowing into the Bay of Bengal. The name, like that of the Carnatic (q.v.), is rather of historical interest than of actual use. See J. D. B. Gribble, *History of the Deccan* (vol. i. 1896; vol. ii., ed. by the author's daughter, Mrs Pendlebury, 1925).

**Deceased Wife's Sister.** By the laws of the United Kingdom, marriage with a deceased wife's sister was till 1907 prohibited as incestuous. At one period this was the universal law of Christendom—both branches of the Christian church, the Eastern as well as the Western, having united in condemning it. The early canon law forbade marriages between relatives to the seventh degree (afterwards changed to the fourth degree by the Lateran council 1215 A.D.), and declared that affinity must be treated in the same way as consanguinity (see CONSANGUINITY). The professed foundation for this was the Mosaic law respecting the intermarrying of kindred, as given in Leviticus, xviii. As is well known, however, the canon law was not at all times stringently enforced in this respect by the ecclesiastical courts, and we find that papal dispensations—a fruitful source of revenue to the church—were not uncommon at certain periods of history. A noted historical instance is the case of Henry VIII. and Catharine of Aragon. The opinion of the 19th century, however, ran counter to the canon law on the subject, as adopted by the Reformed Churches; and the law prohibiting marriages with a brother's widow or a deceased wife's sister has been abrogated in every state on the continent of Europe, in the United States, and in most, if not all, the British colonies. Great Britain, however, adhered to the old rule till 1907, and till 1921 excluded marriage with a brother's widow.

In England, though marriage with a deceased wife's sister seems to have been voidable at common law, it was first prohibited by an act passed in the reign of Henry VIII. (25 Henry VIII. chap. 22). The force of this enactment was, however, somewhat weakened by another statute in the following year declaring that 'all lawful persons may marry.' The combined effect of these

statutes and the common law continued to be a subject of dispute among lawyers down to the passing of Lord Lyndhurst's Act, 1835. The better opinion seems to be that down to 1835 such marriages were binding till they were annulled by decree of the ecclesiastical courts, and therefore if either of the parties died before decree was obtained, the children of the marriage were legitimate, and entitled to inherit, and such marriages were not uncommon. But Lord Lyndhurst's Act declared all such marriages entered into after its date to be *ipso facto* null and of no effect.

In Scotland, by the Act 1567, chaps. 14 and 15, all connections supposed to be expressly prohibited by the divine law in the 18th chapter of Leviticus are declared incestuous, and punishable by death. The declaration of the Confession of Faith follows in this matter the canon law as fixed by the Lateran council above mentioned. According to the interpretation which this Act of 1567 received from the judges, it applied to marriages with a deceased wife's sister. Barbara Tannahill, in the beginning of the 18th century, was executed on her own judicial confession for having had connection with the husband of her deceased sister. In punishing the offence criminally, the Scottish law was more stringent than the English, incest not having been *per se* a crime in England till 1908 (8 Edw. VII. chap. 45).

Organised agitation in Great Britain for the abolition of the law respecting marriage with a deceased wife's sister dates back almost to the time of Lord Lyndhurst's Act. The matter was first brought before parliament in 1841, in which year leave was refused by the House of Commons for the introduction of a bill for the repeal of the law. Thereafter the subject was brought constantly before parliament. When the bill for repealing the law passed in the Commons in 1907, it had been previously passed there eighteen times.

In Great Britain the churches opposed legislation, the former law being, as above stated, professedly based upon Leviticus, xviii. 18. The interpretation of this text has given rise to diversity of opinion. The better opinion is that the prohibition refers only to marriage during the lifetime of the wife; and, in particular, this view of the text has been taken by the most learned Jewish rabbis. In the Book of Deuteronomy the Jewish law seems to have allowed and even commanded marriage with a deceased husband's brother, and it seemed hardly reasonable to suppose that one was permitted and the other prohibited, though the converse held in Great Britain from 1907 to 1921.

Marriage with a deceased husband's brother remained null and void until the passing of the Deceased Brother's Widow's Marriage Act, 1921.

A clergyman is not bound to allow the use of his church for such marriages, but *may* (the act says 'may' not 'must') permit another clergyman, entitled to officiate within the diocese, to perform the marriage service. A clergyman of the Church of England is still liable to ecclesiastical censure for marrying his deceased wife's sister.

The Act of 1907 does not affect decrees of nullity made before its date, nor does it affect marriages contracted before its passing, which were valid at the time of marriage, e.g. where a man who had married his deceased wife's sister had, before the passing of the act, married another woman in her lifetime. But sect. 1 has a retrospective effect, legitimating all children of marriages with a deceased wife's sister whenever contracted.

Sect. 2 of the act contains a saving of existing rights and interests and of claims by the crown for death-duties payable before the passing of the act. The editor of Chitty's Statutes observes, 'The effect is that though the void marriage is by sect. 1

rendered valid, the results of such void marriage are not to be interfered with.'

Sect. 3 provides, in effect, that adultery with a wife's sister shall still be a ground of divorce, without it being necessary for the injured wife to prove cruelty. Accordingly, as has been said, 'this extraordinary result is arrived at, namely, that adultery with a wife's sister is incestuous, but upon the wife's death "incest" ceases by virtue of sect. 1.' This sect. 3 also provides that 'it shall not be lawful for a man to marry the sister of his divorced wife, or of his wife by whom he has been divorced, during the lifetime of such wife.'

The word 'sister' in the act includes a sister of the half-blood.

Finally, it should be noticed that by the Colonial Marriages (Deceased Wife's Sister) Act, 1906 (6 Edw. VII. chap. 30) it is provided that 'where a man has, whether before or after the passing of this act, married his deceased wife's sister, and at the date of the marriage each of the parties was domiciled in a part of the British possessions in which at that date such a marriage was legal, the marriage, if legal in other respects, shall be, and shall be deemed always to have been, legal for all purposes, including the right of succession to real property and to honours and dignities, within the United Kingdom, unless either party to the marriage has subsequently, during the life of the other, but before the passing of this act, lawfully married another.' There is a saving for rights accrued before the act.

**December**, the last month of the year. In the old Roman calendar, before the time of Julius Cæsar, the year began with March, and that which is now the twelfth was then the tenth month; hence the name (*decem*, 'ten').

**Decemvirs** (*decemviri*, 'ten men'), a body of ten commissioners, the ten men appointed to codify the law, both public and private, at Rome. Commissioners were first sent to Greece to study the Greek statute law, and on their return (451 B.C.) all the magistracies were suspended, and a commission of ten patricians (*decemviri legibus scribendis*) appointed with consular powers to reduce the laws to writing. By the end of the next year the code was finished, and after being ratified by the comitia of the centuries, was erected in the Forum inscribed on ten tables of wood. Next year the decemvirate was renewed, and the result of their deliberations was to add two other supplemental tables, from which the whole code bore its official title of the laws of the Twelve Tables (q.v.). The president of both the decemvirates was the notorious Appius Claudius (q.v.).

**Deception Island**, a volcanic island belonging to the South Shetland group in the Antarctic Ocean, directly south of Cape Horn. Amidst its ice-covered rocks lies a crater-lake, 5 miles in circumference, surrounded by hot springs.

**Déchelette**, JOSEPH, French archæologist, born in 1862 at Roanne, wrote an important but unfinished *Manuel d'Archéologie préhistorique, celtique, et gallo-romaine* (1908-14), and other works. He was killed in action on the Aisne.

**Deciduous Trees** are those which annually lose and renew their leaves before next year's leaves appear. In cold and temperate countries the fall of the leaf in autumn, and the restoration of verdure to the woods in spring, are among the most familiar phenomena of nature, connecting themselves also very intimately with the feelings, habits, and circumstances of mankind. The greater part of the trees and shrubs of temperate regions are deciduous; but within the tropics the forest retains always its luxuriance of foliage, except in countries

where the dry season is extremely marked. There many trees lose their leaves in the dry season, and exhibit the same partial suspension of vegetative life. Trees not deciduous are called Evergreen (q.v.). The means of disarticulation of deciduous leaves is described under LEAF.

**Decimal Fractions** (Lat. *decem*, 'ten') are such as have for their denominator any of the numbers 10, 100, 1000, &c.—i.e. any power of ten (see FRACTION). Thus,  $\frac{7}{10}$ ,  $\frac{13}{100}$ ,  $\frac{17}{1000}$ , are decimal fractions. In writing these the denominator is conventionally omitted, and the fractions expressed thus: 0·7 or ·7, ·23, ·019. That these numbers do not express integers is intimated by the point to the left; and the denominator is always 1, with as many ciphers annexed as there are figures in the decimal. In the third example a cipher is prefixed to 19, because otherwise it would read as if it stood for  $\frac{19}{10}$ . The expression £5·647 is read, Five pounds and 647-thousandths of a pound; or, Five pounds, and six-tenths, four-hundredths, and seven-thousandths of a pound. That these two readings are equivalent appears from this, that  $\frac{19}{10} = \frac{190}{100} + \frac{17}{1000} + \frac{170}{1000} = \frac{19}{10} + \frac{17}{100} + \frac{17}{1000}$ . It thus appears that the first figure of a decimal to the right of the point expresses tenths of the unit; the second, hundredths; the third, thousandths, &c. In this property lies the great advantage of decimal fractions; they form merely a continuation of the system of notation for integers, and undergo the common operations of addition, multiplication, &c., exactly as integers do. To explain the principles which determine the position of the decimal point after these operations belongs to a treatise on arithmetic.

The disadvantage attending decimal fractions is, that comparatively few fractional quantities or remainders can be exactly expressed by them; in other words, the greater number of common fractions cannot be reduced, as it is called, to decimal fractions, without leaving a remainder. Common fractions, such as  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{6}$ , for instance, can be reduced to decimal fractions only by multiplying the numerator and denominator of each by such a number as will convert the denominator into 10, or 100, 1000, &c. (The common process is merely an abridgment of this.) But that is possible only where the denominator divides 10, or 100, &c., without remainder. Thus, of the above denominators, 2 is contained in 10, 5 times; 4 in 100, 25 times; and 25 in 100, 4 times; there-

fore,  $\frac{1}{2} = \frac{1 \times 5}{2 \times 5} = \frac{5}{10} = \cdot 5$ ;  $\frac{1}{4} = \frac{1 \times 25}{4 \times 25} = \frac{25}{100} = \cdot 25$ ;  $\frac{9}{25} = \frac{9 \times 4}{25 \times 4} = \frac{36}{100} = \cdot 36$ . But neither 3 nor

7 will divide 10 or any power of 10; and therefore these numbers cannot produce powers of 10 by multiplication. In such cases, therefore, and in fact in the case of any vulgar fraction (in its lowest terms) whose denominator contains any other prime factor than 2 or 5, an equivalent decimal cannot be found. If we try to find it, the result is an infinite series, which is called a repeating, recurring, or circulating decimal. Thus  $\frac{1}{3} = \cdot 6666$ , &c., where the 6 repeats for ever—i.e.  $\frac{1}{3}$  cannot be expressed as a decimal. The non-terminating result, '666, &c., is written  $\cdot 6$ .

**Decimal System**. This name is applied to any system of weights, measures, money, &c., in which the standard unit is divided into tenths, hundredths, &c., for the denominations below it, and multiplied by 10, 100, &c., for those above it. The nature of this method of division will be best explained by an example from the French system, where it has been most rigidly carried out. The

*metre* (=39·37 English inches nearly) is the unit of length, and the foundation of the whole system. For the higher denominations of length the Greek prefixes *deca*, *hecto*, *kilo*, and *myria* are prefixed to signify multiplying by 10, 100, 1000, 10,000; so that *decametre*=10 metres, *kilometre*=1000 metres, &c. The Latin prefixes *deci*, *centi*, *milli*, on the other hand, are used to express division by 10, 100, &c. Thus *decimetre*= $\frac{1}{10}$  of a metre, *centimetre*= $\frac{1}{100}$  of a metre, &c. For money, the *franc* being the unit, a *décime* is the tenth part of a franc; and a *centime*, the hundredth part.

In 1865 Belgium and Switzerland adopted the French decimal system of money, weights, and measures. Afterwards the Italian *lira*, the Greek *drachmè*, the Spanish *peseta*, and more recently the Rumanian *lei*, and the Serbian *dinar*, were assimilated to the *franc*. Other countries, though retaining each its own special unit coin, divide it into 100 parts—viz. Germany, Austria, Russia, and the United States of America. Many countries have adopted the metrical system of weights and measures, though rejecting the franc.

The method of decimal gradation in weights and measures naturally suggests itself to the arithmetician, on account of the *language* of numbers, and the Arabic notation. Practical legislators, however, have pronounced the number *ten* to be most unsuitable as a basis, especially for the purposes of 'retail trade.'

In 1821, after an able report drawn up by John Quincy Adams, the United States government rejected the metrical system as unsuited to practical life. The question of adopting the French scheme has also been repeatedly discussed in the House of Commons, but though many, in the interests of scientific pursuits and international transactions, advocated a change, there are difficulties in the way of uprooting our existing method, with its excellent supply of binary factors. A Royal Commission reported against change in 1920. Although proposed in 1795, the decimal system in France required repeated legislation before it could gain footing, and though it was made obligatory from 1st January 1840, the people still retain traces of the older modes of computation. The centesimal division of the right angle into grades and of these into minutes was also proposed at the French Revolution, but had long been abandoned, even in France, when it was officially adopted in Sweden in 1921. It was also used as a basis in dividing the thermometric scale, but Fahrenheit's is often preferred to the centigrade, because there are more subdivisions, and because it avoids the use of negative numbers. The application of the system to the division of time was so unworkable as scarcely to tolerate even a trial. There, as elsewhere, the duodecimal mode, as compared with the decimal, is incontestably superior. For the decimal system in numerical notation, see SCALES OF NOTATION, NUMERALS; and for the system of measurements based on the metre, see METRE.

**Decimation**, a Roman military punishment, whereby when a considerable body of troops committed some grave military offence, which would be punished with death in an individual, the punishment was awarded to one-tenth of them by lot, instead of to the whole number, that so the army might not be too much weakened. The practice was borrowed from the Romans by Essex at Dublin (1599), by the Austrians at Leipzig (1642), and by the French at Trèves (1675); but Blücher tried vainly to employ it against the mutinous Saxon battalions at Liege (1815).

**Decius**, a Roman emperor, whose name in full was C. MESSIUS QUINTUS TRAJANUS DECIUS. He was born at Budalia, in Lower Pannonia, towards

the close of the 2d century, and was sent in 249 by the Emperor Philipppus to reduce to subordination the rebellious army of Mœsia. The soldiers proclaimed him emperor against his will, and forced him to march upon Italy. Philipppus encountered the forces of Decius near Verona, but was defeated and slain. Decius assumed the government of the empire in the end of the year 249, but his brief reign was one of restless warring with the Goths, fighting against whom he was killed near Abricium in the close of the year 251. In his reign the Christians were persecuted with great severity. At Rome, Antioch, and Jerusalem the bishops were massacred, the great Origen was cruelly tortured, and dreadful cruelties were perpetrated at Alexandria.

**Deck**. In ship construction a deck is a platform extending from one side of a vessel to the other, laid on the top of the beams which connect the sides of the vessel together. Except in very small vessels, there are more decks than one. Each deck forms a flooring for the cargo, or passengers and crew accommodated thereon, and a covering for the deck below it. The several decks are further supported one over the other by iron or steel pillars secured to the beams, and by the transverse bulkheads which form watertight and other divisions.

A deck generally has a certain amount of 'camber' or athwartship round, not only to drain water to the ship's side, but to contribute to the strength of the deck beams. The deck is also 'sheered' forward and aft, to raise the ends higher above the water.

Vessels are described by the number of complete decks that are 'laid and caulked.' A 'three-decked' ship has 'upper,' 'main' or 'middle,' and 'lower' decks; but, in addition, there may be an 'orlop' deck, depending on the depth of the vessel.

Again, certain vessels are distinguished by some characteristic deck. A 'spar-decked' vessel is similar to a three-decked vessel of the same dimensions, but is lighter in construction. The spar deck corresponds to the upper deck. An 'awning-decked' vessel is one having a comparatively light superstructure, above the main deck proper, forming a complete deck, which is intended to shelter passengers or cattle, or for the conveyance of cargo either light in its nature or limited in quantity.

Above the upper deck there are generally superstructures which do not extend the full length of the vessel, and which form partial decks: the 'forecastle' deck (either 'sunk' or 'top-gallant') being at the fore end of the vessel; the 'bridge' deck about the mid-length; and the raised 'quarter'-deck and the 'poop'-deck at the aft end. In large passenger vessels there may also be a 'promenade' deck and a 'boat' deck.

Depending on size, vessels have one or more steel decks fitted, with the wood longitudinal planking on the top.

The spaces between the several decks are spoken of as 'tween decks.'

Modern vessels have so increased in size, and have so many decks, that Lloyd's Register of Shipping have now abandoned the foregoing names to the various complete decks, simply numbering them instead. See also SHIPBUILDING, NAVY. For deck cargoes, see PLIMSOLL.

**Decken**, KARL KLAUS VON DER, an ill-fated African traveller, was born 8th August 1833, at Kotzen, in the Mark of Brandenburg, passed from the gymnasium of Lüneburg, and the cadets' college at Hanover, into the Hanoverian army, which he left after ten years' service (1860) to follow his bent towards travel. On Baith's advice he went to Zanzibar, and started thence on a

journey to Lake Nyasa, which failed through the treachery of his Arab guide. In 1861 he started on a second and successful journey to the mountain-regions of Kilima-Njaro. In the following year, with O. Kersten, he climbed that mountain to the height of 13,780 feet. In 1863 he made an extensive voyage along the east coast of Africa, after which he returned to Europe to plan a great expedition for the exploration of East African rivers. This journey ended in disaster, and Decken was murdered by a Somali on the 25th September 1865. Only five Europeans and six negroes of his company managed to reach Zanzibar. See Kersten's *Von der Decken's Reisen in Ostafrika* (4 vols. 1869-79).

**Decker, SIR MATTHEW**, a political economist, was born at Amsterdam in 1679. He came to London in 1702, and having embarked in commerce, attained the greatest success; received a baronetcy in 1716, and subsequently sat in parliament. He died 18th March 1749. He published anonymously two pamphlets which were much discussed: one (in 1743) proposed to raise all the public supplies from a tax upon houses; the other, on the decline of Britain's foreign trade (1744), contained many good arguments for free trade.

**Decker, THOMAS.** See DEKKER.

**Declaration**, in Criminal Proceedings. In Scotland, the prisoner's statement before the magistrate (or sheriff) is called his declaration. It is the duty of the magistrate to take this declaration immediately on the prisoner's being brought to him—that is to say, if the prisoner is in his sober senses; but under the Criminal Procedure (Scotland) Act, 1887, the magistrate has power to postpone the examination to a time not later than forty-eight hours after arrest, in order to give opportunity for the legal adviser of the prisoner to appear. Before the examination the prisoner is entitled to have a private interview with his legal adviser, who may be present during the examination. The magistrate must previously inform the prisoner that it is entirely at his own option to declare or not, but that if he chooses to declare, the declaration may be used in evidence against him on his trial. In practice the examination is generally conducted by the procurator-fiscal. The declaration ought to contain the name, age, and designation of the prisoner, the parish and county in which the crime is said to have been committed, and all similar particulars. When completed it must be read over to the prisoner, who, if he is able to write, signs every page of it along with the magistrate. If he cannot or will not write, the magistrate signs it in his stead. There must, moreover, be two witnesses present, who shall sign the declaration, and who, if necessary, can speak to the manner in which it was taken. If the prisoner does not understand English, a sworn interpreter must be employed. The declaration cannot be produced as evidence if the magistrate has delegated the duty of taking it to his clerk, or to any one not a magistrate.

In the United States, when a person is arrested for a felony, the magistrate before whom he is brought takes the statement of the accused prior to the commitment if he desires to make one. The magistrate must act in person, and the prisoner must understand that he may or may not make the statement, and that it may be used against him upon his trial. If he cannot write, or refuses to write, the magistrate must not write his name for him; if he signs it he must first have the opportunity of reading it himself, but may waive his right to read it and ask the magistrate to read it to him. The magistrate may ask questions to bring out the facts. The mode of

taking the statement or declaration is in general regulated by statute, and may form a part of the preliminary examination. If taken according to the prescribed forms of law, and as a spontaneous admission of guilt, it is termed a judicial confession upon which an indictment may be found. See CRIMINAL LAW.

**Declaration**, in Common Law, was the pleading in which the plaintiff in an action at law set forth his case against the defendant. Since the Judicature Act of 1875, the *Statement of Claim* (q.v.) takes the place both of it and of the former *Bill in Chancery* (see BILL). In the United States the declaration still retains many of the features of the English common-law declaration, but this form is gradually falling into disuse in obedience to the modern tendency to simplify judicial proceedings. Many of the states having adopted one form of civil action, the courts of law have simplified the common-law declaration and adapted it to this form of action. The declaration substituted must be entitled of the court, term, and number, the venue laid, the names of the parties, and the facts necessary to show jurisdiction stated. This is followed by a concise statement in narrative form of the entire cause of action showing the right of plaintiff to recover.

**Declaration**, in lieu of an oath. See AFFIRMATION, OATH. In the United States, the form of an oath is immaterial, provided it be such as the witness believes is binding upon his conscience. It is essential that the oath, declaration, or affirmation be administered in a manner prescribed by law. Mere technical variations do not affect the validity of an oath, and verbal deviations are immaterial. Perjury may be committed although the person was improperly sworn. No person will be permitted to make a declaration or affirmation unless he has conscientious scruples against swearing or taking an oath. Declaration in lieu of an oath or affirmation is becoming very general throughout the United States.

**Declaration, DYING.** The rule that secondary or hearsay evidence is inadmissible suffers an exception, both in England and Scotland, in the case of a declaration made by a person convinced of his impending death, and who does not survive the trial of the accused. In cases of murder, the dying declaration of the victim as to the circumstances of the crime is always admitted as evidence on the trial of the prisoner, provided that it was deliberately emitted while the deceased was in possession of his faculties, and that it is proved by credible witnesses. In Scotland, the dying declaration of a witness is admissible even though he is not himself conscious of the danger of death, but in the United States the English rule is followed, and the declarant must have abandoned all hope of recovery from the injury inflicted by the accused. In Scotland, while a declaration is usually taken officially and on oath, it is admissible unsworn, if freely emitted and taken by some 'credible person.' The principle under which the dying declaration is admitted is that the awful situation of the dying person is as powerful over his conscience as the obligation of an oath, and does away with all motive to disguise the truth. Accordingly the person against whom a dying declaration is put in evidence may be allowed to show that the deceased was not of such a character as to feel the religious obligation of his situation. A dying declaration may be adduced for as well as against a person accused of crime; and there are cases on record in which persons charged with murder have been successfully exculpated by this kind of evidence.

**Declaration of Rights.** See RIGHTS.

**Declaration of War.** See ENEMY.

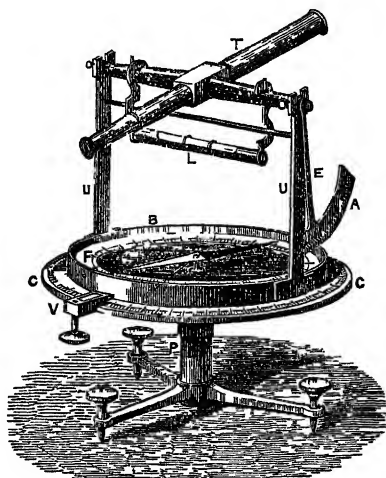
**Declarator.** See ACTION.

**Declension**, a grammatical term applied by the ancient grammarians to the system of modifications called *cases*, which in many languages nouns, pronouns, and adjectives undergo to indicate the various relations in which they stand to other words. The word *Case* means 'falling'; *Declension*, a 'sloping down'; and were applied because that form of a noun used as the subject of a sentence was supposed to be represented by an upright line, and the other forms by lines falling or sloping off from this upright line at different angles. Hence a collection of the various forms which a noun might assume formed the *declension* or *sloping down* of the noun. The English language has no proper declensions at all, having no cases but the genitive, and some traces of a dative, accusative and instrumental. Sanskrit had eight cases; Latin, six; and Greek, five. Groups of nouns forming their case-endings in the same way are called declensions. Thus Latin nouns are said to be divided into five declensions. The Latin cases are the Nominative, which names the subject or actor; the Genitive, expressing the source whence something proceeds, or to which it belongs; the Dative, that to which something is given, or for which it is done; the Accusative, the object towards which an action is directed; the Vocative, the person addressed or called; and the Ablative, that from which something is taken. The Greek has no Ablative case, while the two additional cases of Sanskrit are an Instrumental case, and a Locative case. In time case-endings become rubbed off, and prepositions are used in their stead, thus French and Italian have lost all the Latin cases of nouns and adjectives. Languages of the agglutinating order have, in general, a great abundance of cases. Thus Finnish nouns have fifteen cases; and in Magyar as many as twenty cases may be reckoned. See GRAMMAR and PHILOLOGY.

**Declination.** If a great circle be drawn through the pole of the heavens and any star, the declination of the star is the portion of the circle intercepted between the star and the equator (see POLE). The place of a point in the heavens is determined by its *right ascension* and *declination*, just as a point in the earth's surface is determined by its latitude and longitude.

**Declination Needle**, or DECLINOMETER. The magnetic meridian passing through any place on the earth's surface is a vertical plane whose direction is that in which a magnetic needle, free to move about a vertical axis, comes to rest under the influence of the earth's magnetic force. In general, the magnetic and geographical (or astronomical) meridians are not coincident; the angle between is termed the magnetic declination, or (in nautical phraseology) the variation. It is east or west, according as the magnetic is east or west of the geographical meridian. Any apparatus for the measurement of this angle is termed a declinometer, and consists essentially of a means of ascertaining the two necessary elements—viz. the directions, at the place of observation, of the two meridians. The accompanying figure represents one such instrument, the declination needle or compass. Upon a tripod, provided with levelling screws, stands the pillar P, to which is fixed the graduated circle CC. The compass-box B, with the attached vernier V, moves on the azimuthal circle by means of a pivot on the pillar P. Two uprights, U, U, are fixed to the side of the compass-box, on the tops of which rests the axis of the telescope T. A graduated arc, A, is fixed to the bottom of one of the uprights, and the angle of elevation of the

telescope is marked by the vernier on the aim E, attached to the axis of the telescope, on which is hung the level L, for adjusting the instrument previous to making an observation. Inside the compass-box is another graduated circle F, the line joining the zero-points of which is parallel to the axis of the telescope. The compass-box and telescope thus move round together on an axis passing through the centre of the azimuthal circle. When an observation is made, the instrument is first of all levelled, and the telescope directed to a star which is either on the astronomical meridian or whose position with respect to it is known. The



Declination Needle.

reading of the inner circle then gives the declination at once, in the former case; if the latter—i.e. if the star be not on the meridian, the reading of the inner circle has to be corrected by adding or subtracting, as the case may be, the position of the star in azimuth, in order to give the declination. In order to obviate error due to the non-coincidence of the magnetic and geometric axes of the needle, a second reading is taken with the face of the needle reversed; the mean of the two readings is taken as the true declination.

It is found, however, that this instrument only gives results approximately correct, and has in consequence been superseded in observatories and magnetic surveys by a form of the unifilar magnetometer. For an account of the determination of declination by this latter instrument, see MAGNETOMETER. Details as to the value and secular change of the declination at different places on the earth's surface will be found under MAGNETISM.

**Decoction**, the term applied in pharmacy to the solution procured by boiling an organic substance with water.

**Decolorimeter**, an instrument for determining the power of portions of bone-black or animal charcoal to abstract colouring matter. See CHARCOAL.

**Decomposition** is the rather comprehensive term applied to the breaking up of complex substances, or substances of delicate stability, into others which are less complex or more stable. Such breaking up is very familiar in many chemical changes, and may result from increase of temperature, the action of light, the action of ferments and micro-organisms, and so on. The ordinary process of alcoholic fermentation is a good example of decomposition, which takes place in the presence

of, and is dependent upon, the life and growth of yeast in the saccharine solution. Similarly the oxidation of nitrogenous organic matters with formation of nitrates, if not dependent upon, is greatly accelerated by the presence of a micro-organism.

The term decomposition is constantly applied in chemistry to the changes which compounds undergo in the most varied circumstances when subjected to change of conditions. See also CHEMISTRY, FERMENTATION, PUTREFACTION.

**Decomposition of Forces.** See COMPOSITION.

**Decorated Style** of Gothic Architecture prevailed in England during the reigns of the first three Edwards, or from towards the close of the 13th till near the end of the 14th century. Under **GOthic ARCHITECTURE** it will be shown

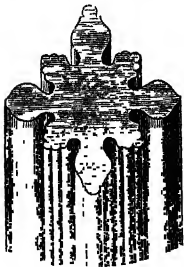


Fig. 1.—Column, Collegiate Church, Manchester, 14th century

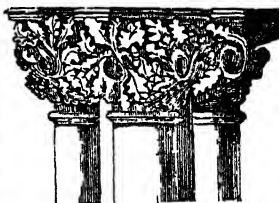


Fig. 2.—Decorated Capital, York Cathedral.

how the pointed style progressed, and was naturally and logically developed in all its elements, constructional as well as decorative, until skill in execution exceeded originality in design, after

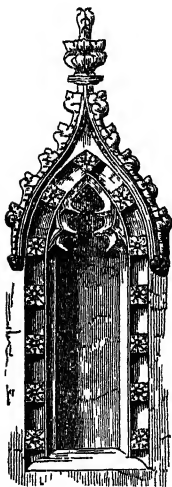


Fig. 3.—Niche, Walpole St Andrews, Norfolk, 14th century.

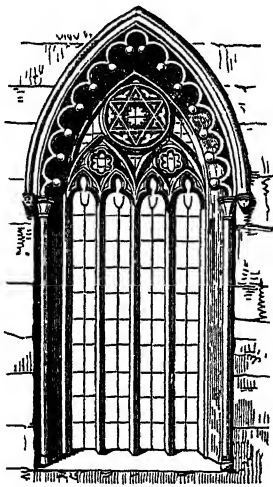


Fig. 4.—Window, Broughton, Oxfordshire, 1300.

which the art gradually deteriorated. The Decorated or second pointed style occupies the position in which these two elements were in full accord and completest development. Hence this is invariably considered the perfect period of Gothic Architecture.

In the Decorated style the simple forms of the early pointed became more complex. The simple roll is divided into two parts, the mouldings are more numerous and refined, and they are beautifully grouped and proportioned. The pilastrs consist similarly of clustered shafts or mouldings arranged commonly on a lozenge plan (fig. 1). The caps are usually carved in imitation of natural foliage, and partake of the character of wreaths growing round the caps, instead of springing from the neck-moulding as in the preceding style (fig. 2). The buttresses are encircled with niches and canopies, and the latter are more elaborately decorated than formerly. The drip-mouldings over doors, windows, niches, &c. are crocketed and formed into an ogee curve at the top, and finished with a finial—in short, every detail is elaborated and richly decorated. But this development is most prominently marked in the tracery of the windows. In the first pointed style this feature is of the simplest character; but in the Decorated it becomes fully developed, and forms the most prominent characteristic of the style. At first the tracery consists of geometric figures, such as circles, trefoils, &c.; but in the later examples it develops into flowing lines, which in France passed into the 'Flamboyant' (q.v.). This development of the tracery led to the enlargement of the windows, in order to afford space for its exhibition. Large circular windows, filled with tracery, were also introduced (see WINDOW). The early ornaments became refined, as, for instance, the dog-tooth was enriched into a four-leaved flower, and the ball-flower is also of frequent use. Segmental arches and square lintels are occasionally employed. In the beginning of the 15th century the Decorated gradually passed into the Perpendicular style.

**Decoration Day**, in the United States, is the 30th of May, on which day the graves of soldiers are visited, and flowers deposited thereon by surviving comrades.

**Decorations.** See ORDERS OF KNIGHTHOOD, MEDAL.

**Decort**, FRANS, a Flemish lyrical poet, born at Antwerp, 21st June 1834. At first he was engaged in trade, later he edited newspapers, was secretary to a steamship company, and became in 1861 secretary to the general auditor in the Cour Militaire at Brussels, where he died, 18th January 1878. Decort's poetry deals mainly with the simple joys and sorrows of the family hearth, but it does not lack passion and power. For some years he issued at Antwerp a very popular almanac, *Jan en Alleman*. Various collections of his poems were *Liederen* (2 vols. 1857–59), *Zingzang* (1866), and *Liederen* (1868). He did a fine Flemish translation of some of Burns's songs (1862).

**De Coster**, CHARLES, Belgian writer, in French, was born 20th August 1827 at Munich. He was employed in a bank at Brussels for some time, and then studied (1850–55) in Brussels university. His *Legendes flamandes* appeared in 1857; *Contes brabantines* in 1861. Ten years of work went to his masterpiece, *La Légende de Thyl Ulenspiegel et de Lamme Goedzak* (1867), a prose epic of the resurgence of Flemish nationality in the days of Spanish tyranny, borrowing its story from the German *Till Eulenspiegel* and its language from Rabelais, but full of the spirit of Flanders. De Coster was professor of history and French literature in Brussels military academy from 1870, and died 7th May 1879. His books, illustrated by Félicien Rops and others, were in his lifetime and for long after comparatively little read or appreciated, but *Uelenspiegel* is now recognised as one of the greatest achievements of Belgium in literature. An abridged translation into English was done by G. Whitworth

in 1918; a complete one by F. M. Atkinson in 1922.

**Decoy.** See WILD-FOWL.

**Decoying of Children.** See ABDUCTION, KIDNAPPING.

**Decree**, or, as it is frequently called in Scotland, a Decreet, is a final judgment of a court, whereby the question at issue is set at rest. In England, it used to be commonly applied to the final judgments of courts of equity. For a *decree nisi*, see DIVORCE. *Decree in absence*, in Scotland, is equivalent to a judgment by default in a common-law court.

In the United States, a decree is the order or judgment of a court of equity, admiralty, or a common-law court with equity powers. It may be either final or interlocutory, and is conclusive if all parties in interest have been served with proper notice. It cannot be set aside by an act of congress or the state legislature. By the United States Constitution, the decrees of a competent court having full jurisdiction in one state are equally binding in every other state, and must be received in evidence in all the courts of the United States.

**Decree**, in Theology. See PREDESTINATION.

**Decrepitation**, the crackling sound heard when a substance like common salt is thrown upon a fire. A series of minute explosions occur, owing to the water between the plates of the crystalline particles becoming expanded by the heat, and ultimately bursting them.

**Decretals.** See CANON LAW.

**Dédéagach** (Gk. *Alexandropolis*), an Ægean seaport of Greece, Turkish till 1913-14, Bulgarian till 1919, about 10 miles NW. of the mouth of the Maritza. It has a considerable trade, and railway connection with Constantinople, Salonika, and Bulgaria. Pop. 7000.

**Deduction**, in Logic, as opposed to Induction (q.v.), is the method of reasoning from generals to particulars, as the latter is from particulars to generals. *Induction* is the mode by which all the materials of knowledge are brought to the mind and analysed; *Deduction*, the process by which the knowledge thus acquired is utilised, and by which new and more complicated inductions are rendered possible. See INDUCTION, LOGIC.

**Dee**, a Welsh and English river, issuing from Bala Lake, in Merionethshire, and flowing NE., N., and NW. to the Irish Sea. Near Trevor it is crossed by the Ellesmere Canal, on an aqueduct 1007 feet long and 120 high; and also by the stone viaduct of the Chester and Shrewsbury Railway, of 19 arches, each 90 feet span and 150 high. Below Trevor it winds first south-east, and then north-east and north to Chester, which city it nearly encircles. At Chester (q.v.) it is 100 yards broad, and thence runs alongside marshes in an artificial tidal canal 7 miles long, which should admit ships of 600 tons, but which in the autumn of 1888 was reported to be rapidly silting up. Near Connah's Quay, between Chester and Flint, where its width is 160 yards, it is crossed by the great railway swing-bridge, whose first cylinder was laid by Mr Gladstone on 16th August 1887. The Dee ends in the Irish Sea, in a tidal estuary 13 miles long and 3 to 6 broad, and forming at high-water a noble arm of the sea; but at low-water a dreary waste of sand and ooze (Kingsley's 'sands of Dee'), with the river flowing through it in a narrow stream. Its whole course is 90 miles long, and its chief tributaries are the Treveryn, Alwen, Ceirog, Clyweddog, and Alyn. Canals connect the Dee with the rivers of central England. The

ancient Britons held its waters sacred; Milton speaks of its 'wizard stream,' and Spenser of the

Dee, which Britons long ygone  
Did call divine, that doth by Chester tend.

**Dee**, a beautiful river of Aberdeen and Kincairdine shires, rising at an altitude of 4060 feet among the Cairngorm Mountains, and running 87 miles eastward, till it enters the German Ocean at Aberdeen, where in 1870-72 a mile of its channel was diverted for harbour improvements. It makes a descent of 2084 feet during the first 2½ miles of its course; at the Linn of Dee, 18 miles lower down, tumbles through a chasm 300 yards long, and at one point scarcely 4 feet wide; thereafter flows by Castleton of Braemar, Balmoral Castle, and Ballater; since 1864 has supplied Aberdeen with water; and is still a good salmon river, though not what it once was.—The *Kirkcudbrightshire Dee* issues from Loch Dee (750 feet above sea-level), and flows 38 miles south-eastward and southward, past Threave Castle and Kirkcudbright, to Kirkcudbright Bay. Midway it is joined by the Water of Ken, 28 miles long, a stream of greater volume than its own. It, too, affords fine fishing.

**Dee**, DR JOHN, alchemist, was born in London, 13th July 1527, and educated there and at Chelmsford, till in 1542 he was sent to St John's College, Cambridge, where for three years he studied eighteen hours a day. One of the original fellows of Trinity (1546), he earned the reputation of a sorcerer by his mechanical beetle in a representation of Aristophanes' *Peace*, and next year he fetched from the Low Countries sundry astronomical instruments. This was the first of many foreign visits—to Louvain and Paris (1548-51), where he lectured on Euclid, to Venice and Presburg in Hungary (1563), to Lorraine (1571), to Frankfort-on-Oder (1578), to Bohemia (1583-89), and even, it is said, to St Helena. He was imprisoned under Queen Mary on suspicion of compassing her death by magic (1555); but Edward VI. had conferred two church livings on him, and Elizabeth showed him considerable favour, twice visiting him at his Mortlake home, and in 1595 making him warden of Manchester College. He was constantly in difficulties, though he claimed to have found in the ruins of Glastonbury a quantity of the Elixir, one grain of which transmuted into gold a piece of a warming-pan. Indeed, he appears to have been as much dupe as deceiver, the dupe of his own assistant, Edward Kelley, during 1582-88. This knave, who had lost both ears in the pillory, professed to confer with angels by means of Dee's magic crystal (see CRYSTALLOMANCY), and talked him into consenting to a community of wives. In 1604 Dee petitioned to James I. to let him clear himself by public trial of the slander that he was a 'caller of divels,' but half a year later he was back at his invocations. He died wretchedly poor, in December 1608, and was buried in Mortlake church. 'A mighty good man he was,' by Aubrey's showing, 'a great peace-maker, a very handsome man, with fair, clear, sanguine complexion, and a long beard as white as milke.' His eldest son, Arthur (1579-1651), was likewise an alchemist, a friend of Sir Thomas Browne. Of Dr Dee's seventy-nine works, only thirteen have ever been printed: the rest are in MS. at Oxford, Cambridge, and the British Museum. They deal with logic, mathematics, astrology, alchemy, navigation, geography, and the reformation of the calendar (1583), in which at least he was much in advance of his countrymen. See his *Private Diary* (ed. Halliwell-Phillipps, Camden Society, 1842), Cooper's *Athenæ Cantabrigienses* (vol. ii. 1861), his *Life* by Miss C. Fell Smith (1909), and a monograph by G. M. Hort (1922).

**Deed**, EXECUTION OF, the performance of the ceremonies required by law in order to make a deed binding and effectual. These ceremonies in England consist in signing, sealing, and delivering. Signing is usual in practice, but it is open to doubt whether it is strictly necessary in law. When a party, from any cause, is unable to write, it is usual for him to place his mark in the place of signature. But a mark is unnecessary, and signature by another, at request of the party, is enough. Sealing is the most ancient form of authentication of deeds, and comes from the Norman usage. A seal is absolutely essential to the validity of an English deed, but any species of seal is sufficient, and in practice a common wafer is usually affixed. Delivery is the third requisite. Delivery may be made either to the grantee or to another person for him. In the former case, the deed becomes absolute; in the latter, it is called an *Escrow*, and does not yet acquire its full effect. Witnesses are not absolutely required to a deed in England, but in practice it is usual that one witness should attest. Before execution, a deed must be read, if required, by a party to it; and if not read, it is void as to the party requesting. A will (except that of a soldier or sailor in active service) must be in writing, and signed by the testator or by some other person in his presence and by his direction; and two witnesses must attest the signature.

In Scotland, sealing was once essential, but has long fallen into disuse. A deed is now probative on the face of it (i.e. is received as the authentic act of its grantor) if it is signed by the grantor on each sheet, and attested by two witnesses who are either designated in the deed itself, or in a designation added to their subscriptions before the deed is recorded or founded on in court. In case the maker of the deed cannot write, the deed is validly executed by one notary public or justice of the peace signing it for him in his presence and by his authority, and reading it over to him, all in the presence of two witnesses. A parish minister may act in his own parish as notary for signing a will. Holograph deeds—i.e. deeds written throughout in the handwriting of the grantor, are exempted from the rules as to execution; as also, out of favour to trade, are mercantile writings, such as Bills of Exchange.

In the United States, the formalities required for the transfer of real estate are governed by local laws. Generally throughout the states, signing, sealing, attestation, acknowledgment, and delivery are the essential requisites of a valid deed of conveyance. The usual form of attestation being 'signed, sealed, acknowledged, and delivered in the presence of us witnesses,' then follow the names of the subscribing witnesses. The grantor must himself sign the deed, or if it is signed by his agent he must adopt the signature as his own in the presence of the subscribing witnesses and the commissioner or other qualified officer. In the United States, a 'deed,' technically speaking, is an instrument under seal; hence a seal, although a mere formality, is essential, except in those states in which seals have been abolished by statute—Alabama, Louisiana, Texas, Virginia, Kentucky, Kansas, and Iowa. Neither wax nor wafer is necessary for a seal, although a wafer is generally used. A scroll with a pen inclosing the letters 'L.S.' is a seal within the meaning of the law, if it is the intention of the party appending it to adopt it as his seal, and by its use a specialty is created, the same as by the use of wax or wafer. It is not necessary to refer to the fact of sealing in the attestation clause. The number of witnesses required is governed by statutes in most of the states. Generally two are required, but in some of the states only one witness is necessary if the grantor

can read; and it is believed that in any state a deed otherwise properly executed with but one subscribing witness would be good as between the parties themselves. It has also been held that independent of any statute, a deed signed, sealed, and delivered, without being acknowledged or recorded, is valid as between the parties and their privies, but the provisions of a local statute as to the execution of a deed must be strictly followed, or the deed is inoperative. Delivery, although essential to the execution of a deed, need not be formally made in the presence of witnesses, but may be a matter of circumstance. A deed takes effect from the date of actual delivery, or the date of record. Everywhere in the United States it is the law that deeds of conveyance must be recorded either in the proper office of the county in which the land lies—or if the conveyance be by grant or letters patent from the state or United States, the record must be made in the land office of the state or United States. The recording of a deed has the force of *seisin* and possession under the English law. Deeds of conveyance of lands sold at judicial sale, or for taxes for several successive years and unredeemed made by the sheriff of the county, and deeds made in pursuance of a decree of court by the officer appointed for that purpose, are as effectual as if made by the grantor and his heirs, and must be executed with the same formalities and recorded within fifteen days; neither is it necessary to set forth in the deed as a part of the title the proceedings which culminate in the decree of sale. Federal decisions as to the formalities necessary to the execution of a deed are apparently conflicting. This arises from the application of the principle that land or property must be governed by the law of the place in which it is situated, and the lack of uniformity of State laws upon this subject. The United States laws are applicable only to lands belonging to the United States and those located within the territories. See also CONVEYANCING, CONTRACT, CHARTER, TITLE-DEEDS, WILL, ERASURE, REGISTRATION, &c.

**Deemster** is the title of the two chief judges in the Isle of Man (q.v.). In Scotland, *Dempster* or *Doomster* was the name of an officer formerly attached to the High Court of Justiciary, who pronounced the doom or sentence on condemned persons. The office was held along with that of executioner. See Scott's notes to *Old Mortality* and *Heart of Midlothian*.

**Deep-sea Exploration.** See CHALLENGER EXPEDITION, SEA, and SOUNDING.

**Deer**, formerly a beast in general (O.E. *déor*, not akin to Gk. *thēr*), as in the romance of *Bevis of Hampton*: 'Ratons and myse and soche smale dere, That was hys mete that vii yere'; now confined to the *Cervidæ*, a large family in the ruminant section of even-toed Ungulates. Though doubtless of common ancestry, the antlered ruminants or deer are definitely, though not very readily, separated from the other great family of horned ruminants or cattle. The contrasting characters of *Cervidæ* and *Bovidæ* are noted under the title ARTIODACTYLA (q.v.); only the chief peculiarities of the *Cervidæ* need here be noted.

**General Characters.**—If appendages are present on the head, they are true bony outgrowths, familiarly known as antlers. Except in one genus, they are confined to the males. There are two openings to the duct of the lachrymal gland, situated on or inside the orbit. A large cavity in front of the orbit cuts off the lachrymal from its usual contact with the nasal. The first molar tooth is short-crowned. There are usually upper canine teeth in

both sexes, and these are often large in the males. In addition to the functional third and fourth digits, the second and fifth are very generally represented. The placenta has few cotyledons or villous patches. Except in Australia and Africa, the Cervidae are distributed over the globe, usually living in pairs or herds in wooded and grassy regions, and feeding upon herbage. About 100 living and extinct species are known.

**Genera.**—Dr J. E. Gray classified the Cervidae into two groups, according to the position of a hair-tuft on the lower part of the hind-leg. Professor Garrod has divided them according to features in the skull; Sir V. Brooke has classified them according to the state of the limbs. In their general outlines the three classifications agree; that of Brooke is here followed.

A. Upper ends of the second and fifth metacarpals remain—Plesiometacarpi—e.g. *Cervus*. B. Lower ends of the metacarpals remain—Telemetacarpi; within which the three genera *Alces*, *Hydropotes*, and *Capreolus* are separated by other characters from a more definite section, including *Cariacus*, *Pudua*, and *Rangifer*.

**Important Forms.**—As many of the important deer will be separately discussed under their common names, a list of the distinctive types is all that is here necessary. A. *Cervulus muntjac*, from British India and the Malayan region, with large canines in the males (see MUNTJAK); *Elaphodus*, with very small unbranched antlers; *Rusa*, a sub-genus of *Cervus*, from the Indian region, including some of the largest and smallest species—e.g. *C. aristotelis*, *C. equinus*; *Rucervus*, another Indian sub-genus, with forms of small stature—e.g. *C. schomburgkii*; *Elaphurus*, *Axis* (q.v.); *Pseudaxis*, other sub-genera of *Cervus*; the genus *Cervus*, in the restricted sense, large deer in Palaearctic and Nearctic regions, including the Red Deer (q.v.), or *Cervus elaphus*, in Britain, Continental Europe, Algeria, Asia Minor, and the Caucasus, and *C. canadensis*, in North America; *Dama*, another sub-genus, including forms of medium size, from south-western Palaearctic regions—e.g. the Fallow-deer (q.v.), semi-domesticated in European parks. B. (1) The northern genus *Alces*, including the Elk (q.v.), of large size, with great antlers; the Water-deer (q.v.), or *Hydropotes*, without antlers in either sex; the genus *Capreolus*, including the small Roe-deer (see ROE) (*Capreolus caprea*), in Britain, Europe, North Palestine, &c. (2) The genus *Cariacus*, in its strict usage, including the Virginian Deer of the United States (*C. virginianus*) and the Mexican Deer (*C. Mexicanus*); the sub-genera of *Cariacus*—*Blastocercus*, *Furcifer*, *Coassus*, from South America; *Pudua*, from the Chilean Andes; and the Reindeer (q.v.), or *Rangifer*, with antlers in both sexes.

**Antlers.**—Antlers are usually present in the male deer, though absent in both sexes in *Hydropotes*, and present in both in the reindeer. Their nature as true bony outgrowths, their early covering with sensitive vascular skin or velvet, the drying of this to leave the horn a hard and insensitive weapon, the basal constriction and detachment, and the regrowth in the following year with an additional tine (No. 4 in the cut representing the fifth year), have been referred to at ANTLERS (q.v.). Amongst the technical terms are the permanent 'pedicle' or stalk from which the regrowth starts, the main stem or 'beam,' the branches, 'tines,' or 'snags,' and the not infrequently flattened or 'palmate' form. Antlers are of special importance as weapons used by the males in fighting for the possession of the females, and have doubtless been perfected by Sexual Selection (q.v.). They are also of interest in the parallel they illustrate between the life-history of the individual and the evolution of the race. The figure

given of antlers at successive years in a stag's life will also suit for the evolution of antlers in successive historic periods. Young deer develop in the first year small simple antlers, and the branches are added on the annual regrowths. So the earliest (Lower Miocene) deer had no antlers, the Middle Miocene species had simple, at most two-branched processes, as in the second year of life, while in the Upper Miocene three branches occur; and in Pliocene and Pleistocene the modern luxuriance



gradually appears. Sir V. Brooke gives full details (1) of the gradual evolution of antlers from very simple to complex forms, tracing the history from the earliest *Dremotherium* onwards; (2) of their constant tendency to vary, as is well known in the semi-domesticated species; (3) of 'variation extending far enough to induce the partial atrophy of one part of the antler to compensate for the extra development of some other part'; (4) of the transmission and establishing of such variations by heredity. A great part of the theory of evolution can be beautifully read from antlers alone.

The flesh, skin, and antlers of deer are valuable, but deer injure crops, eat the leaves, twigs, and bark of trees, and damage forest trees by rubbing their antlers against the trunks and branches.

See articles on the various kinds of Deer (RED DEER, &c.), DEER FORESTS, GAME LAWS, POACHING, STAG-HOUND; J. G. Millais, *British Deer and their Horns* (1897); Roosevelt, *The Deer Family* (1902).

**Deer.** OLD, a village of Buchan, Aberdeenshire, 36 miles N. of Aberdeen. Here, about 580 A.D., St Columba (q.v.) and Drostan, his nephew, established a monastery, which William Comyn, Earl of Buchan, refounded about 1219 for Cistercian monks. Little remains of the monastic buildings; but in 1715 a Latin MS., a small octavo of 86 pages, which had belonged to the monks of Deer, found its way to the Cambridge University Library, though not until 1857 was it discovered by Henry Bradshaw, afterwards university librarian. It contains the Gospel of St John, and parts of the other three gospels (mainly in the Vulgate version of St Jerome), the Apostles' Creed, and a fragment of an office for the visitation of the sick, with a Gaelic colophon, apparently of the 9th century. On the blank leaves and margins of the MS., in handwriting of the 11th or early 12th century, are several Gaelic entries relating to the endowments of the Columban monastery. These notes are of the highest interest as the oldest specimens of Scottish Gaelic; and only less interesting is the Gaelic ornamentation enriching the MS. See Dr John Stuart's edition of the *Book of Deer* (Spalding Club, 1869); Magnus MacLean, *Literature of the Celts* (1902); Sir A. Lawrie, *Early Scottish Charters* (1905).

**Deer-forests**, tracts of country devoted to the red deer or fallow deer, either for sporting or for breeding purposes. The requisites of a Scottish deer-forest are a great extent of quiet ground, high mountain tops and corries, plenty of moorland and pasture. There is now little wood in

Scottish deer-forests, and almost all other game, and cattle and sheep, must be excluded. One-tenth of the heather in a deer-forest should be burned every year, the heather living ten or twelve years; and in each forest a sanctuary should be provided. The forest of Mar is 80,000 acres in extent; Blackmount, 70,300; Reay, 64,600; the rest are smaller, some as low as 10,000 acres. The requisites of an English deer-park, on the other hand, are wood, lawn, with sufficient underwood, rough grass, and bracken, in an inclosed and undulating country of rich soil. In Scotland, deer-stalking largely increased during the 19th century; in 1812 there were only five forests; a hundred years later some 130, with a total area of nearly 3,600,000 acres. Since 1912 the area has diminished. In England, since 1750, when fox-hunting superseded deer-hunting, deer are kept chiefly for breeding and ornament, being sometimes fed in stalls. There are, however, several packs of staghounds which hunt the red deer—e.g. in the high ground of Somerset and Devon. Originally, in both England and Scotland, the king's nobles and the church held special forest jurisdictions of the most oppressive kind. Thus, in Scotland, the forester might forfeit cattle and other goods found within the forest. In England, the Norman lawyers pretended that all game belonged to the king. King John had 18 forests, 13 chases, 781 parks. A chase was an open forest, not subject to special forest law; a park was an inclosed chase on the land of the owner; a *purlieu* was an addition made to an old forest. The *Charta de Foresta* disafforested large tracts of land, and prevented the arbitrary creation of forests. In the Highlands of Scotland it was sheep-farming—not in the first instance afforestation for sport—that drove out the crofters, and the decay of sheep-farming facilitated the extension of forests. With new economic conditions since the Great War, the tide turned towards sheep-farming again. See the Report of the Committee on Deer-forests in Scotland (1922), and a book by A. I. McConnochie (1923).

**Deerhound.** See STAGHOUND.

**Deer Mouse** (*Hesperomys*), often called Vesper Mouse, a genus of American rodents representing in the New World the Old-World mice, from which they differ only in trivial characters. The white-footed or deer mouse (*H. leucopus*) is found over the greater part of North America in several varieties. It is about 3 inches in length, of variable but frequently fawn colour; sometimes arboreal, sometimes burrowing; feeding chiefly on corn and nuts, which it stores for winter. See MOUSE.

**Deer-stealing.** See GAME-LAWS, POACHING.

**Deés, Dés, or Dér,** a town of Transylvania, on the Szamos, 37 miles NNE. of Klausenburg by rail. Rock-salt is mined in the neighbourhood. Pop. 10,000.

**Defamation.** See LIBEL.

**Default.** A party to an action is in default when he fails to comply with the rules of procedure. If the defendant, for example, fails to appear to the writ, the plaintiff may have judgment against him; if the plaintiff fails to deliver a statement of claim, the defendant may apply to have the action dismissed. Judgment by default may be set aside, on such terms as to costs, &c. as the court thinks just. In Scotland, a decree by default may be recalled by reclaiming note, but after the time for reclaiming has expired, an action of reduction must be brought to set it aside.

**Defeasance, DEED OF,** in English law, an instrument which defeats the force or operation of some other deed or estate. That which in the same deed is called a condition, in a separate deed is called a defeasance.

**Defectives (MENTAL).** See IDIOCY.

**Defender of the Faith,** a title conferred in 1521 on Henry VIII. by Pope Leo X. as a reward for writing his *Assertio septem Sacramentorum*, in answer to Luther. The title was afterwards confirmed by parliament (35 Henry VIII. chap. 3), and has ever since been used by the sovereigns of this country. The corresponding title in Spain is 'Most Catholic,' and in France was 'Most Christian King.'

**Defenders,** a Catholic association in Ireland (1784-98), the opponents of the Peep o' Day Boys.

**Deffand, MARIE DE VICHY-CHAMROND, MARQUISE DU,** one of the most brilliant letter-writers of the 18th century, was a member of a noble Burgundian house, and was born in 1697. She was educated in a convent in Paris, and as a girl became famous for her wit, audacity, and beauty. In 1718 she married the Marquis du Deffand, from whom she shortly afterwards separated. She led a life of gallantry for a number of years, and became a conspicuous figure in the literary society of Paris, her salon in the Rue Saint Dominique being a favourite resort of the *philosophes*. She was a correspondent of Voltaire, Montesquieu, D'Alembert, and other great men of letters of her day. In 1753 she became blind, and in the following year she invited Mademoiselle de Lespinasse to live with her and help her to preside over her salon. The arrangement lasted for ten years, when a quarrel broke out through Madame du Deffand's jealousy, and Mademoiselle de Lespinasse departed, taking away with her D'Alembert and others of the elder lady's former admirers. From 1766 Madame du Deffand carried on an interesting correspondence with Horace Walpole, who held her in the highest estimation, and pressed the use of his purse on her when she fell into pecuniary troubles. 'To say nothing of her extraordinary parts,' Walpole wrote, 'she is certainly the most generous friendly being upon earth.' Really she was as selfish and spiteful as she was witty and shrewd. She died 24th September 1780.

See *Correspondance de Madame du Deffand* (new ed. 5 vols. 1865-67); her *Letters to Horace Walpole and Voltaire* (4 vols. Lond. 1810); *Asse, Malle. de Lespinasse et la Marquise du Deffand* (1877); *Lettres de la Marquise du Deffand à Horace Walpole*, with notes by Mrs Paget Toynbee (first complete edition, 3 vols. 1912).

**Defilading,** in Fortification (q.v.), consists in determining the direction and height of the rampart, so that the interior of the work may not be commanded by the fire of the enemy. To prevent the lines being enfiladed, their prolongations must avoid all places where hostile batteries could be posted, and the parapets must be of sufficient height to protect the interior from frontal fire.

**Definite Proportions, LAWS OF,** in Chemistry. See ATOMIC THEORY.

**Definition,** the process by which we determine the common qualities of the objects belonging to any given class, so as to distinguish effectively that class from other classes. Regarding the class as a species, we give the proximate genus and the difference; genus here denoting the distinctive qualities belonging to all of the genus, while the difference marks out the part of the genus in question. A good definition should state the essential attributes of the species defined, without containing the name itself, and should be exactly equal in denotation with it.

**Deflagration** is the term applied to the rapid combustion of ignited charcoal when a nitrate (such as potassium nitrate) or a chlorate (such as potassium chlorate) is thrown thereon. As chlorates do not occur naturally, it follows that deflagration with a natural salt indicates a nitrate; and if the deflagration be accompanied by a violet flame, it is

characteristic of potassium nitrate (ordinary nitre or saltpetre); and if by a strong yellow flame, it is indicative of sodium nitrate (cubical nitre).

**Deflection**, in Navigation, the departure of a ship from her true course; in Optics, a deviation of the rays of light toward the surface of an opaque body.

**Defluxion** (Lat. *defluxio*), a discharge from a mucous membrane, especially of the air-passages, as in catarrh.

**Defoe**, DANIEL, immortal as the author of *Robinson Crusoe*, was born in 1659 or 1660, in the parish of St Giles, Cripplegate, London. His family belonged originally to Northamptonshire, and his father, James Foe, became a butcher in St Giles's. It was Daniel who first changed his name to De Foe, or Defoe, about 1703, for unknown reasons. He had a good education at a dissenting academy, but soon abandoned his early idea of becoming a dissenting minister, and engaged in business, apparently as a hose-factor, about the year 1685. Little is known of his early life, but it seems that at some undetermined time he had travelled in France, Germany, Italy, and Spain, and that he was out with Monmouth, and it is certain that he volunteered into King William's army in 1688, and became bankrupt in 1692; his debts, or at least great part of them, he paid up later with a scrupulousness most honourable to him. He next became accountant to the glass-duty commissioners, and secretary to a Tilbury pantile factory. His *Essay upon Projects* appeared in 1697, and towards the close of William III.'s reign he became noted as an able and busy pamphleteer in support of the king's policy, against occasional conformity, and in other controversies. His vigorous poem, *The True-born Englishman, a Satyr* (1701), was an attempt to apologise for the king's being a Dutchman by proving the English themselves to be a most composite race. His restless pen was active throughout the bitter struggle under Anne between the High-Church party and the dissenters, and his famous treatise, *The Shortest Way with the Dissenters* (1702), made him a martyr in the cause. Ostensibly written by a 'high-flyer,' it advocated the extirpation of dissenters with a masterly irony (*pace* Mr Saintsbury), which at first deceived and then infuriated his opponents, as, in his own words in *The Present State of Parties* (1712), it 'cut the throat of the whole party.' The House of Commons ordered the book to be burned, and a reward of £50 was offered for his apprehension, from which fortunately we have an exact description of his appearance as 'a middle-sized, spare man, about forty years old, of a brown complexion, and dark brown-coloured hair, but wears a wig; a hooked nose, a sharp chin, gray eyes, and a large mole near his mouth.' Tried at the Old Bailey in July, he was sentenced to pay a fine of 200 marks, to stand thrice in the pillory, and to be imprisoned during the queen's pleasure. Accordingly, the 'unabashed Defoe' stood in the pillory the last three days of July 1703, in the midst of a sympathetic mob that protected him from insult, and even drank his health. On the same day he suffered appeared his masculine *Hymn to the Pillory*, which concluded with a noble defiance to the government, expressed in some of his finest lines. During his imprisonment in Newgate he continued an incessant literary activity, but (contrary to what used to be believed) he had been liberated (about 1st November 1703) at Harley's instance, before he published a 'true collection' of his writings, and started his *Review* (19th February 1704–11th June 1713), at first a weekly, after eight numbers a bi-weekly, and after the eighth number of the second volume a tri-weekly newspaper, 'purged from the errors and partiality of

newspapers and petty statesmen of all sides.' This was Defoe's largest, if not his most important work, and indeed forms one of the greatest monuments of literary industry ever reared by a single hand, embracing as it does in more than five thousand printed pages essays on almost every branch of human knowledge, and these written during but nine years, in which he was actively engaged as a political spy and intriguer in journeys all over England and Scotland, in which also, according to W. Lee, he published no fewer than eighty distinct works, themselves containing as many as 4727 pages. Its 'Scandal Club,' which discussed minor matters of manners, was distinctly the forerunner of the more famous *Tatlers* and *Spectators*.

Defoe's moral character, never very noble, seems now to have deteriorated. Harley procured him pecuniary relief and employment as a political agent. After a short stay at Bury St Edmunds he returned to London, maintaining at both places his activity in his *Review*, and in such admirable pamphlets as *Giving Alms no Charity*, and *Employing the Poor at a Grievance to the Nation* (1704), a masterly denunciation of indiscriminate charity and national workshops—a scheme propounded by Sir Humphrey Mackworth. Next year (1705) appeared *The Consolidator*; or *Memoirs of Sundry Transactions from the World in the Moon*, a political satire, which some have supposed may have supplied a hint for *Gulliver's Travels*; and the year after (5th July 1706) his masterpiece of circumstantial narrative, *The True Relation of the Apparition of one Mrs Veal*. Lee disproved the old story that this fiction was a mere *tour de force*, written to sell an unsaleable book, Drelincourt on *Fears of Death*, by showing that Drelincourt's book was already popular, being then rapidly running through its third English edition, while Defoe's pamphlet was only attached to its fourth edition by the author's consent. Mr Aitken showed that the story was current at the time. His next work was his *Jure Divino*, a tedious political satire, in twelve books of poor verse. In 1704 and 1705 Defoe was sent by Harley on secret missions to various parts of England, and in October of the next year we find him sent to Scotland as a secret agent to promote the Union, and there he lived till December 1707. His *History of the Union* appeared in 1709, and in the same year Sacheverell's famous sermon gave him the opportunity of a fling at an old enemy. At the beginning of 1708 Harley's fall had made his political position somewhat precarious, but he worked for Godolphin in Scotland, until the fall of the Whigs after the error of Sacheverell's impeachment and Harley's return to power (1710) left him under the necessity of arguing that Englishmen should support the country even under a Tory ministry. In the pages of his *Review* he did his best to preserve the semblance of consistency, but not all his cleverness could save him from the contemporary reproach of being a time-server and a renegade. It is itself significant that his journalism was always anonymous from his second employment by Harley. He played a difficult and dubious part in the strange intrigues that preceded the accession of the House of Hanover, with the result that at length he found himself in a general discredit, which his apology, entitled *An Appeal to Honour and Justice* (1715), did not remove. Letters of his found in the State Paper Office in 1864 revealed the fact that in 1718 he was in somewhat equivocal government service, subediting Jacobite and High-Church organs, as the *Mercurius Politicus*, Dormer's *News-Letter*, and *Mist's Journal*. In such a dexterous way that 'the sting should be entirely taken out, although it was granted that the style should continue Tory' (second letter). Further, in the same letter he describes his purpose

more fully, that these papers 'will be always kept (mistakes excepted) to pass as Tory Papers, and yet be disabled and enervated, so as to do no Mischief, or give any Offence to the Government.' He describes himself further as 'for this Service, posted among Papists, Jacobites, and enraged High Tories—a generation who, I profess, my very Soul Abhors. . . . Thus I bow in the House of Rimmon.' Defoe was not exactly scrupulous in his point of honour, but it is certain he never was a Tory, and it would not be difficult for him to construct an argument by which he could persuade himself that by this dangerous and ambiguous means he was doing good service to the cause of liberty and religion.

Although he wrote busily in the journals almost to the close of his life, henceforward his interest for us is mainly literary. In 1715 appeared the first volume of the *Family Instructor*, and four years later the first volume of the immortal *Robinson Crusoe*, which at once leaped into that popularity which it will never cease to retain. The same year appeared the second volume, and the year after the greatly inferior sequel. Defoe's realistic imagination worked most freely on a basis, however slight, of fact, and this was found for him in the four years' solitary residence of a marooned sailor, Alexander Selkirk, on the island of Juan Fernández. Perhaps no man at fifty-eight in the whole history of literature ever devised a more splendid masterpiece of creative imagination than this marvellous story, which carries with it the irresistible conviction of very truth. In 1720—his most prolific year—he gave to the world the *Life and Adventures of Duncan Campbell*; the famous *Memoirs of a Cavalier*, the most real and truthful of all our historical romances, which the great Chatham accepted as genuine history; and *Captain Singleton*, a book of such brilliancy, vigour, and interest as would alone have given a reputation to any other writer. His next great creative year was 1722, in which he issued *The Fortunes and Misfortunes of Moll Flanders*, which is at least a marvel of the novelistic art; *The Journal of the Plague Year*, called in the second edition *A History of the Plague*, a fresh masterpiece of verisimilitude and reality; and the *History of Colonel Jack*, which, though unequal throughout, and actually feeble towards its close, is in its commencement, and in episodes here and there, the most charming and, perhaps, the greatest of all his books. Later works were *Roxana, or the Fortunate Mistress* (1724), a weaker Moll Flanders; *A Tour through the Whole Island of Great Britain* (1724-26); *A New Voyage round the World* (1725); *The Complete English Tradesman* (1725-27), a glorification of mere money-getting, which Charles Lamb condemned for its 'vile and debasing tendency'; *The Political History of the Devil* (1726), which may be grouped with his *System of Magic* (1726) and *Essay on the Reality of Apparitions* (1727). The only other works that may here be mentioned are his *Religious Courtship* (1722), and *The Treatise concerning the Use and Abuse of the Marriage Bed* (1727), which reveal the strangely limited and vulgarly profit-and-loss character of his conception of religious duty. His *Everybody's Business is Nobody's Business* (1725) is an amusing diatribe upon the insolence of domestic servants—a subject to which he frequently recurs.

Meantime Defoe had been prospering in his affairs. He built himself 'a very handsome house' at Stoke-Newington, where he amused himself with gardening and the company of his three daughters. A mystery not yet satisfactorily explained hangs around some months in 1729-30. His affairs seem to have fallen into confusion, one of his sons had behaved undutifully, and he was under apprehen-

sions of some trouble, which may, however, have been due merely to a degree of mental derangement. After a recovery of literary activity and power, he died 'of a lethargy' in Ropemakers' Alley, Moorfields, 26th April 1731, and was buried in Bunhill Fields.

Defoe remains one of our greatest English writers, and his greatness is of a kind unlikely to be disturbed by a competitor. His immense vitality and energy, clear-sightedness, and ready power of forcing plain arguments either in prose or verse to an irresistible conclusion, make him the typical journalist—to be surpassed only by Swift at his best; but it is to a much rarer quality than this that he owes his fame—his incomparable realism and faithfulness in fiction, the secret of which must be looked for not in his singularly plain and direct language, his simple-looking but most effectively artistic digressions, or his perfect though artless preservation of dramatic propriety, but in that subtle and impalpable genius which informs his style. For his character he was shifty, casuistical, and double-dealing; but with all his political inconsistencies he remained true to the principles of the Revolution.

See the *Lives* by George Chalmers (1786), Walter Wilson (1830), Chadwick (1859), Lee (1869), Wright (1894), and Whittin (1900); the studies by Scott, Lamb, Hazlitt, Forster, Leslie Stephen, and Professor Minto; and the chapter in the *Cambridge English Literature* (vol. ix. 1912) by Professor W. P. Trent, who has undertaken a full life and bibliography. The best approximations to complete editions of Defoe's works have been those of Scott, Hazlitt, and Aitken (16 vols. 1895).

**Deforcement**, in English law, includes abatement, intrusion, disseisin, or any other wrong whereby he that has the right to a freehold is kept out of possession. 'Deforciant' was formerly the technical name of the defendant in the fictitious proceeding called a Fine. In Scotland, the term deforcement is most commonly used to denote forcible obstruction of the officers of the law: this is one of the cases in which the Court of Session has a criminal jurisdiction.

**Deformities** are variations in the form of the body as a whole, or in one or more of its parts, constituting a departure from the normal conditions of structure, and usually implying a corresponding divergence from natural and healthy functions. They may be divided into three groups, with reference to their origin—the *hereditary*, the *congenital*, and the *acquired*. The first group is characterised by a marked tendency to recurrence in the line of direct descent from generation to generation, as in those cases where the presence of extra fingers or toes has become characteristic of many members of one family (for a full record of an interesting case in point, see Carpenter's *Human Physiology*). Such hereditary tendencies to modification of form along certain lines of descent constitute local examples of the 'Natural Law of Variation,' which plays an important part in the Darwinian theory of the origin of species. According to this theory, modifications which are of value in the exigencies of the struggle for existence will become perpetuated, and supersede earlier and less favourable conditions of conformation; while modifications that do not possess such value, after repetition through one or two generations, disappear again, and these, since they are useless as well as aberrant conditions, are properly included within the group of *hereditary* deformities. In the second group, that of *congenital* deformities, occur those much more frequent abnormalities that result from disturbing influences acting on the otherwise normal embryo previous to its birth. These anomalies occur chiefly as deformities by defective development, and deformities by perverted development.

Arrested development may be general, affecting the whole body, when a dwarf is produced; or local, affecting individual organs or parts, producing a great variety of obvious local deformities, in disproportion or malformation of special regions of the body. If the local arrest of development is absolute, the defect caused by it is so great as to constitute a Monstrosity (q.v.), where whole organs may be absent, as the brain (*anencephalia*), the skull (*acrania*), the lower jaw (*agnathia*), all the limbs (*amelus*), or one or more of them, as one arm, one eye (*monobrachius*, *monopus*). Perverted development is seen in cases where parts normally separate become fused together, as in the 'siren-monster,' in which both lower limbs are welded into one tapering extremity (*mermaid*). The causes producing these monstrosities and the lesser and more common deformities of the same class are very varied. Modern writers have, however, made them a subject of special study under the name Teratology (*teras*, 'monster,' *logos*, 'science'), and have devised experimental conditions which illustrate the subject. Thus, in the case of the embryo chick, Panum found that deformities could be produced by varying the temperature of the hatching apparatus, and varnishing the egg shells; while Dareste discovered that a like result occurs if the eggs be placed vertically instead of lying on their sides; and Gerlach, by varnishing the whole surface of the egg with the exception of a Y-shaped streak on one side, succeeded in producing a double-bodied chicken.

In the human subject the cause of the deformity may depend on purely mechanical conditions, as when the navel-string of the embryo becomes twisted round a limb and causes its gradual separation and destruction (so-called 'intra-uterine amputation'). In many cases, however, the cause is much more recondite, and appears to depend upon a variety of circumstances affecting the maternal organisation. In an increasing proportion of cases which are carefully investigated, it appears that maternal impressions, the result of shock or unpleasant experiences, may have a considerable influence in producing deformities in the offspring. This has for long been a popular theory, and it is one that recent scientific observation is tending to confirm, but only in a comparatively limited proportion of cases; and it must be admitted that the majority of cases cannot be explained on any theory of causation as yet suggested.

The chief varieties of malformation, coming under the heading of *congenital* deformities, are the following: (1) As regards the *number* of parts. In the *Siren*, two lower extremities are fused into one mass, but dissection shows that all the constituent bones of the limbs may be present, though much distorted, in the combined structure. In the *Cyclops*, the eyes are similarly fused into one irregular structure occupying the centre of the face. (2) As regards the *size* of parts. This may involve the whole body, as in dwarfs, of whom there have been some remarkable peripatetic specimens: the Corsican fairy was only 2 feet 7½ inches high; Mademoiselle Crachami, the smallest lady who ever lived, died at ten years of age, only 20 inches in height. This kind of deformity is not necessarily hereditary; the father of Borowlaski, who was only 39 inches when thirty years old, had six children alternately short and tall; and dwarf women have brought forth infants as long, when extended, as their mothers. One limb only may be diminutive. Of course, deformities the opposite of these exist, such as giants, or instances of premature or excessive local growth. O'Byrne, the Irish giant, measured 8 feet 4 inches when he died at the age of twenty-two. Such individuals are generally subject to premature decay. One finger

or one toe often grows to such abnormal dimensions as to necessitate its removal (local hypertrophy). (3) As regards the *shape* and *continuity* of parts. Distortion may occur from partial paralysis or irregular muscular action at an early stage of development, giving rise to Club-foot (q.v.), club-hand, &c.; or natural fissures or apertures which should close in the course of development may remain open, as in hare-lip, cleft palate, and *spina bifida* (non-union of spinal bones).

*Acquired deformities* arise in various ways as the result of injury or disease at any period after birth. Among injuries, burns, scalds, fractures, and dislocations are the most fertile causes of permanent deformity; and among diseases, rickets, and other diseases of bone, leprosy, and rheumatic affections are common causes. Another group of these affections, known as 'trade' deformities, are directly traceable to the special work done by the person suffering from them.

**Defregger**, FRANZ VON, Austrian historical and genre painter, was born 30th April 1835, a peasant's son, at Stronach, near Dölsach, in the Pusterthal. Inheriting and selling his father's farm, he went to Innsbruck to study sculpture with Stolz, by whose advice he soon removed to Munich, and studied painting with Dyk and Anshütz. After a short sojourn in Paris he returned to Munich in 1866, and became a pupil of Piloty. There he continued to live, himself a professor in the Akademie from 1878. Innocent and amiable by nature, he painted subjects from Tyrolean history and Tyrolean peasant life, which won great popularity by their freshness and truth, not quite free from sentimentality. He died at Munich, 1st January 1921.

**Degas**, EDGAR HILAIRE GERMAIN, a great French painter, was born in Paris, 19th July 1834, a prosperous banker's son, and was educated at the Lycée Louis-le-Grand. Deserting law for art, he entered the Ecole des Beaux-Arts, and became a pupil of Lamotte in 1855. The deepest and most enduring influence upon him, however, was that of Ingres, who was never formally his teacher. As for Ingres, draughtsmanship was for Degas the thing that mattered most in a picture. He visited Rome in 1856. On returning to Paris he painted historical subjects for a time; but essentially a realist, he passed through portrait-painting to truthful observation of contemporary Parisian life, especially of the racecourse and the ballet, for the sake of the opportunity that these subjects, often paltry and sordid in themselves, give for the treatment of line in movement. In 1870 Degas withdrew from the Salon, but he often exhibited from 1874 with the Impressionists, with whom he had much in common, though he is apart from them in the matter of colour. Japanese influence is strong in him. 'Le Ballet de Robert le Diable' (National Gallery) shows his breach with tradition in composition. He worked chiefly in pastel. He died at Paris, 27th September 1917. See Life by Henri Hertz (1920), and a study by Meier-Graefe (1923).

**Degeneration**, a biological term used to describe those not unfrequent cases where an entire organism falls below the structural level of its young stages, or where an organ in the same way loses its fullness of function, and becomes more or less atrophied, abortive, and simplified. Thus many parasitic worms, crustaceans, &c. are emphatically simpler than their free-swimming larvæ, and the sessile adult Ascidian shows only traces of the vertebrate characters which are plain enough in the active young. Thus, too, a crustacean which starts with a well-developed eye, may exhibit the gradual loss of this on assuming a dark habitat. The term is best confined to cases

where a level of structure exhibited during early life is more or less lost in the adult. Degeneration must be distinguished (a) from occasional *abortion*, (b) from *Reversion* (q.v.) to an ancestral type, and (c) from the occurrence of *rudimentary and undeveloped organs* where a character possessed by ancestral types remains more or less undeveloped, or shows itself only in embryonic life. Degeneration may be due to the environment, or to cessation of function, or to some more subtle constitutional cause. Absence of food, heat, light, &c. may mean the absence of the necessary stimulus for the growth and maintenance of the organs, or superfluity of food may cause one system to preponderate over others. Nor can it be doubted that cessation of function checks the food-supply to a given organ, and in other ways helps to bring about its degeneration. But, on the other hand, some less obvious cause—the fatigue of early life, a constitutional sluggishness, &c.—may share in conditioning degeneration, as in the case of the majority of the Tunicata. Weismann and others, however, would explain degeneration by the non-operation of natural selection. On this view, organs are not only developed but maintained by natural selection, and if it happen that an organ is no longer an advantage in this struggle for existence (e.g. eyes in dark caves), then natural selection no longer maintains that organ, and it disappears in the course of generations.

See, for instances, ASCIDIANS, CAVE-ANIMALS, CRUSTACEA, INSECTS, PARASITIC ANIMALS, PARASITIC PLANTS; also ENVIRONMENT, EVOLUTION, &c.

**De Gérando, JOSEPH MARIE, BARON**, was born 29th February 1772, at Lyons, of Italian blood. Fleeing from Paris to Germany, he entered (1797) Masséna's army as a private, and wrote a treatise, 'crowned' by the Academy, *Des Signes et de l'Art de Penser* (1800). In 1802 appeared his *De la Génération des Connaissances Humaines*, a precursor of his *Histoire de Philosophie* (1803), long reputed the best French work on the subject. It procured him, in the following year, admission into the Academy. He was appointed secretary-general to the Ministry of the Interior by Napoleon. But De Gérando is better known by his philanthropic writings. His excellent work, *Le Visiteur du Pauvre* (1820), obtained the Montyon prize, as did also his *Du Perfectionnement Moral* (1824). De Gérando was elevated to the peerage in 1837, and died 12th November 1842, vice-president of the Council of State.

**Deggendorf**, a town of Lower Bavaria, on the Danube, which is here crossed by two bridges, 39 miles NW. of Passau by rail, with manufactures of paper, linen, woollens, stoneware, and matches. Its church of the Holy Sepulchre is often visited by more than 30,000 pilgrims in a year. Pop. 7000.

**Degraded**, in Heraldry, means placed upon steps or *degrees*.

**Degree**. See CIRCLE, GRADUATION, THERMOMETER, LATITUDE AND LONGITUDE. Were the earth perfectly spherical in shape, the distance between two points on the same meridian differing by one degree in latitude would be exactly equal to  $\frac{1}{360}$  of the whole meridian, and would be the same at all parts of the earth's surface. But owing to its oblately spheroidal shape the distance increases from the equator, where the curvature is greater, to the poles, where it is less. At the equator the length of a degree of latitude is 362746·4 feet; while at the poles it is 366479·8 feet. The differences between the length of the degree of latitude in different latitudes, ascertained by actual measurement, is one of the proofs that the figure

of the earth is not that of a sphere, but that of an oblate ellipsoid.

A degree of *longitude* is the length between two meridians that make an angle of one degree at the poles, measured by the arc of a circle parallel to the equator passing between them. It is clear that this space is greatest at the equator, and vanishes at the poles; and it can be shown that it varies with the cosine of the angle of latitude. The annexed table shows the lengths of a degree of longitude for places at every degree of latitude from 0° to 90°. It is computed on the supposition that the earth is a sphere.

Degree lat.	English miles	Degree lat.	English miles	Degree lat.	English miles.
0	69·07	31	59·13	61	33·45
1	69·06	32	58·51	62	32·40
2	69·03	33	57·87	63	31·33
3	68·97	34	57·20	64	30·24
4	68·90	35	56·51	65	29·15
5	68·81	36	55·81	66	28·06
6	68·62	37	55·10	67	26·96
7	68·43	38	54·37	68	25·85
8	68·31	39	53·62	69	24·73
9	68·15	40	52·85	70	23·60
10	67·95	41	52·07	71	22·47
11	67·73	42	51·27	72	21·32
12	67·48	43	50·46	73	20·17
13	67·21	44	49·63	74	19·02
14	66·95	45	48·78	75	17·86
15	66·65	46	47·93	76	16·70
16	66·31	47	47·06	77	15·52
17	65·98	48	46·16	78	14·35
18	65·62	49	45·26	79	13·17
19	65·24	50	44·35	80	11·98
20	64·84	51	43·42	81	10·79
21	64·42	52	42·46	82	9·59
22	63·97	53	41·53	83	8·41
23	63·51	54	40·56	84	7·21
24	63·03	55	39·58	85	6·00
25	62·53	56	38·58	86	4·81
26	62·02	57	37·58	87	3·61
27	61·48	58	36·57	88	2·41
28	60·93	59	35·54	89	1·21
29	60·35	60	34·50	90	0·00
30	59·75				

**Degrees, UNIVERSITY.** In its original signification a degree was simply a certificate that the person who held it was qualified to take part in the public teaching of a university. In the fully developed medieval university there were the four faculties of arts, law, medicine, and theology; and in each of these faculties there were special degrees of its own. These degrees were the baccalaureate, the licentiate, and the doctorate, though, strictly speaking, the first was not a degree, since it did not confer the right of public teaching. For the attainment of each degree certain subjects were prescribed for examination, as also a fixed term of study in connection with some university. Both the subjects and the periods of study varied with the progress of learning; but the different universities always sought to preserve a common standard. In Paris, at the close of the 15th century, the terms of study requisite to qualify for teaching in the different faculties were the following: in arts, four years; in law, seven; in medicine, eight; and in theology, fourteen. In modern times a degree in arts is simply a certificate of a certain measure of acquaintance with the subject to which it refers; but in the case of the higher faculties, that is, of law, medicine, and theology, the degree also implies a license to exercise the functions of the professions that depend on these faculties. It was formerly an indispensable condition to obtain a degree that the knowledge it represented should have been acquired at one or other of the legally constituted universities; but of late years certain universities, such as that of London, have been founded, which grant degrees to persons who pass examinations on prescribed subjects without the necessity of university attendance. A still further departure from the

original import of the term is seen in what are known as 'honorary degrees.' Such degrees are conferred by universities on persons who have distinguished themselves in spheres of life which have no direct connection with the studies for which they exist. Thus, eminent soldiers, artists, and even merchants, have received the degree of Doctor of Laws. Not a few scholastic bodies are even understood to grant degrees on purchase, or on other such easy conditions that the original significance of the degree is completely lost. In the middle ages the right to confer degrees was granted by the pope, who was the recognised head of all the universities; and at the present day he claims the privilege of directly conferring degrees on whom he pleases. In Protestant countries the right can be granted only by the state. By an act of the reign of Henry VIII., the Archbishop of Canterbury received the right of conferring degrees; but these, known as 'Lambeth degrees,' never carried with them the same privileges as those of Oxford and Cambridge. In the medieval universities, music made part of the curriculum of the faculty of arts, and doctors and bachelors of music are still created by some universities. The German doctorate in philosophy corresponds in some respects to the M.A. degree elsewhere. Degrees in science are of comparatively recent institution. See ABBREVIATIONS, UNIVERSITY, DOCTOR.

**De Gubernatis.** See GUBERNATIS.

**Dehiscence** (Lat., 'gaping'), a technical term applied to the mode of opening of certain ripe fruits; see FRUIT.

**Dehmel, RICHARD**, German poet, was born, a forester's son, at Wendisch-Hermsdorf, in Brandenburg, 18th November 1863. He studied at Berlin and elsewhere, and became secretary to an insurance company. At this period, besides writings on insurance, he published two collections of poems, *Erlösungen* (1891) and *Aber die Liebe* (1893), and a book of short stories, *Lebensblätter* (1895). Thereafter he confined himself to literature, living first at Pankow, near Berlin, afterwards at Blankenese. His plays are *Der Mitmensch* (a tragicomedy, 1895), *Lucifer* (a pantomime play, 1899), *Fitzebutze* (a dream play, 1907), *Michel Michael* (an allegory for the German people, 1911), and *Die Menschenfreunde* (1918). Besides some books for children, his other works are *Weib und Welt* (poems, 1896); *Zwei Menschen* (a novel in ballads, 1903), perhaps his best work; *Die Verwandlungen der Venus* (1907), *Die Gottesnacht* (1911), *Blinde Liebe* (1912), narrative poems; *Betrachtungen über Gott, Kunst und die Welt* (1908); *Die Schöne Wilde Welt* (poems, 1913); *Volksstimme Gottes* (war poems, 1914); and *Zwischen Volk und Menschheit* (a war diary, 1919). Though an epileptic, he volunteered for war service, which led to his death, 8th February 1920. Dehmel was probably the greatest German poet of his time. Of vigorous personality and vehement lyrical inspiration, intellectually and ethically sound and robust, he has been classed, for his strength, with Nietzsche; but he was too strong to be a mere Nietzschean. See *Mein Leben* (1922), and *Ausgewählte Briefe* (1922).

**Dehra**, the capital of the Dehra Dún district in the United Provinces of India, is pleasantly situated in a mountain-valley, 2300 feet above sea-level, and 100 miles NE. of Meerut. The forestry school (1878-1914) is the finest building in the town, and contains magnificent collections. The Royal Indian Military College was opened in 1923. Pop. (with cantonment) 38,000.

**Deianeira**, daughter of Eneus and Æthea, and sister of Meleager. She became the wife of Herakles, but unwittingly caused his death by

sending him the mantle of the centaur Nessus, which was said to have the property of preserving love, but was really steeped in fatal poison. The poison entering his frame, the hero suffered such agony that he ordered a funeral pyre to be erected in Mount Æta, and cast himself into the flames, whereupon Deianeira hanged herself from grief.

**Dei Gratia** (Lat., 'by the grace of God') is a formula taken from several apostolical expressions in the New Testament. It is believed to have been first formally used by the bishops at the Council of Ephesus, 431 A.D. Afterwards, it came to be appended by archbishops, bishops, abbots, monks, and even chaplains, to their titles, in letters, and other documents, as a humble expression of dependence on the Most High. After the middle of the 13th century, the higher clergy wrote *Dei et Apostolicæ sedis gratia*, 'by the favour of God and the apostolic see.' In the British Islands, this style was generally dropped about the time of the Reformation, but it was occasionally given to the Archbishops of Canterbury and York, even after the beginning of the 17th century. Many temporal princes, earls, and barons made use of the formula *Dei Gratia*; William II. and Edward III. of England employed it; and before the 15th century, no idea of independence or of divine right seems to have been attached to it. But in 1442 King Charles VII. of France forbade its use by the Comte d'Armagnac, and in 1449 obliged the Duke of Burgundy to declare that he used it without prejudice to the rights of the French crown. These instances show that it had now begun to be regarded as belonging exclusively to sovereigns who owed no allegiance to any other earthly potentate or power. In this way, what was originally a pious expression of humility came to be looked upon as an assertion of the doctrine of the 'divine right' of kings.

**Deinotherium.** See DINOTHERIUM.

**Deipnosophists.** See ATHENEUS.

**Deira**, an ancient Anglian kingdom, extending from the Tees to the Humber, and westwards to the borders of Cumbria. With its northern neighbour, Bernicia, it was afterwards merged in the kingdom of Northumbria, but later both were earldoms under the West Saxon kings.

**Deir-el-kamar** ('convent of the moon'), a town of Syria, formerly the capital of the Druses, 13 miles SSE. of Beirut. It is situated on the edge of a deep and picturesque glen of Mount Lebanon, on the opposite side of which the palace Bteddin was the summer residence of the Christian governor of Lebanon. Pop. 8000, mostly Maronites.

**Deism** properly means belief in a God, as opposed to atheism; but the term used to express this sense is *Theism* (q.v.). On the other hand, Deism is generally understood to imply the denial of a revelation; and a Deist is one who holds the existence and providence of God, but grounds his belief on reason and evidence, rejecting the testimony of a revelation. The name is often used vaguely by way of reproach.

The term Deists, or Freethinkers, is usually employed to designate a series of writers who appeared in England in the 17th and 18th centuries, and sought to establish Natural Religion upon the basis of reason and free inquiry, in opposition to all positive religions, and without reference to supernatural revelation. They were critical, if not hostile, in their attitude towards Scripture, and denied miracles, the Trinity, and atonement by Christ; and they may fairly be taken as constituting one movement, though they by no means formed one school or agreed in the details of their teaching. Thus some believed and others rejected the immortality of the soul and human free-will, and they did not all teach the same doctrine as to

the relation of God to the universe, some being almost pantheistic. They were not for the most part accurate scholars, and were rather acute than profound thinkers; but though their influence on English thought seemed for a time to be blotted out, they contributed largely to the progress of rationalism in Europe. The chief deists were Lord Herbert of Cherbury, called the 'Father of Deism' (died 1648), Blount, Tindal, Woolston, Toland, Lord Shaftesbury, Lord Bolingbroke, Collins, Morgan, and Chubb (died 1746). See the separate articles on these writers, also CHURCH HISTORY, RELIGION, RATIONALISM; Leland, *View of the Deistical Writers* (1754); Lechler, *Geschichte des Englischen Deismus* (1841); Hunt, *Religious Thought in England* (1872); Stephen, *English Thought in the 18th Century* (1876); Benn, *English Rationalism in the 19th Century* (1906); Robertson, *History of Free Thought* (1906).

**Déjazet**, PAULINE VIRGINIE, a great French actress, born at Paris, 30th August 1797. On the stage before she was five years old, she grew up playing children's and boys' rôles with marvellous precocity of intelligence and grace, but first awoke to a sense of her real greatness in an engagement at Lyons, where her playing of such parts as were then known as *soubrettes* endeared her to the citizens. In 1821 she began to play at the Gymnase, but her greatest triumphs were won at the Théâtre du Palais-Royal, whither she betook herself in 1834. From 1844 to 1849 she played at the Variétés, next at various Paris theatres, in the provinces, and at London, till 1859, when she undertook the management of the Folies-Dramatiques. She left the boards in 1868, next year received a pension of 2000 francs, and died 1st December 1875. See *Lives* by Lecomte (1866 and 1892) and Duval (1876).

**Dekker**, THOMAS, dramatist, was born in London about 1570. He was a very prolific writer, but only a few of his plays were printed. In 1600 he published two comedies, *The Shoemaker's Holiday*, or *the Gentle Craft*, and *The Pleasant Comedy of Old Fortunatus*. The first of these pieces is one of the pleasantest of old plays, and the second abounds in poetry of rare beauty. Dekker's next play was *Satirromastix*, or *the untrussing of the Humorous Poet* (1602), in which Ben Jonson was held up to ridicule. In *Every Man out of His Humour* and *Cynthia's Revels* Jonson had made some satirical reflections on Dekker; and in *The Poetaster* (1601) he had assailed Dekker and Marston with bitter vehemence. Long afterwards, in 1618, Jonson told Drummond of Hawthornden that Dekker was a knave. Before the quarrel Jonson and Dekker had worked in harmony; in 1599 they wrote together two plays (which have not come down), *Page of Plymouth* and *Robert the Second*. In 1603 Dekker published a pamphlet entitled *The Wonderful Year*, which gives a heart-rending account of the sufferings caused by the plague. To the same year belongs the very amusing tract *The Bachelor's Banquet*, in which he describes with gusto the ills to which henpecked married men are forced to submit. His most powerful writing is seen in *The Honest Whore* (1604), of which the second part was published in 1630. Middleton assisted him in the first part. In 1607 he published three plays written in conjunction with Webster, the *Famous History of Sir Thomas Wyatt* (which has descended in a mutilated state), *Westward Ho*, and *Northward Ho*. A pamphlet entitled *The Bellman of London* (1608) gives a very lively account of the vagabonds of London; and Dekker pursued the subject further in *Lanthorn and Candlelight* (1608), which passed through several editions. The most famous of his

pamphlets is *The Gull's Hornbook* (1609), in which the life of a town-gallant is raucily depicted. *The Roaring Girl* (1611) was partly written by Dekker; but Middleton must take the chief credit for that excellent comedy. From 1613 to 1616 Dekker was confined in the King's Bench prison. Earlier in his career he had spent some time in the Counter prison. In each case his debts were the cause of his imprisonment. With Massinger he composed the *Virgin Martyr*; and Lamb was doubtless right in ascribing to Dekker the most beautiful scene (II. i.) in that play. *The Sun's Darling*, licensed for the stage in 1624, but not printed till 1656, was written in conjunction with Ford. A powerful tragedy, *The Witch of Edmonton* (posthumously published in 1658), was written by Dekker, Ford, and Rowley. We hear of Dekker in 1637, when he republished his *Lanthorn and Candlelight* under the title of *English Villainies*, and then he drops out of notice. His plays were collected in 1873 (4 vols.), and his pamphlets were republished in Grosart's 'Huth Library' (5 vols.). F. P. Wilson edited the *Plague Pamphlets* in 1926. See Tucker Brooke's *Tudor Drama* (1912); Miss Leland Hunt's study (1912); and Swinburne's essay.

**De la Beche**, SIR HENRY THOMAS, a well-known geologist, was born near London in 1796. He was educated at the military school at Great Marlow, and entered the army in 1814. Three years after, he became a Fellow of the Geological Society, of which he was afterwards made secretary, and eventually president in 1847. In 1820, while residing in Switzerland, he published a paper on the temperature and depth of the lake of Geneva. In 1824 he visited Jamaica, and published a paper on the geology of the island. Other works are a *Manual of Geology* (1831), *Researches in Theoretical Geology* (1834), and a *Geological Observer* (1853). He undertook to form a geological map of England; and soon after he had begun, the government, sympathising with his design, instituted the Geological Survey, and placed him at its head. He was founder of the Geological Museum in Jermyn Street, and of the School of Mines. In 1848 he received the honour of knighthood; and in 1853 was elected a corresponding member of the Academy of Sciences of Paris. He died 13th April 1855.

**De la Borde**, HENRY FRANÇOIS, COUNT, a French general, born at Dijon, 21st December 1764. The son of a baker, he enlisted at the outbreak of the Revolution, and by 1793 had risen to be general of brigade. He distinguished himself in Spain at the Bidassoa (1794), next commanded a division on the Rhine under Moreau, was governor of Lisbon in 1807, and was ennobled in 1808. He declared for the emperor on his return from Elba. He died 3d February 1833.

**Delacroix**, EUGÈNE, a French painter, chief of the Romantic school, was born at Charenton-Saint-Maurice, near Paris, 26th April 1799. At the age of eighteen he entered the atelier of Pierre Guérin, a follower of David, and came under the far more powerful influence of his fellow-pupil, Géricault. In 1822 he exhibited his first work, 'Dante and Virgil,' the novel force of which attracted much attention and won the praise of M. Thiers among others. In 1824, Delacroix, who was now at the head of the new school of young painters, produced the 'Massacre of Scio,' which was entirely repainted after the artist had studied a work of Constable's. The July revolution left its impress on Delacroix, and in 1831 appeared his 'Liberty directing the people on the Barricades.' In 1832 he made a voyage to Morocco, where he familiarised himself with novel effects of light and costumes. From this period, Delacroix continued to send forth picture after picture, besides decorat-

ing many public buildings and churches. He also executed a number of lithographs, including a series illustrating Hamlet, and one dealing with Faust, of which Goethe wrote that he found 'in these images all the impressions of his youth.' In 1857 he was chosen by the Institute to fill the place of Delacroix. He died 13th August 1863. The most striking quality of Delacroix's art is its invention, its impetuous imaginative force and vitality. He aimed at a powerful and dramatic expression of passion and emotion, and in the pursuit of this aim a sense of beauty was frequently lost. He was an admirable colourist, and his admirers have ranked him with Veronese and Rubens. His drawing, sometimes incorrect, is always spirited and full of vigour. See Lives by Moreau (1873), Burty (1880), and Chesneau (1885); a book by Mrs Bussy (1907); and his *Journal* (1898).

**Delagoa Bay**, a large inlet of the Indian Ocean, in Portuguese East Africa, was discovered by one of Vasco da Gama's lieutenants in 1502. It is 25 miles wide, and for size and accommodation is the finest natural harbour in South Africa; in spite of islands and shoals its navigation is safe and easy, and the anchorage is commodious and well sheltered. The settlement of Lourenço Marques (capital of the province) and surrounding country have been notoriously unhealthy; but drainage and other improvements have been carried out. The rivers Maputa, Tembe, and Umbelosi (the two latter joining to form the English River), and the Komati, fall into Delagoa Bay. The proximity of Delagoa Bay to the Transvaal goldfields greatly increased its commercial and political importance. Railway lines connecting with Pretoria (350 miles from the coast) and with Johannesburg, &c., were completed in 1890-95, and both before and during the war of 1899-1902 proved invaluable to the Transvaal. Another (1906-12) runs to Swaziland. See LOURENÇO MARQUES, MOZAMBIQUE.

**De la Mare**, WALTER, poet and novelist, was born 25th April 1873 at Charlton, in Kent. His *Songs of Childhood*, published in 1902 as by 'Walter Ramal,' and much revised in later editions, his prose romance, *Henry Brocken* (1904), his volume of *Poems* (1906), his children's monkey-story, *The Three Mulla Mulgars* (1910), and his fascinating novel of the occult, *The Return* (1910), were recognised as books of high promise. That promise was fulfilled in *The Listeners* (1912), and bettered in *Peacock Pie* (1913) and in *Motley and other Poems* (1918). As a romanticist and a musician in words Mr De la Mare has reminded his critics of Coleridge, with something of Keats added. His art and his atmosphere are yet those of no sorcerer's apprentice, but of an authentic magician. Moreover, he has faced the problem of the real universe, and sometimes he has found himself upon the cold hillside, as in his prose novel *Memoirs of a Midget* (1921) and in *The Veil and other Poems* (1921). But he can still regain access to his *märchen* world, in whose enchantments and humour children and older readers delight alike. His *Collected Poems* were published in 1920, a book of short stories, *The Riddle*, in 1923, *Ding Dong Bell* and *Crossings* in 1924.

**Delambre**, JEAN JOSEPH, astronomer, born at Amiens, 29th September 1749, taught, and studied physics and astronomy under Lalande. The discovery of Uranus by Herschel in 1781 gave him the first opportunity of attracting the attention of the learned world in general by preparing tables of the motion of the new planet. Soon after, he commenced the construction of new solar tables, and tables of the motions of Jupiter and Saturn. Along with Méchain, he was appointed by the French government, in 1792, to measure the arc of the

meridian between Dunkirk and Barcelona, which was completed in 1799 (see METRE, ARAGO). He was elected member of the Academy, and in 1803 perpetual secretary of the mathematical section of the Institute. The result of his measurements appeared in his great work, *Base du Système Métrique Décimal* (1806-10). In 1807 he obtained the chair of Astronomy at the Collège de France, rendered vacant by the death of Lalande, his master and friend. In 1814 he was appointed a member of the Council of Public Instruction. He died at Paris, 19th August 1822. Delambre received a multitude of honours during his lifetime. He was a member of most of the learned bodies in Europe, and an officer of the Legion of Honour. His writings are very numerous.

**Delane**, JOHN THADEUS, editor of the *Times* newspaper, was the second son of a barrister, and was born in London, 11th October 1817. He received the earlier part of his education in private schools, and at King's College, London, and finally went to Magdalen Hall, Oxford, where he took his degree in 1839. At the university, he was more famous for horsemanship than reading, and though bright and active-minded, he never professed to be a scholar. After leaving Oxford he studied life in many forms, walked the hospitals, was called to the bar, and reported in the House of Commons and on circuit. Mr Walter had early marked Delane's capable character, and soon placed him on the *Times* staff; and in May 1841, not yet twenty-four, he became its editor. For thirty-six years Delane held this post, aided, however, for the greater part of this period by his brother-in-law and college friend, George Dasent (q.v.). Under his editorship, the *Times* attained a prodigious circulation, and an influence unparalleled in the history of journalism. He wrote no articles, but he contributed excellent reports and letters. He merged his personality in his paper, and the history of his later life is the history of the extraordinary influence wielded by the leading journal. His exposure of the railway mania, his vehement attacks upon the management of the Crimean war, and his strong opposition to England's assisting Denmark in 1864, are among his best-remembered acts. He was singularly shrewd in weighing public opinion, possessed remarkable foresight, and seldom made a mistake. Having resigned the editorship in 1877, he died two years later, 22d November 1879. His successor was Thomas Chenery. A Life by Sir G. Dasent, withheld in deference to Mr Walter, was published in 1908, one by Sir E. T. Cook in 1915.

**Delany**, MRS (Mary Granville), was born at Coulston, Wiltshire, 14th May 1700. The niece of Lord Lansdowne, she married first, in 1718, 'fat, snuffy, sulky' Alexander Pendarves (1659-1724); and secondly, in 1743, the Rev. Patrick Delany (1685-1768), an Irish divine, Swift's friend, and the author of a dozen volumes. After his death she lived chiefly in London, till her own death at Windsor on 15th April 1788. Her much-admired 'paper mosaics,' or flower-work, have long since faded; but she is remembered through her patronage of Miss Burney, and by her *Autobiography and Correspondence* (6 vols. 1861-62). See also G. Paston, *Mrs Delany, a Memoir* (1900).

**De la Pole**. See POLE.

**De la Ramée**, LOUISA. See OUIDA.

**Delaroche**, HIPPOLYTE, known as PAUL (1797-1856), painter, was born at Paris. He studied under Baron Gros, and excited admiration in 1824 by his 'Joan of Arc before Cardinal Beaufort,' followed by 'Death of Queen Elizabeth' (1827). In 1831 he produced the 'Princes in the Tower;' in 1833, 'Cromwell contemplating the Corpse of Charles I.:' in 1834 his 'Execution of

Lady Jane Grey,' and in 1837 his 'Charles I. insulted by the Parliamentary Soldiers,' and his 'Strafford receiving Laud's Blessing on the Way to Execution.' From this period until 1841 he was engaged on what is probably his grandest work—the series of paintings on the wall of the semicircular saloon of the École des Beaux Arts, in the execution of which he was aided by Armitage and other pupils. Later works were 'Marie Antoinette before the Tribunal' (1851); 'The Finding of Moses' (1852); 'Calvary' (1853); and 'The Floating Martyr.' He also executed striking portraits of Guizot (1838), Thiers (1856), &c. The characteristic excellences of Delaroche are picturesqueness of conception, precision of handling, and accuracy of drawing. He has been accused, however, of want of fire, imagination, and depth, and it must be admitted that he very rarely, if ever, exhibits the highest qualities of creative genius. Delaroche was made a member of the Institute in 1832, and professor of Painting in the École des Beaux Arts in 1833. See Rees, *Vernet and Delaroche* (1880).

**De la Rue, WARREN**, an eminent electrician, was born in the island of Guernsey, 18th January 1815. He was educated at Paris, and early entered his father's business—the manufacture of paper-ware—for which his inventive ability and scientific knowledge enabled him to devise many new machines and processes. He took an active part in the Exhibitions of 1851 and 1862; was a member of the International Electrical Congress in Paris in 1861; and was president of the Royal Astronomical Society, of the Chemical Society, and the London Institution. In 1878 he succeeded Spottiswoode as secretary of the Royal Institution, and in 1880 was elected a corresponding member of the French Académie des Sciences in the department of astronomy. His scientific work, done at his observatory at Cranford and at his private physical laboratory, was of the highest value in the departments of astronomical photography and electricity, and its results were communicated from time to time to the Royal Society and the French Académie des Sciences. He died 19th April 1889.

**Delaunay, LOUIS ARSENE**, a French actor, was born 21st March 1826, at Paris, and made his début in October 1846 at the Odeon. In the year 1848 he first trod the classic boards of the Théâtre Français in the rôle of Durante, and here he soon procured an engagement and became secretary to the theatre in 1850. He retired in 1857, and died in 1903. One of the most accomplished actors on the French stage, he found some of his greatest parts in the plays of Hugo, Paileron, De Musset, and Augier.

**Delavigne, JEAN FRANÇOIS CASIMIR**, dramatist, satirist, and lyricist, was born at Le Havre on April 4, 1793. He became one of the most popular writers in France, after the publication in 1818 of his *Messénienes*, satires directed against the monarchy of the Restoration. He then turned his attention to dramatic authorship and produced *Les Vêpres Siciliennes* (1819), a tragic piece, which was followed by the comedies, *L'École des Vieillards* and *Les Comédiens* (1821). He was made an academicien in 1825. As a lyricist and satirist, he espoused the cause of the patriots in Italy, Greece, and Poland, and of the democratic party in France, but although he appears to have been a sincere politician, he failed to give natural and original expression to his convictions. His tragedy of *Louis XI.*, which was partly founded on *Quentin Durward*, and an adaptation of which is familiar to English playgoers, was brought out in 1833. Among his other dramas were *Le Paria*, *Marino Faliero*, *Les Enfants d'Edouard*, *Don Juan d'Autriche* (1835), and *La Fille du Cid* (1839). He died on December 11, 1843. He had no true poetic

faculty; neither was he a skilful dramatist, though his plays, when first produced, gained considerable popularity. In his day he was supported by the opponents of the Romantic school, but his mediocrity has come to be recognised by critics of all parties.

**Delaware**, one of the Atlantic States of the American Union, forms a part of a peninsula lying between the lower reaches of the Susquehanna and Chesapeake Bay on the west, and the Delaware River and Bay and the Atlantic on the east. The bay was named in 1611 from Thomas West, Lord de la Warr, first governor of Virginia. The state is bounded N. by Pennsylvania (where the boundary is an arc of a circle), E. by the Delaware River and Bay and the Atlantic, and S. and W. by Maryland. With an area of 2000 sq. m., or about that of Northumberland, it is the smallest of all the states except Rhode Island; in 1920 it was the smallest of all in population, except Nevada and Wyoming. Save in a small hilly section in the north nearly all the surface is low and level, and in the extreme south there is much swampy land; while the most southerly two-fifths of the area is in great part a sandy region. The hill-district in the north presents a stony surface overlying azoic rocks, such as gneiss and granite, with patches of serpentine and limestone. A strip of highly fertile red clay lies south of the hill-country; and next southward occurs a productive and fossiliferous greensand formation, succeeded by a somewhat sandy belt, less fertile than the greensand, although the greater part of its extent is by no means unproductive. The coast-region has many salt-marshes, some of them dyked, and thus rendered tillable; and farther inland is a considerable body of extremely rich alluvial soil. The western border of the state is generally well wooded, and in some places flat and marshy. The rivers of Delaware are mostly small, but many are navigable. In the north kaolin and iron ore are found; bog ore or limonite occurs to some extent in other parts; and granite is largely produced.

Delaware is divided into three counties, New Castle, Kent, and Sussex. It is well provided with railroad facilities, and is crossed by a canal connecting the Delaware and Chesapeake bays. The northern section has large and varied manufacturing interests. Fishing and the taking of oysters and crabs are important industries in Sussex county, and along the shores and tidal streams. Peaches and the various small fruits, as well as market-garden products, are leading articles of export; and fruit-evaporating and canning are important. The principal cereal crops are maize, wheat, and oats. Pop. (1880) 146,608; (1900) 184,735; (1910) 202,322; (1920) 223,003. The principal towns are Wilmington, the centre of manufacturing industries, New Castle, Dover, the state capital, and Smyrna.

Delaware's first permanent white settlements were made by Swedes and Finns, who settled at Christiana (Wilmington) in 1638; for a Dutch settlement of 1613 at Hoornkill (now Lewes) was destroyed a year later by the Indians. The colony of New Sweden included a small part of Pennsylvania and a section of New Jersey. For several years the Dutch and Swedes contended for the possession of this region, till in 1655 it passed under Dutch sway. After the transfer of New Amsterdam (now New York) to the English rule in 1664, Delaware, like the stronger colony, became English also. It was governed from New York until 1682, when William Penn became proprietary of the three Delaware counties, which, however, were never considered as forming any part of Pennsylvania, to which colony they were attached. In 1776 it was made a separate state, and a constitution was

adopted, which was set aside by another in 1791. Delaware was a slave-state until the war of 1861-65, but took no part in the secession movement. The state sent 14,000 soldiers to the northern armies, but many from the southern districts joined the Confederates in the war.

**Delaware**, THOMAS WEST, LORD, the first governor of Virginia, arrived there from England in June 1610, but nine months later was prostrated by ill-health, and died in 1618.

**Delawares**, a tribe of Algonquins (q.v.) formerly inhabiting the Delaware basin, now, after several removals, mostly incorporated with the Cherokees in Oklahoma.

**Delbrück**, HANS, historian, born at Bergen in Rugen, 11th November 1848, studied at Heidelberg, Greifswald, and Bonn, was tutor to a princess, edited the *Preussische Jahrbücher* 1883-1920, sat in the Reichstag 1884-90, became professor of history at Berlin in 1885. He wrote a *Geschichte der Kriegskunst im Rahmen der politischen Geschichte* (1900-20), and many other works on kindred subjects, including responsibility for the Great War and its outcome.

**Delcassé**, THÉOPHILE, French statesman, born 1st March 1852 at Pamiers (Ariège), as minister for the colonies (1894-5) furthered French enterprise in Africa, as foreign minister (1898-1905) settled the Fashoda difficulty which had arisen out of his colonial policy, mediated between Spain and America, fostered the Russian alliance, composed differences with Britain, and resigned on the Morocco crisis. In 1911-13 he was minister of marine, in 1913-14 ambassador to Russia, and in 1914-15 foreign minister. He died in February 1923.

**Del Credere Commission**, the higher rate or allowance charged by a factor or agent, in respect of which he guarantees the solvency of the purchaser, and renders himself personally liable to his principal in the case of the purchaser's failure to pay the price of the goods sold. It is not necessary that the contract be in writing. The premium is often double an ordinary selling commission.

**Deleb Palm**, or ETHIOPIAN FAN-PALM (*Borassus aethiopum*), is very common and widely distributed throughout Central Africa, where it often practically replaces the date palm in the domestic economy of many negro tribes. Its large hard nut is eaten fresh, but also largely planted until germination has fairly commenced; the young embryo thus laden with sugar, &c., is then eaten raw or cooked.

**Delectus** (Lat., 'a selection'), the old name often applied to a selection of passages from Latin or Greek writers graduated in difficulty for the use of young learners. None is so famous as Valpy's.

**Deledda**, GRAZIA, Italian novelist of violent and sombre Sardinian life, was born at Nuoro in Sardinia in 1872.

**Delegation** (Ital. *delegazione*), the term formerly applied in Lombardy, Venice, and the States of the Church, both to the governor and governing court of a province and to the province itself. The number of such provinces varied, but was at one time nineteen. The delegate was always a prelate, and directly appointed by the pope. If he was a cardinal, he was called a Legate, and his province a Legation. See also AUSTRIA-HUNGARY.

**Delescluze**, LOUIS CHARLES, French commandant, was born at Dreux, 20th October 1809. His politics early drove him from France to journalism in Belgium, but the February revolution opened to him a career in Paris, where his clever and facile pen quickly brought him popularity,

imprisonment and a fine of 10,000 francs. Again at Paris in 1853, he was sentenced to two years' imprisonment, and was next transported to Cayenne, where he remained till 1859. His experiences of his sufferings he gave in *De Paris à Cayenne: Journal d'un Transporté* (1867). After his return he was quiet for some years, until his journal, *Réveil*, started in 1868 to advocate the doctrines of the International, brought him anew into trouble. In the history of the Paris Commune he played a prominent and responsible part. He died on the last barricade, 28th May 1871.

**Delfshaven**, an old town in South Holland on the Maas,  $1\frac{1}{2}$  mile W. of Rotterdam, with which city it was incorporated in 1886.

**Delft**, one of the most ancient towns of South Holland, is situated on the Schie, 8 miles N.W. of Rotterdam by rail, and is intersected by numerous canals. Delft was noted from the 16th to the 18th century for its delft-ware (see POTTERY), but has now entirely lost its high reputation for this manufacture, and not more than a few dozen persons are engaged in making earthenware. Of several interesting buildings, one, the town-hall (1618), is a picturesque and richly adorned edifice. The New Church (1476) contains a monument, more ornate than tasteful, to the memory of William I. of Orange, who was assassinated here, 10th July 1584. It also contains the tomb of Grotius, and the burial-vaults of the present royal family of Holland. The Old Church, a building of some note, contains the tomb of the naturalist, Leeuwenhoek, and of the great admiral, Van Tromp. Delft has also a state arsenal, an East Indian college, a polytechnic, and several hospitals. There are some manufactures of fine carpets, casks, baskets, and trade in glass, spirits, and butter. Pop. 40,000.

**Delhi** (*Dehli*), a city detached in 1912 from the Punjab and made capital of the Indian empire, stands on the right bank of the Jumna, 113 miles NNW. of Agra, and 954 NW. of Calcutta. It is walled on three sides, has ten gates, and stands on high ground, the grand series of buildings forming the famous palace of Shah Jehan, now the Fort, looking out over the river and a wide stretch of wooded and cultivated country. To the north, about a mile distant, rises the historic 'ridge,' crowned with memorials of the Mutiny, and commanding a fine view of the city, the domes and minarets of which overtop the encircling groves. The gardens in the city, the suburbs, and the neighbouring country are all richly wooded. The palace buildings, the splendid heritage of Mogul sovereignty, comprise the cathedral-like entrance-hall, the *diwan-i-khas*, or audience-hall, the *diwan-i-am*, the *rang mahal*, and several lesser pavilions, covering in all an area of 1600 feet by 3200, exclusive of gateways. The beautiful inlaid work and carving of these buildings are the admiration of the world, and the *diwan-i-khas* is worthy of its famous inscription: 'If there is a heaven on earth, it is this—it is this!' In the heart of the city stands the Jama Masjid ('great mosque'), one of the largest and finest structures of the kind in India, which also owes its origin to Shah Jehan. Among the notable monuments in the neighbourhood are the imperial tombs, including that of Hamayun, second of the Mogul dynasty; the old Kala Masjid, or black mosque; and the famous Kutab Minar, 10 miles to the south. The Minar, erected by Kutab-ud-din, founder of a dynasty, early in the 13th century, is 238 feet high, and tapers gracefully from a diameter of 47 feet at the base to 9 feet at the summit. It incloses a winding staircase, and is garlanded with inscriptions from the Koran. Modern Delhi is noted for its broad main streets, the chief being the Chandni Chauk, or Silver

Street, with its high clock-tower, and the institute and museum. Delhi having been selected to supersede Calcutta as capital of India, a district to the south known as Raisina, between the Jumna and the southerly continuation of the ridge, was set apart in 1913 for the new city, which was planned by Sir Edwin Lutyens and Mr Herbert Baker, with Government House, secretariats, legislative chambers, public offices, museums, colleges, cathedrals, parks, courts, &c. The Delhi College, once a famous oriental school, has been abolished, government having withdrawn the collegiate staff of teachers to concentrate the grant upon the central institution at Lahore; but a new university was founded in 1922. Delhi has a large trade in wheat and other produce, and its bazaars are noted for gold and silver work, precious stones, shawls, and costly fabrics. It is a great banking centre. Across the river is the ruined fort of Salimgarh. Pop. (1891) 192,579; (1901) 208,385; (1911) 232,837; (1921) 304,420, more than half Hindus.

The name Dilli or Dillipur first appears in the 1st century B.C. and is connected with the famous iron pillar of Raja Dhava, a solid shaft of metal, set up in the 3d or 4th century, which is 16 inches in diameter, and 50 feet long, and which is so firmly planted that only half of it is above ground. This indisputable relic bears a Sanskrit inscription, in which the name of the city is mentioned. Delhi was the capital of the Afghan or Pathan, and afterwards of the Mogul, empire. It was taken by a British army under Lord Lake, 8th September 1803, and has ever since—if we except the brief period when it was held by the mutineers in 1857—continued under British rule. In our own time Delhi has been rendered memorable by the events of 1857. The march on the city of the mutineers from Meerut; the terrible 11th of May; the explosion of the powder-magazine by Willoughby and his heroic band; the assault, when the city was won (20th September) gate by gate and quarter by quarter—a success saddened by the death of the gallant Nicholson; the subsequent daring capture of the king of Delhi by Hodson of Hodson's Horse; and the capture and shooting of his miscreant sons by the same officer, are memorable events in Indian history. A memorial to Willoughby was erected by government in 1888. In 1877 Delhi was the scene of the Durbar at which Queen Victoria was proclaimed Empress of India; in 1903 of the Durbar to celebrate the accession of Edward VII., and in 1911 King George and Queen Mary attended the coronation Durbar there. Delhi is now the most Europeanised of all the cities in the interior. An earthquake did much damage in 1905. See H. C. Fanshawe, *Delhi Past and Present* (1902).

**DELHI, PROVINCE OF.**—The province of Delhi forms a small enclave administered by a chief commissioner. Its area is 557 square miles and population about 498,000, including the city of Delhi. The old district of Delhi has been broken up. Those portions which are not included in the enclave have been absorbed in the districts of Rohtak and Gurgaon. Those two districts and Hissar, Karnal, Ambala, and Simla, which, with Delhi, formed the division of Delhi, have been formed into a new division called the Ambala Division (Punjab). A small part of the district of Meerut (U.P.) has been included in the Delhi Province.

**Delibes, LÉON**, a French composer, born in 1836 at St Germain du Val, in the Sarthe, entered the Paris Conservatoire in 1848, and in 1855 produced an operetta, *Deux Sacs de Charbon*. At the Grand Opéra, where he became second director in 1865, his music for the ballet *La Source* (1866) met with great success, and his ballet-music for *Coppélia* (1870), his finest work, secured his

position as a composer. He wrote music for a third ballet and for three comic operas, one of which, *Le Roi l'a dit* (1873), became very popular. In 1880 Delibes was appointed professor in the Conservatoire. He died 16th January 1891.

**Delilah** (signifying, according to Bertheau, 'the delicate'; according to Ewald, 'the traitress'), the Philistine woman who betrayed Samson (q.v.).

**Delille, JACQUES**, a writer extravagantly overrated in his lifetime, was born near Aigues-Perse in Auvergne, on June 22, 1738. He was an illegitimate child, and was brought up by charity. Educated at the Collège de Lisieux in Paris, he distinguished himself as a scholar, and obtained a professorship in Amiens. His verse translation of the *Georgics*, published in 1769, had an extraordinary vogue, and was extolled far beyond its merits by Voltaire and other critics. Its author was made an academicien in 1774, and, after holding a canonry at Moissac, was presented by the Comte d'Artois with the abbacy of Saint-Severin, the income of which amounted to 30,000 livres a year. *Les Jardins*, a didactic poem which Delille published in 1782, found a vast body of readers, and was generally accepted as a masterpiece. The outbreak of the Revolution compelling Delille to leave France, he travelled in Switzerland and Germany, and then removed to London, where he occupied himself for eighteen months in translating the *Paradise Lost*. After his return to France in 1802, he produced a translation of the *Æneid* (1804) and several didactic and descriptive works in verse—*L'Imagination* (1806), *Les Trois Règnes* (1809), and *La Conversation* (1812). He became blind in his old age, and died on May 1, 1813. During his life he was not only regarded by his countrymen as the greatest French poet of the day, but was even declared to be the equal of Virgil and Homer. His fame, however, suffered a rapid eclipse, and his lack of poetic genius is now generally admitted. He was merely a fluent versifier, whose knack of turning out ingenious paraphrases exactly suited the taste of his contemporaries. See Sainte-Beuve's *Portraits Littéraires*, vol. ii.

**Deliquescence** is the term applied to the property which certain substances have of absorbing moisture from the air, and becoming damp, and even running into liquid. Caustic potash, and the chlorides of calcium and magnesium, are examples of substances which undergo this change.

**Delirium** belongs essentially to the group of the confusional or toxic insanities, although the term is generally restricted to the mental disturbances accompanying acute febrile conditions. The toxins which cause its symptoms may be of various kinds—e.g. (1) The infective organisms of various fevers, pneumonia, or acute rheumatism; (2) the toxins produced within the system as the result of metabolic disorders, excess or diminution of the secretion of certain endocrine glands, sunstroke, diseases of such excreting organs as the kidneys, or inanition from wasting diseases or starvation; (3) toxic substances voluntarily introduced into the system, such as alcohol.

The symptoms of delirium include disintegration of the normal mental processes, extending from slight disorders of consciousness to complete disorientation, muttering, delirium, and coma. In addition, illusions of the senses are common, the patients misinterpreting sounds, objects, and the identity of persons near them. In more severe cases hallucinations, both of sight and hearing, may occur, and these are usually accompanied by delusions of various kinds, but of an unformed and fleeting character.

As a rule the subjects of delirium are restless and sleepless, but other symptoms tend to vary greatly in the course of the attack. At times the patients may be violent and oblivious of their surroundings; at other times, though apparently self-restrained and responsive, they may yet be under the influence of delusions and hallucinations.

The symptoms of delirium are partly conditioned by the nervous constitution of the individual, and partly by the nature and virulence of the toxæmia.

**Delirium Tremens** is the term employed to denote one of the acute phases arising in the course of *Chronic Alcoholism* (q.v.). It may be precipitated, either by a period of excessive drinking, by severe shock of a mental or physical kind, or by acute illnesses, such as fever or pneumonia. It reveals itself at first by general uneasiness, restlessness, and sleeplessness. These initial symptoms usher in the delirium, always accompanied by constant muscular tremors. The delirium presents the main features of mental confusion, illusions, hallucinations and delusions, referred to in the preceding article, but it is more coloured by anxiety and the emotion of fear than other forms of delirium. An attack generally lasts about three days, but it may persist for six or seven days, and, so far as is at present known, there is no means of shortening its duration. The chief danger lies in the great risk of exhaustion to which the patients are liable. The only rational treatment consists in combating the tendency to exhaustion by means of sedatives, hypnotics, and the administration of such easily assimilable nutriment as the disordered digestive tract can absorb.

**De Lisle.** See LÉCONTE, ROUGET.

**Delitzsch,** a town of Prussian Saxony, on the Lösser, 12 miles N. of Leipzig by rail, with manufactures of cigars, straw, leather, ivory, and wooden goods; pop. 12,000.

**Delitzsch, FRANZ,** a learned theologian and Hebraist, born at Leipzig, 23d February 1813, studied theology and orientalia at the university there, and became professor of Theology at Rostock in 1846, whence he was called to Erlangen in 1850, and to Leipzig in 1867. Delitzsch's vast learning and exegetical sagacity combined to give him a foremost place among the more conservative German theologians, while his great personal influence over a generation of Leipzig students, and a long series of profoundly learned books, contributed enormously to extend a sound knowledge of Old Testament exegesis not only in Germany, but in England and America. His earliest works were in the field of the post-biblical Jewish literature, followed by his commentaries. Later works are his *System der biblischen Psychologie* (1855), *System der christ. Apologetik* (1869), *Jesus und Hillel* (1867), *Jüd. Handwerkerleben zur Zeit Jesu* (1868). His commentary on Genesis (1887) made large concessions to the critical theory of the Pentateuch. He died 3d March 1890.—His son, **FRIEDRICH DELITZSCH** (1850–1922), made a great reputation as an Assyriologist by his *Assyr. Studien* (1874), his translation of George Smith's *Chaldean Account of Genesis* (1876), *Wo lag das Paradies?* (1881), his *Assyr. Wörterbuch* (1887 et seq.), his *Assyrische Grammatik* (1903), and his *Babel und Bibel* (1904).

**Delius, FREDERICK,** born in 1863 of German parents at Bradford in Yorkshire, forsook a business career to become an orange planter in Florida, and there he gave his leisure to musical studies, continued after some years at the Leipzig conservatorium. From 1890 he lived in Paris or elsewhere in France. A remarkable composer, he belongs to no school. Among his works are a *Légende* for violin and orchestra (1890); a fantasia

overture *Over the Hills and Far Away*; several operas (*Konga*, *Village Romeo and Juliet*, *Fennimore and Gerda*, &c.); concertos; a *Requiem*; settings of passages from Whitman and Nietzsche; and *Brigg Fair* and other symphonic poems. See a book by P. Heseltine (1923).

**Delius, NIKOLAUS,** a distinguished German Shakespearean critic, was born at Bremen, 19th September 1813, and studied philology at Bonn and Berlin, and in England and France. He finally settled in 1846 at Bonn, where he died 18th November 1888. His early lectures were on Sanskrit and the Romance tongues, but he afterwards devoted himself to the English language and literature, and published several works on Shakespeare. His edition of Shakespeare (Elberfeld, 7 vols. 1854–61) is an acknowledged masterpiece, its notes a marvel of terse sagacity.

**Delivery.** See DEED, SALE OF GOODS.

**Della Cruscan School.** About the year 1785 a number of English residents at Florence endeavoured to amuse their lagging hours by writing verses, which they published under the title of *The Florence Miscellany*. The insipidity, affectation, and fantastic silliness of these productions transcend belief; yet such was the poetic poverty of the time, that they soon found a crowd of admirers and imitators. Taking the name of a Florentine Academy (q.v.), the Della Cruscan now began to print their precious lucubrations in England, chiefly in two daily newspapers called the *World* and the *Oracle*. 'While the epidemic malady was spreading from fool to fool,' as Gifford pungently says, one of the brotherhood, a Mr Robert Merry, came over from Florence, and 'immediately announced himself by a sonnet to Love.' It was answered by one, 'Anna Matilda' (Mrs Cowley), who (as was the custom) praised it immoderately in language even more absurd than Merry's own. The fever now turned to a frenzy: Laura Maria, Carlos, Orlando, Adelaide, and a thousand other nameless names, caught the infection; and from one end of the kingdom to the other all was nonsense and Della Crusca. But retribution followed, for Nemesis watches the course of poetry as sharply as that of politics. In 1794 Gifford produced his *Baviad*, and in 1796 his *Mæviad*. Rarely has literature witnessed such a scalping. It completely killed the school, and, indeed, it is only in these two poems that the memory of most of the unhappy Della Cruscan songsters has been preserved—an immortality which may be compared with that conferred by the *Newgate Calendar*.

**Dellys,** a port of Algeria, 50 miles E. of Algiers, with a French garrison; pop. 14,000.

**Delmenhorst,** a town of Germany, in Oldenburg, 8 miles W. of Bremen, has woollen, jute, and linoleum manufactures; pop. 20,000.

**De Lolme, JOHN LOUIS** (1740–1806), born at Geneva, was an advocate there, but about 1769 came to England, where, in spite of his literary activity, he lived for several years in great poverty, always in debt and repeatedly in prison. Inheriting a small property, he returned to Switzerland in 1775. His principal work is *The Constitution of England; or an Account of the English Government; in which it is compared both with the Republican Form of Government and the other Monarchies of Europe*, first published in French at Amsterdam in 1771; the English translation, by another hand apparently, did not appear till 1775. The work, which flattered England, threw no new light on the subject, long enjoyed a high reputation, and reached a tenth edition (with Life, 1853). Its author was called by Isaac D'Israeli 'the English Montesquieu.' In 1772 he published anony-

mously in English *A Parallel between the English Government and the former Government of Sweden*: ten years later, his *History of the Flagellants*; and in 1796 *Strictures on the Union of Scotland with England*.

**Deloney**, THOMAS (circa 1550–1600), silk-weaver, balladist, pamphleteer, and writer of fiction, had produced some of his work by 1586. He has been credited with 'The Blind Beggar of Bednall Green,' and other well-known ballads, printed in the *Garden of Goodwill*. His *Jack of Newbury*, *Thomas of Reading*, and *Gentle Craft*, with their lively dialogue and characterisation, are not far from the later novel. See F. O. Mann's edition of Deloney (1911), and a book by A. Chevalley (Paris, 1926).

**Delorme**, MARION, daughter of an official in Champagne, was born 3d October 1613, and came at an early period of her life to Paris, where her great beauty and brilliant wit soon gathered a group of wealthy and high-born lovers round her. Even the great Cardinal Richelieu was not insensible to her charms, and revenged himself for her contempt by causing her to be separated from the ill-fated young Cinq-Mars, her love for whom was the one ennobling passion of her life. Among her lovers were, in succession, the Duke of Buckingham, Saint-Evremond, the Duc de Brissac, the Chevalier de Grammont, and Emeri, the Superintendent of Finance. During the first disturbances of the *Frondeurs*, her house was the rallying-point of the chiefs of that party, and in consequence Mazarin was about to fling her into prison, when she suddenly died in 1650. A curious tradition sprang up in France during the next century, to the effect that Marion had not died, but escaped to London; that she had married an English lord, had then returned to Paris, and married first a robber-chief, next a procurator of finance, and, finally, that she died in 1706; or, according to another account, even so late as 1741. Her story was treated by Victor Hugo in a drama; by Alfred de Vigny in his romance *Cinq Mars*. See Eugène de Mircourt's imaginative *Confessions de Marion Delorme* (3 vols. 1851).

**Delos** (called also in ancient times *Asteria*, *Ortygia*), an island in the Grecian Archipelago, the smallest of the Cyclades, is situated between the islands Rhenea and Mykonos. According to the mythological account it was at first a floating island, but was fixed to the bottom by Zeus in order that it might become a safe abode to Leto for the birth of Apollo and Artemis. Its earliest historical inhabitants were Ionians, and it appears to have been the centre of a great periodical festival held in honour of Apollo, both on the mainland and in the islands. In 426 B.C. Delos was purified by the Athenians, all the tombs were removed from it, and it was declared pollution for any birth or death to take place on it. Four years after they expelled the Delians from the island. After 146 B.C., when Corinth fell, Delos became the seat of extensive commerce. Its sacred associations, its great festival, its excellent harbour, and its situation in the direct route from southern Europe to the coasts of Asia, all combined to render it a port highly favoured by merchants. So great was the traffic of Delos that it is said 10,000 slaves changed hands here in a single day. After flourishing for a considerable time, it was devastated in the Mithridatic war (87 B.C.), and from this calamity it never recovered. Little more than 1 sq. m. in area, it was noted for its palm-trees, and also for its brass, and the brazen vessels which it manufactured. The town of Delos, which stood at the foot of Mount Cynthus, a granite crag 347 feet high, is a mass of ruins, in which frescoes, mosaic floors, &c. help us to reconstruct its domestic

life. The remains of the great temple of Apollo, and of the colossal statue raised in his honour, may be distinctly traced. Since 1877 extensive investigations have been prosecuted in its ruins by Homolle and other French archaeologists. See Homolle and Holleaux, *Explorations archéologiques de Délos* (Ecole française d'Athènes, 1909 *et seq.*).

**Delphi**, an ancient Greek town in Phocis, celebrated chiefly for its famous oracle of Apollo, was situated about 8 miles N. of an indentation in the northern shore of the Gulf of Corinth, at the southern base of Parnassus. Homer invariably speaks of it as Pytho. It stood in the centre of a district renowned for its classical associations. Occupying the vale of the Pleistos, it was seated in a semicircle like the area of a grand natural theatre, backed towards the north by two lateral spurs of Parnassus. From the cliffs springs the famous fountain of Castalia. The earliest inhabitants of Delphi are said to have come from Lycorea, a town upon one of the slopes of Parnassus, the inhabitants of which are supposed to have been Dorians. From the Delphian nobles were at first taken the chief magistrates and the priests of the temple, while the Pythia or priestess who delivered the oracle, at first always a young maiden, but latterly always a woman not younger than fifty, was usually selected from some family of poor country-people. In the south-west of the temple was a small chamber, under which was led the water of another sacred spring, Cassotis, now dry, whence was said to arise a cold, intoxicating vapour; and the Pythia having breathed this, sat down upon the tripod or three-legged stool, and thence delivered the oracle, which, if not pronounced at first in hexameters, was handed over to a poet, employed for the purpose, who converted it into that form of verse. As the celebrity of the Delphic oracle increased, Delphi became a town of great wealth and importance, famous not only in Hellas, but also among the neighbouring nations. Here the Pythian games were held, and it was one of the two places of meeting of the Amphictyonic Council (q.v.). The fourth temple, though the first built of stone, was destroyed by fire in 548 B.C., and during the succeeding century a fifth was built by the Alcæonidæ, of limestone fronted with Parian marble. This temple was destroyed in the 4th century, perhaps by an earthquake, and that described by Pausanias was then built, and adorned with statuary by Praxias and Androsthenes. In 480 B.C. Xerxes sent a portion of his army to plunder the temple; but as they climbed the rugged path that led to the shrine a peal of thunder broke overhead, and two huge crags tumbling from the heights crushed many of the Persians to death, while their comrades, struck with terror, turned and fled. It was plundered by the Phocians during the Sacred War, and was attacked by the Gauls in 279 B.C., who were said to have been repulsed like the Persians by portents. The splendour of Delphi subsequently excited the rapacity of many conquerors, and suffered severely by their attacks. Nero carried off from it 500 bronze statues; Constantine also removed many of its works of art to his own capital. In the time of Pliny the number of statues in Delphi was not less than 3000, and within the temple for a long time stood a golden statue of Apollo. The site, carefully excavated and explored by French archaeologists since 1892, shows a walled temenos, up which the Sacred Way winds past the foundations of the buildings and monuments seen by Pausanias to the terrace on which are the somewhat scanty remains of the temple of Apollo, and the sanctuary of Apollo's predecessor, Ge. A very well-preserved theatre occupies the north-west corner. The supposed Omphalos, or 'navel of the world,' was dis-

covered in 1915. The treasury of the Athenians has yielded important inscriptions—hymns to Apollo with musical notation.

See A. Mommsen, *Delphika* (1878), Bouché-Leclercq, *Histoire de la Divination dans l'Antiquité* (1880), Frazer, *Pausanias* (1898), Homolle, *Fouilles de Delphes* (1902 et seq.), Farnell, *Cults of the Greek States*, Bourguet, *Les Ruines de Delphes* (1914), T. Dempsey, *Delphic Oracle* (1918), Poulsen, *Delphi* (trans. 1920).

**Delphinapterus.** See BELUGA.

**Delphin Classics**, an edition of the Greek and Roman classics (64 quarto volumes, 1674–1730) prepared by thirty-nine of the best scholars of the time, under the editorship, originally, of Bossuet and Huet, tutors to the dauphin, son of Louis XIV. The title-pages bear the words, 'In usum Serenissimi Delphini,' hence the name. Editions in octavo of particular authors, as Virgil and Horace, were often reprinted in England. The Delphin Classics are now esteemed of little value.

**Delphinidae.** See DOLPHIN.

**Delphinium.** See LARKSPUR.

**Delta** is the alluvial deposit formed at the mouth of a river from the deposition of the particles which it has held in suspension or rolled forward upon its bed. The term was originally applied to the tract of land thus formed (mainly within historical times) by the Nile, which, being inclosed by two main branches and the sea, has the form of the Greek letter Δ, delta. The formation of deltas depends more upon the absence of opposing currents at the mouth of the river than upon the quantity of sediment held in suspension when it reaches the sea. Deltas are consequently of almost invariable occurrence in inland lakes, in the quiet estuaries of the nearly tideless Mediterranean, and in the sheltered bays and gulfs of other seas. When, on the other hand, there are strong ebb-tides, or powerful oceanic currents, the detritus is carried off into the sea.

**Deluc**, JEAN ANDRÉ, geologist and meteorologist, was born at Geneva in 1727. Settling in England in 1773, he was appointed reader to Queen Charlotte, a post which he retained till his death at Windsor, 7th November 1817. He was author of thirteen works.

**Deluge** (from the Latin *diluvium*, 'flood,' through the French). There is a widespread tradition amongst a large number of races that in primitive times the earth was devastated by a great deluge. The best-known embodiments of this tradition are found in (a) the Old Testament story of the flood (Gen. vi. 5–ix. 19); (b) the Babylonian account which exists in two forms—i.e. in the narrative of Berossus and the flood-tablets; (c) the Indian deluge story preserved in the *Satapatha Brahmana* (Muir, *Sanskrit Texts*, i. 196–201); (d) the Zoroastrian myth preserved in the Zend-Avesta (*Vendidad*, ii. 46 ff.); (e) the Phrygian story.

The most important of these records is undoubtedly the Babylonian, especially in the form preserved in the flood-tablets, since it appears to be quite certain that this was the source from which the Genesis narrative was derived. The story is as follows: The gods, at the instigation of Bel, determine to destroy the world owing to its sin. One of the gods, Ea, selects a man named Par-napisti, and warns him of the approaching doom, telling him to build a ship to save his own life and the 'seeds of life of all kinds.' Into this ship, the dimensions of which are specified in the tablets, Par-napisti collects his family, his servants, his cattle, and 'wild beasts of the field.' When they have safely entered the ship, and the door is barred, the deluge begins. All the elemental

forces of nature are unloosed; rain falls in torrents, and the earth is covered with dense darkness. The storm rages incessantly for six days and nights, till the whole land becomes a sea. On the seventh day the rain abates, a calm ensues, and the ship grounds on the top of Mount Nisir. After an interval of seven days Par-napisti sends out one after another—a dove, a swallow, and a raven. The two former return, but the raven never comes back. This is regarded as an indication that the deluge is over. Appropriate sacrifices are offered, and the refugees open the door of the ship, and return to the earth. The remarkable coincidences between the narrative and the story in Genesis are too striking to be merely accidental.

The Genesis narrative itself in its present form is composite in its origin. Part of the story is derived from the Priestly Code (5th century B.C.), and the remainder from the Yahwistic document, 900–750 B.C. (See BIBLICAL CRITICISM, PENTATEUCH.) It is the weaving together of these two documents that accounts for the discrepancies in the story. For instance, in Gen. vi. 19 we read, 'And of every living thing, two of every sort shalt thou bring into the ark;' but in Gen. vii. 2 the injunction runs, 'Of every clean beast thou shalt take to thee seven and seven.' In Gen. vii. 12 the duration of the deluge is given as forty days, but in vii. 24 the statement is made that 'the waters prevailed upon the earth an hundred and fifty days.'

It is no longer possible to accept the account of a primitive universal deluge as historical fact. There are too many difficulties in the supposition that the whole face of the earth was once covered with a flood, and only a few lives were saved by means of an ark. But, on the other hand, it does not seem possible that these stories are altogether the products of the imagination. There are three modern explanations: (1) The flood stories are a nature-myth—portraying the departure of winter, the rainy season, and the return of spring; (2) they are a variant of the creation-myth, and represent not the destruction of a world which was already in existence, but the first emergence of the earth out of the waters (see CREATION); (3) the most probable view is that they perpetuate the tradition of some local disaster—e.g. a great flood, the devastation caused by a tidal wave, the havoc wrought by an earthquake, an abnormal overflow of a river like the Euphrates or the Nile. Professor Prestwich held that the flood was probably on a more extensive scale. He maintained, on geological grounds, that long after the appearance of palæolithic man there was a subsidence of the crust of the earth in western Europe and north-west Africa, and a great inundation of the sea, and that this event might have been the basis of the deluge narrative. The weak point in the theory is that the flood-story does not emanate from the districts indicated. See Prestwich, *On certain Phenomena belonging to the Close of the last Geological Period*; Nöldeke, *Der Mythos von der Sündfluth*; article on 'Flood,' by Woods, in *Hastings's Bible Dictionary*; article by Zimmermann and Cheyne on 'Deluge' in *Encyclopædia Biblica*.

**De Lunatico Inquirendo.** See INSANITY.

**Delundung**, a kind of Civet (q.v.).

**Delusion.** See HALLUCINATIONS, ILLUSIONS.

**Delvino**, a town of Albania, 45 miles WNW. of Janina, with a trade in oil and fruit. Pop. 6000.

**Dem'ades**, an Athenian orator, who, a bitter enemy to Demosthenes, promoted eagerly the Macedonian interest, and was sent away in safety by Philip when taken prisoner at Cheronea (338), but had not the grace to be honest even in his anti-patriotism, and was put to death for his treachery by Antipater in 318.

**Demand and Supply.** In Political Economy demand has reference to the quantity of goods asked for in the market, and supply has reference to the quantity of goods offered. The laws of demand and supply may be thus stated: when the demand exceeds the supply, competition grows stronger among the buyers, and prices rise, and when the demand falls short of the supply, competition grows stronger among the sellers, and prices fall; or thus, falling prices tend to lessen the supply and increase the demand, while rising prices tend to increase the supply and lessen the demand. A rise in prices tends to encourage production, while a fall in prices tends to discourage it. Conversely, consumption is promoted by falling and lessened by rising prices. The result is that demand and supply continually tend to equilibrium. Under such a system it is assumed that buyers and sellers or producers and consumers are free to fix their own prices. In other words, the laws of supply and demand prevail under a system of free competition.

**Demavend,** MOUNT, an extinct volcano of Persia, forming the loftiest peak of the Elburz Chain, which separates the low shores of the Caspian Sea from the high tableland of Persia. The height is about 18,600 feet. It supplies pumice and sulphur. Sulphur vapours still rise from it.

**Dembea,** LAKE. See TZANA.

**Dembinski,** HENRY, a Polish general, was born near Cracow, 16th January 1791, entered the Polish army in 1809, and fought under Napoleon against Russia and at Leipzig. In the Polish revolution of 1830 he so distinguished himself that for a short time he was commander-in-chief of the national army; in 1833 he entered the service of Mehemet Ali. On the outbreak of the Hungarian insurrection, Kossuth appointed him commander-in-chief of the Hungarian army. He drew up a plan of the campaign, but was hampered by the jealousy of Górgéi; and after the defeat of Kopolna (February 26-28, 1849) he was forced to resign his command. At Kossuth's resignation Dembinski fled to Turkey, but in 1850 he returned to France, and died at Paris, 13th June 1864. He was author of *Mémoires* (1833) and four other works.

**Deme** (Gr. *dēmos*), a subdivision of ancient Attica and of modern Greece. The *dēmoi* were townships or hundreds, subdivisions of the *phulai*, and were equivalent to the Dorian *kōmai*, Lat. *pagi*; in the time of Herodotus they were 100 in number (10 in each *phulē*), afterwards 170; their origin was commonly referred to Theseus. The word *dēmos* early came to be applied to the commons, and survives significantly in our *democracy* and *demagogue*.

**Demembré,** or DISMEMBERED, a heraldic term to signify that the members of an animal are cut from its body.

**Dementia.** See INSANITY.

**Demerara,** one of the three counties of British Guiana (q.v.), between the Abari and the Essequibo, takes its name from the Demerara River, which rises in the Maccari Mountains, in about 4° 40' N. lat., and after a northerly course of about 200 miles, enters

the Atlantic at Georgetown. The mouth is 1½ mile wide, but is obstructed by a bar at low tides; the stream is navigable for 90 miles, and has many flourishing settlements on its banks.

**Demesne** was that portion of the lands of a Manor (q.v.) which the lord of the manor reserved for his immediate use and occupation.

**Demeter,** the Ceres of the Romans, was one of the chief divinities of the Greeks. She was the earth-goddess, the patroness of agriculture and of fruits, and her name itself most probably meant Mother-Earth (*gē-mētēr*). She was the daughter of Cronus and Rhea, and was by Zeus the mother of Persephone (Proserpine), who was carried off while gathering flowers in the Nysian plain, in Asia, by Aidoneus (Pluto), the god of the nether world. Demeter wandered for some time in search of her daughter, and when she learned whither she had been carried, quitted Olympus in anger, and dwelt on earth among men, as at Eleusis, bringing blessings in her train. At length Zeus sent Hermes to bring back Persephone, and both mother and daughter then returned to Olympus, whereupon the earth again brought forth her fruits. As Persephone had eaten a part of a pomegranate in the under world, she was obliged to spend one-third of the year in the gloomy kingdom of her husband, returning to her mother the remainder of the year. Many later additions were made to this beautiful story, in which it is not difficult to see an allegorisation of the burial and revival of the seed-corn within the ground. The Latin poets made Enna, in Sicily, the scene of Proserpine's rape. The Eleusinia were held every year at Athens, in honour of Demeter and her daughter, as well as the Thesmophoria, both there and in other parts of Greece. The Athenians revered her especially as the originator of civilised life and its arts, which all rest on the basis of agriculture. In art Demeter is represented fully clothed, a garland of corn-ears round her head, in her hand a sceptre, corn-ears, or a poppy, and sometimes with a torch and mystic basket. The worship of Demeter, known as Ceres, reached Rome from Sicily, and ultimately acquired great political importance. Her chief festival there was the Cerealia. See CERES.

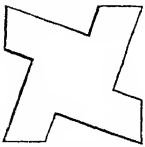
**Demetrius,** or DMITRI. See RUSSIA.

**Demetrius Phalereus,** so named from the Attic demos of Phalerus, a seaport of Athens, where he was born about 345 B.C., was distinguished as an orator and politician. Though descended from a family of neither rank nor property, by his abilities and energy he rose to the highest honours at Athens. He was educated along with Menander in the school of Theophrastus, entered upon public life about 325, and soon made himself famous by his oratory. In 317 he was intrusted by Cassander with the government of Athens, and discharged its duties for ten years with such general satisfaction that the grateful Athenians heaped all kinds of honours upon him, and erected no fewer than 360 statues to his honour. During the later period of his administration he seems to have given himself up to dissipation; and when Demetrius Poliorcetes, Cassander's enemy, approached Athens with a besieging army in 307, Demetrius, having lost the sympathies and co-operation of the Athenians, was obliged to flee. All his statues were demolished except one. He retired first to Thebes, but afterwards found refuge in the court of Ptolemy Lagi, at Alexandria, where he lived for many years, devoting himself to literary pursuits. On the death of his protector, Demetrius was expelled from the court of Egypt, retreated to Busiris in Upper Egypt, and died there from the bite of an asp in 283. Demetrius was the last of the Attic orators worthy of the name. His style was graceful, insinuating, and elegant; bearing, however, in its luxuriousness and tendency to effeminacy, the marks of a declining oratory. The list of his works (fifty in number) given by Diogenes Laërtius shows him to have been a man of most extensive acquirements.



Dismembered.

**Demi-bastion**, in Fortification, differs from a Bastion (q.v.) in having only one flank instead of two and no curtain.



Demi-bastion.

**Demidoff**, a Russian family distinguished for wealth and beneficence, descended from Nikita Demidoff, originally a blacksmith at Tula, who in the time of Peter the Great became famous as a manufacturer of arms, and amassed an immense fortune.

Of the numerous princes of the line, perhaps the most famous is Prince Anatol (1813-70), born at Moscow, but educated in France. He was always remarkable for his enthusiasm in letters and in the sciences; his principal work being his *Travels in South-east Europe* (4 vols. Paris, 1839-40). It contains very valuable scientific observations, and is magnificently illustrated.

**Demi-lion**, **DEMI-ROSE**, **DEMI-FLEUR DE LIS**, &c., in Heraldry, means, when an animal is spoken of, the upper half; and with an inanimate object, the dexter half parted per pale.

**Demi-lune**, in Fortification, is the name formerly given to the work now called a ravelin. See FORTIFICATION.

**Demi-monde** (Fr. *demi*, 'half,' and *monde*, 'world,' or 'society'), a term that came into vogue from the title of a play by the younger Dumas (1855), as applied to a class of women in large towns, and especially Paris, whose disregard for the proprieties prevents their being more than half recognised by society. The word covers women of all degrees of disrespectability, provided only they respect the elegancies of life.—*Demi-rep* is a similar 18th-century word, compounded clumsily enough, for a woman of more than doubtful reputation.

**Demir-Hissar** ('iron-castle'), a town of Greek Macedonia, on a tributary of the Struma, 45 miles N.E. of Salonika; pop. 8000.

**Demise**. See LEASE.

**Demisemiquaver**, half a semiquaver, or the 32d part of a semibreve. See MUSIC.

**Demiurge** (from Gr. *demos*, 'people,' and *ergon*, 'a work,' hence a 'handicraftsman') was the name given in the cosmogony of the Gnostics to the creator or former of the world of sense. He was conceived as the archon or chief of the lowest order of the spirits or sons of the pleroma; mingling with chaos, he formed in it a corporeal animated world. He created man, but could impart to him only his own weak principle, the *psychē* or sensuous soul; therefore the highest, the really good God, added the divine rational soul, or *pneuma*. But the power of evil in the material body, and the hostile influence of the merely sensuous demiurge, prevented the development of that higher element. The demiurge holding himself to be the highest God, could not bring his creatures to the knowledge of the true Godhead; as the Jehovah of the Jews, he gave them the imperfect law of Moses, which promised merely a sensuous happiness, and even that not attainable; and against the spirits of the *hylē*, or world of matter, he sent only a psychical, and therefore powerless Messiah, the man Jesus. See Gnosticism.

**Demmin**, an ancient town of Prussia, on the Peene, which is navigable for small vessels to this point, 29 miles S. of Stralsund by rail. It has manufactures of machinery, bells, ironwares, sugar, lime, and bricks, and a trade in grain, wool, coal, and iron. Pop. 13,000.

**Democracy** ('rule of the people,' from Gr. *demos*, 'the people,' and *kratō*, 'I rule') is a form of government in which power rests with the body of

the citizens. It is opposed to monarchy, the rule of one; to aristocracy, the rule of the 'best' or nobles; and to oligarchy, the rule of the few. It is government of the people by the people, and for the people, as opposed to government by a single chief or a dominant class.

Democracy was a great force in the ancient world, but as then prevalent it had certain characteristics, which very clearly distinguish it from its modern forms. In antiquity the democracy was associated with the city. There was no system of representation by which the people spread over extensive territories could send deputies to speak and act for them in a common parliament. In the ancient democracies, the people were, in the original sense of the word, citizens, who personally appeared and spoke and voted in the assemblies. Another great feature in the ancient world was the existence of a great number of slaves who had no political and few civil rights—i.e. a very large and important part of the population were not reckoned among the citizens at all. Hence it will be seen that the 'people' in the ancient democracy was limited in number, consisting of a city population, and excluding the labouring class or slaves. Thus constituted, the ancient democracy had a most interesting history. It attained to its highest and finest development in the Athens of Pericles before the outbreak of the Peloponnesian war. Besides being a conflict for the headship of Greece between Athens and Sparta, that war was a struggle for supremacy in the Hellenic world between the democratic and aristocratic principles, of which these cities were respectively the representatives and champions. It resulted in the overthrow of the Athenian democracy, but the struggle of the people against the rich and privileged classes continued in the Greek cities as long as they retained their independence. At Rome, too, the history of the city is to a large degree the record of popular struggle against the privileged and wealthy classes. Quiescent for about two hundred years after the reforms of the 4th century B.C., it broke out afresh at the time of the Gracchi, and ended with the triumph of a great chief of the democracy, Julius Cæsar. But this triumph meant the end of the republic, and the permanent rule of a single head, as consolidated under Augustus.

Among the Germanic tribes which overthrew the Roman empire, as among most peoples at a similar stage of development, the general body of freemen had considerable power. But the term democracy properly refers to communities in a comparatively advanced state of political evolution, and it would be an anachronism to apply the theories and problems connected with the word to nations still in the tribal stage.

With the growth of the republics of medieval Italy, and of the cities of Flanders and Germany, began a democratic movement similar in some respects to that of ancient times. It was similar, inasmuch as it was associated with city life, but it differed from the ancient democracy, in so far as slavery ceased to be an important factor, and the development of the medieval cities was controlled or affected by the great feudal states which had now risen. As the great modern states have become consolidated, the cities which played so important a part in medieval life have been absorbed in them. The process has been a slow one, for Venice was an independent republic till the close of the 18th century. Hamburg was fully incorporated in the German empire only in 1888. In the city life which thus came to a close, the struggle between rich and poor, between privileged classes and the people, was more or less present.

The modern democracy differs essentially from the ancient and medieval forms. The people no

longer consist merely of a body of burgesses limited in number, but of millions of men inhabiting extensive countries. A government on such a basis is rendered possible through the representative system, by which the vast electorate choose a convenient number of deputies, on whom the legislative and other functions are conferred. Another important point of difference is the abolition of slavery, serfdom, and the other unfree conditions which formerly prevailed. Freedom of conscience, freedom in the choice of one's residence and profession, have been more or less fully realised. We must also note the progress towards the abolition of all privileged classes, and towards equality before the law.

The modern democracy, as we now see it, is the result of a gradual process of development continued through centuries amidst the severest struggles. Such struggle will appear to be inevitable, when we consider that democracies have grown up in large states in which absolutism formerly prevailed, and in which the military system prevails even yet. Among the decisive steps in the modern struggle of the people against the old classes and systems should be noted the long contest of the Dutch against Spain, the great English revolutions of 1642 and 1688, the war of American Independence in 1776, the great French Revolution of 1789, and the revolutionary periods of 1830, 1848, and 1906-20. The English revolutions of 1642 and 1688 established parliamentary rule in England, though on a narrow basis. Yet they had the important result of proving the *fitness* of a new type of government, which further became a model for similar institutions in other countries. The greatest event in the evolution of democracy till our own times was the French Revolution of 1789; though it failed for the time, it shook the old system to its foundations; it everywhere spread new ideas, and raised questions that could not again be set aside. The revolution of 1830 showed that the reactionary conditions prevalent after Waterloo had no claim to permanency. The revolutionary movements of 1848, which affected France, Italy, Austria, and Germany, were apparently a failure, yet they overthrew what remained of the Feudal system in western and central Europe. But the most significant thing connected with that period is the fact that only a few years afterwards governments which had been most active in suppressing the revolution found it expedient to adopt its cardinal principles. Consciousness of discrimination between the sexes and the economic dependence of the 'wage-slave' under the industrial system came later to have more weight; and in the revolutions of 1917-18 the miseries of war were a precipitating influence.

To England has been given the great historic mission of working out the methods on which the democracy has so far been realised. Her parliament, first constituted under Simon de Montfort and Edward I. in the 13th century, was, as we have seen, firmly established by the long contest with the Stuarts. After many centuries of experience, trial, and struggle, the English parliament became the mother of parliaments. England has not been the first, however, to bring democratic institutions to their fuller development. The Reform Bill of 1832 conferred the franchise on the middle classes; but it was not till the reforms of 1867 and 1885 that she approximated to universal male suffrage, which the act of 1918 left still unachieved. In the emancipation of women Britain lagged behind New Zealand, Australia, Scandinavia, Finland, and some American states. The British government is now substantially a democracy, modified so far by older forms, the monarchy and the House of Lords, plural voting, and economic inequalities. In many countries which adopted

parliamentary institutions, the power of the people was for long much more seriously curtailed; as in Germany, till 1918, by a sovereign claiming to be of divine right. The German emperor may be regarded as having wielded a power co-ordinate with that of the people, and resting on the army. The position of his chancellor did not depend on a parliamentary majority—he was the servant of the emperor; yet he found it expedient to have one.

As we have seen, the distinctive features of the modern democracy are the widest *personal freedom*, by which each man has the liberty and responsibility of shaping his own career; *equality* before the law; and political power in the form of universal suffrage, exercised through the representative system. With these have been associated universal education, and on the continent of Europe universal liability to military service. On the European continent it was imposed upon its peoples by the necessities of the struggle for existence, which the moral development of mankind has not yet been able so to regulate as to put an end to war. Anglo-Saxon countries have happily, except during the Great War, been in practice free from such necessities, whatever they may have been in theory. See CONSCRIPTION.

It is important to remember that the growth of the modern democracy has gone hand in hand with the general development of the most advanced nations of the world. The consolidation of the political power of the people is the result of far-reaching causes operating on a great scale throughout the history of modern nations. The growth of the democracy is intimately connected with the growth of every other factor in the social life. For example, the different stages in the rise of the democracy could be paralleled by the improvements in the art of printing. The development of the democracy has on the one hand created the demand for cheap literature and cheap newspapers, but it has also on the other hand depended on the supply of them. Further, the growth of the cheap newspaper and of cheap literature depends on the industrial development, on the improvement of our technical capacities and resources, on man's growing mastery over nature. To the production of the daily newspaper a thousand technical appliances are subsidiary. Steam and electricity are the great forces that move the vast mechanism on which society is now based. In fact the growth of the democracy is intimately connected with an industrial and technical development which has culminated in the railway, cheap postage, the electric telegraph, and the printing-press. The peculiar influence of the human voice has not been superseded, yet it is chiefly through the telegraph and the printing-press that the modern democracy obtains the education which the ancient democracies received in their popular assemblies and in the daily intercourse of the market-place.

Thus it will be seen that the democracy as we now have it is an outcome of the general historic movement of modern times, and that it is a fact which is not yet accomplished, but is still in process of making. What its ultimate results for good or evil may be, no man can predict. Scarcely any one, however, will deny that it has greatly raised the average level of intelligence and morality in modern nations. The life of the citizen from the day he enters the elementary school is a continual process of education, and it brings with it in abundant measure the discipline of responsibility. It carries with it also the safeguard of publicity. The public interests are protected by incessant watchfulness and public criticism. On the other hand, the drawbacks of democratic government are obvious enough. Such vast masses of electors are too much controlled by governments, caucuses, newspapers,

and special interests; real interests are concealed under party watchwords, and sacrificed to them. Popular passions are liable to upset the plans of experienced policy, and the demagogue or the newspaper boss too often ousts the true statesman. It may be added that in the administration of foreign affairs, the changefulness and publicity usually characteristic of the democracy place it at a disadvantage against the secrecy, continuity, and tenacity of a government like that of Russia in the days of the autocracy.

Much has been written on the merits and demerits, the advantages and disadvantages of the democracy. It really perhaps concerns us more to observe the fact that it is the inevitable outcome of the prevalent historic forces, that it has a great function in modern history, and that it is the duty of the citizen and statesman to do their duty under it, and to adapt it to the material, intellectual, and moral improvement of men.

See the articles GOVERNMENT, REPRESENTATION, SOCIALISM, WOMEN'S RIGHTS; De Tocqueville, *Democracy in America* (1832); Motley, *Historic Progress of American Democracy* (1869); Freeman, *Comparative Politics* (1873); Sir T. E. May, *Democracy in Europe* (1878); Sir H. S. Maine, *Popular Government* (1885); and books by Sir T. E. May (1878), Lecky, Lowell, Webb, Adams, Hobhouse, Ostrogorski, Bryce, Ramsay Macdonald.

**Democrats**, one of the names for a party in the United States, also called Republicans, who, as early as Washington's first administration, sought to limit the federal power, and to increase that of the states and of the people. About 1808 the title of Republicans as synonymous with Democrats disappeared. See REPUBLICANS. Electing Jefferson president in 1801, the Democrats remained in power till 1841, and the administration was in their hands also in 1845-49, in 1853-61, in 1885-89, in 1893-97, and in 1913-21. Democratic presidents have been Jefferson, Madison, Monroe, John Quincy Adams, Jackson, Van Buren, Polk, Pierce, Buchanan, Cleveland, Woodrow Wilson. For the history and principles of the Democratic party, including latterly the reform of the tariff, see UNITED STATES.

**Democritus**, an illustrious Greek philosopher, was born at Abdera, in Thrace, about 470 or 460 B.C. Of his life little is known. The statement that he was first inspired with a desire for philosophic knowledge by certain Magi and Chaldeans whom Xerxes had left at Abdera, on his Grecian expedition, is as untrustworthy as that which represents him as continually laughing at the follies of mankind. His extensive travels, however, through a great portion of the East, prove the reality of this desire, as does also his ceaseless industry in collecting the works of other philosophers. Democritus was by far the most learned thinker of his age. He had also a high reputation for moral worth. He appears to have left a strong impression of his disinterestedness, modesty, and simplicity on the mind of the community, for even Timon the scoffer, who spared no one else, praised him. The period of his death is uncertain. He lived, however, to a great age. Only a few fragments of his numerous physical, mathematical, ethical, and musical works are extant. These have been collected by Mullach (Berlin, 1843). Cicero praises his style, and Pyrrhon imitated it.

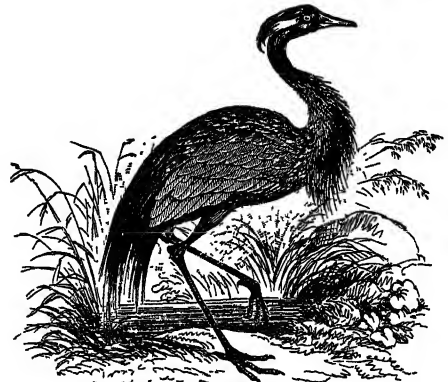
Democritus's system of philosophy is known as the *atomic system*, which is considered to have been founded by Leucippus. Its essence consists in the attempt to explain the different phenomena of nature—not like the earlier Ionic philosophers, by maintaining that the original characteristics of matter were *qualitative*, but that they were *quantitative*. He assumes, therefore, as the ultimate elementary ground of nature, an infinite

multitude of indivisible corporeal particles, *atoms* (see ATOM), and attributes to these a primary motion derived from no higher principle. This motion brings the atoms into contact with each other, and from the multitudinous combinations that they form, springs that vast and varying aggregate called *nature*, which is presented to our eyes. Democritus did not acknowledge the presence of *design* in nature, but he admitted that of *law*. 'The word *chance*,' he says, 'is only an expression of human ignorance.' He believed strictly in secondary or physical causes, but not in a primary immaterial cause. Life, consciousness, thought, were, according to him, derived from the finest atoms; those images of the sensuous phenomena surrounding us, which we call mental representations, were, according to him, only material impressions, caused by the more delicate atoms streaming through the pores of our organs. Democritus boldly applied his theory to the gods themselves, whom he affirmed to be aggregates of atoms, only mightier and more powerful than men. His ethical system, spite of the grossness of his metaphysics, is both pure and noble. Such fragments of his writings as we possess contain beautiful, vigorous, and true thoughts concerning veracity, justice, law, order, and the duties of rulers; while, in a spirit not alien to Christianity, he looks upon an inward peace of heart and conscience as the highest good. Epicurus (q.v.) and Lucretius (q.v.) developed his system.

**Demodex.** See ACARUS.

**Demogot**, JACQUES CLAUDE, a French *littérateur*, born 5th July 1808 at Paris, lectured at Beauvais, Rennes, Bordeaux, and Lyons, became in 1843 professor at the Lycée St Louis, and afterwards at the Sorbonne. Most of his books treat of the history of literature; the chief are *Les Lettres et les Hommes de Lettres au XIX<sup>e</sup> Siècle* (1856); *Histoire de la Littérature française* (1857), an admirable hand-book; *Tableau de la Littérature française au XVII<sup>e</sup> Siècle* (1859); and *Histoire des Littératures étrangères* (2 vols. 1880). His poems are little known. He died 9th January 1894.

**Demoiselle** (*Anthropoides*), a genus of birds in the crane family (Gruidæ), differing from the true cranes in having the head and neck quite feathered, and the beak no longer than the head. The Demoiselle (*A. virgo*) is about 3 feet in length



Demoiselle (*Anthropoides virgo*).

from the point of the bill to the tip of the tail, and the top of its head is about  $3\frac{1}{2}$  feet from the ground. It is remarkable, like its relatives, for elegance and symmetry of form, and grace of deportment. The feathers covering the upper part of the wing are much elongated, as in the cranes. The general

colour of its plumage is gray, but the sides of the head are adorned with two elegant white tufts, and the breast bears long blackish feathers. The demoiselle is an African and Asiatic bird, but visits Greece and other parts of the south of Europe. To the same genus belongs the beautiful Stanley Crane (*A. paradisaus*), a larger and taller bird found in the East Indies.

**Demoivre**, ABRAHAM, a distinguished mathematician, was born at Vitry, in Champagne, 26th May 1667. A Protestant, he fled to England in 1688, after the revocation of the Edict of Nantes, and there long supported himself by private tuition and public lecturing. The appearance of Newton's *Principia* incited him to increased devotion to mathematical studies, and at last he ranked among the leading mathematicians of his time. He was a member of the Royal Society of London, and of the Academies of Berlin and Paris. The *Philosophical Transactions* of London are enriched by many contributions from his pen; and he was so esteemed by the Royal Society that they judged him a fit person to assist in the decision of the famous contest between Newton and Leibniz for the merit of the invention of fluxions. He died in London, 27th November 1754. Among his published works are *Annuities upon Lives* (1725), *Miscellaneous Analytica de Seribus et Quadraturis* (1730); and *The Doctrine of Chances* (1718 and 1738), dedicated to Sir Isaac Newton. Demoivre's name is well known from its association with a useful trigonometrical formula—viz. that, where  $k$  is any real quantity,  $\cos k\theta + i\sin k\theta$  is always one value of  $(\cos \theta + i\sin \theta)^k$ .

**Demonetisation.** See BIMETALLISM.

**Demonology**, the doctrine that relates to demons, a body of spiritual beings inferior in rank to deities proper, but yet capable of influencing human affairs. The earlier and more widely-spread conception of the demon was merely that of a more or less powerful and intermediate agent between gods and men, at one time resolving himself into a kind of special guardian or patron-spirit, at another acting as the minister of the divine displeasure. The gradual differentiation between the beneficent and the malignant qualities of demons resulted in the division into good spirits or guardian-angels and evil spirits or devils; and Christian theology, developing earlier Jewish ideas—themselves powerfully modified by the influence of Persian dualism—worked up the one class into an elaborate hierarchy of angels and arch-angels, the other into a formidable host of fallen angels or devils, considered as continually employed in frustrating the good purposes of God, and marshalled under one master-spirit, the devil proper or Satan, the supreme impersonation of the spirit of evil. The guardian-angel corresponds closely to such conceptions as the Roman *genius* and even the famous *daimon* of Socrates. To primitive man the demon was but one of the thousand spiritual beings who controlled every one of the causes of nature, and whose favour must be purchased by constant tributes of respect and worship. It was perfectly consistent with primitive philosophy that the manes or ghosts of the dead should continue after death the influence they enjoyed in life, and thus should pass into the higher class of deities. The essential distinctions between the divine and the human that seem so fundamental to modern minds did not occur to those whose notions of the visible and invisible universe alike were entirely animistic; and thus we find that the savage makes no clear distinction between ghosts and demons, and that his conception of the demon is constructed on the model of the human soul, of course with any number of terrible and superhuman qualities

superinduced. It is not merely family affection, but actual fear and considerations of prudence, that lead to the worship of ancestors and of the dead; and the good or bad fortune of living men is attributed to the direct interference of the invisible spirits with which the whole air around is swarming. These spirits may not only affect the fortune of the individual, but may even enter into his body, and cause internal diseases and such other inexplicable phenomena as frenzy, wild ravings, hysterical epilepsy, and the like. The very etymology of such words as *cataplexy* and *ecstasy* points plainly to a time when there was no metaphor in their meaning. Such is the explanation of disease offered at the present day by savage man all over the world, and such was also the belief of the semi-civilised ancient Egyptians and Babylonians. Indeed, it disappeared but slowly before the progress of scientific medicine, and continued to reappear in survivals strangely perplexing on any other explanation. Hence the function of the exorcist arises naturally as a means of effecting a cure by expelling the demon, and we find him daily exercising his skill in Africa, and even in China and India. A careful distinction is made by sorcerers as to whether the infesting demon *possesses* or *obsesses* his victim—i.e. controls him from the inside or the outside. In early Christian times those demoniacally possessed, or *energumens*, were grouped into a class under the care of a special order of clerical exorcists, and after the time of St Augustine the rite of exorcism came to be applied to all infants before baptism. Indeed, exorcists still form one of the 'minor orders' of the Catholic Church.

Reverting to the animistic theory of demonology, we find how well it harmonises with widely-spread notions in folklore of phantom-dreams—night-mare (O.E. *mare*, 'a goblin'); the Slavonic vampires, or witch-ghosts, who suck the blood of living victims; *incubi* and *succubæ*, like Adam's wife Lilith in the rabbinical story (Assyrian *lilit*, 'a succuba'), demons who consort with women and men in their sleep and by whose means children may be engendered between demons and women; the Hindu *rakshas*, malignant and gigantic demoniacal ogres who can at will assume any shape; and witches, who have confessed a thousand times to being possessed with a familiar spirit, and who own allegiance in particular to the master-demon, Satan. Other embodiments of the spirit of evil are the Celtic and Teutonic Giants, and the Ogres of southern romance, who destroy men and devour their flesh; the Norse Trolls, one-eyed, malignant but stupid monsters; the *Diakos* and *Lamias* of modern Greece; the Lithuanian *Laume*; the Russian fiery and flying snakes, *Koshchei* the Deathless, *Baba Yaga*, a hideous old hag who flies through the air in a fiery mortar, propelled with a pestle, and the *Morskoi Tsar*, or king of the waters, with his daughters, the ubiquitous swan-maidens of romance. No mythology is richer than the Slavonic in malignant male and female demons and fiends (*chorti*, 'devils'), gloomy shadows of old nature myths and degraded forms of the great deities of an earlier religion, a combination of the most heterogeneous elements flung together in the most perplexing confusion. Traces remain of an original dualism between a great black and a white god (*Byelun*); but besides this and those fiendish forms already mentioned, Ralston enumerates the *karliki*, or fiendish dwarfs; *lyeshuie*, sylvan demons resembling the fauns and satyrs of Greek mythology; *vodyanue*, or water-sprites; *vodzhrushnie*, demons who ride the whirlwinds; *demovue*, or domestic spirits like the Scottish *brownies* and the Lithuanian *kaukas*; and the *rusalka*, a kind of Naiad or Undine.

Demons with specialised functions exist in mythology everywhere, as the Japanese Oni, who bring on winds, themselves living at the centre of the storm; the Chinese air-dragons, whose battles bring on waterspouts; the demons of floods in old Egyptian and Akkadian mythology; the spectres and phantoms that infest the sea; the nixies of northern Europe, and the kelpies of Scotland, who haunt pools to drown unwary travellers, and naturally hate bridges, although elsewhere many bridges as well as other superhuman works have been erected, usually in miraculously short periods of time, by demons, often at the command of powerful magicians like Michael Scott. Sometimes the devil even consents to build a church for the reward of the soul of the first that enters it. Others again are those sirens who, by their unearthly beauty or the charm of their singing, draw on unwary youths to their ruin; most famous of these, the romantic Lorelei of the Rhine. Again, particular animals, chiefly those with power to harm man, are favourite hosts for demons to inhabit, especially the serpent, but also the cat, the hedgehog, the hare, the fox, the he-goat, the raven, the wolf—the old Norse Fenris, and the dog, especially if black in colour, like the dog in *Faust*. The madness of dogs, with its peculiar horror, itself opens up a strange chapter in the history of demonology.

One of the most systematic of demonologies is that elaborated by the Moslem theologians. The Jinn (sing. Jinnee) were created two thousand years before Adam, but sinned against God and were degraded from their original high estate. The greatest among them was Iblees (Eblis), who was cast out by Allah for refusing to worship Adam as made of earth, he himself having been formed of smokeless fire. The Shēytāns form his host; other species of subordinate fiends are the Jānn, the least powerful, also 'Efreetis (Afrits) and Mārīds, the last the most powerful. Eminent among the evil Jinn are the five sons of Iblees—Teer, who brings about calamities, losses, and injuries; El-Aawar, who encourages debauchery; Sót, who suggests lies; Dásim, who causes hatred between man and wife; and Zelemboor, who presides over places of traffic. Inferior demons are the Ghoul, often in human form and devouring the bodies of the dead like the Russian werewolves; the Sealh, found in forests; the Delhān, living in islands; and the Shikk, shaped like a human being halved lengthwise. The Jinn assume various shapes, sometimes as men of enormous size and portentous hideousness. They live chiefly on the mountains of Káf, which encompass the whole earth, and their evil influence may be averted by talismans and invocations, and pre-eminently wise magicians like Solomon may command their services. They consist of forty troops, each troop containing six hundred thousand. See chapter ii. of Lane's *Arabian Society in the Middle Ages* (edited by Stanley Lane-Poole, 1883).

The subject of dualism, or the division of all the invisible powers into two great armies of good and evil demons, ranged under the supreme impersonations of good and evil, will be discussed under ZOROASTER, and here it is sufficient to say that it modified the whole later Jewish and Talmudic demonology, and reappeared in the Manichæan heresy. To it is due the distinction between the *demon* and the *devil*, a notion which seems fundamental to the modern moral sense, but was foreign to the earlier demonology, according to which all the specially malignant qualities and the love of evil for its own sake become characteristic of the latter. The Vritra and the other night-powers, the Panis, of the Vedic hymns, are as yet hardly more than personifications of merely physical evil, not inherently and absolutely wicked; while the

Loki of the ancient Scandinavians, their nearest approximation to a personification of evil, was rather a demigod than a devil, not essentially hostile to the other deities, although he works them mischief enough; and the four archdemons of the Rabbins, Samaël, Azazel, Asael, and Mac-cathiel, seem to have been originally nothing more than personifications of the elements as energies of the deity. Even the name Lucifer ('the light-bearer'), the fallen angel of the morning star, fits ill with a conception of a devil utterly and hopelessly evil. The widely-spread belief that demons are lame accords well with a supposed fall from heaven and an original state of innocence. It is not a little striking at any rate to find the same characteristic in Hephaistos, Wayland the Smith, and the Persian Aśhma—the Asmodeus of the Book of Tobit, the 'Diable Boiteux' of Le Sage. The sootiness of his abode and his blackness of colour are persistent characteristics, although, indeed, some West African negroes have a white devil. The usual cloven feet of the devil in European folk-tales, often the last mark of identification, when even the horns and the tail are hidden, is a reminiscence of the Greek satyr and the forest-sprites of old Teutonic and other folklore. The ugliness of the medieval representations of the devil in religious art, as may be seen in the fantastic gargoyles of many churches, was but a part of the early church's policy of degradation to which the native deities were subjected, and from which sprung the medieval belief that the various gods of the old heathen world were the devils or degraded angels of Scripture. This notion is familiar to readers of *Paradise Lost*, although Milton makes an ingenious poetic use of it that is all his own. And even the medieval devil, with all his terror, had strange limitations to his power, especially perhaps in the folklore of the north. He is often ludicrously outwitted, and his machinations foiled by some obvious enough device or verbal quibble. It is not merely the weakest saint upon his knees that can baffle his infernal schemes, but some country-fellow who beats him at his own weapons, and whom afterwards he will have in hell at no price. The old Scots notion of Satan as grown so much the more dangerous from the accumulated wickedness and wisdom of six thousand years is hopelessly inconsistent with the archfiend of Norse folklore.

The early Christian idea of hell, the abode of the demons, owed many of its features to the Jewish Gehenna, with its perpetual fire, the horror of its sacrifices, and its loathsome worm; and the characteristics of Moloch and other primitive fire-gods became associated with the devil, degraded from a fire-god to a mere powerful spirit. The Jinn of Arabian mythology, who are slaves of the lamp and ascend as clouds of smoke, serve also to show how fundamental was the notion of a fire-fiend which passed, though under degraded form, into Christian theology. Consistent with this is the widespread belief in Europe that the devil cannot touch or cross running water, of which poetic use is admirably made in the magnificent phantasy of *Tam o' Shanter*. Again, the struggle between Balder and the deadly powers of winter in the Norse mythology was spiritualised and amplified into Christ conquering Death and Hell and releasing the spirits from prison; and the old northern ideas of wintry cold personified into a powerful and malignant demon, under new influences passed to swell the attributes of the Christian devil, whose dreary abode provided those torments of frost as well as fire familiar to readers of Dante. No stories are more common than those of compacts with the devil, sometimes written in blood, by

which a man gave away his soul for wisdom, wealth, power, or other gratifications to be enjoyed for a certain number of years. The classical story in this kind is that of Faust, which the genius of Goethe has made an imperishable part of the intellectual birthright of Europe.

Raising the devil or his inferior demons was a feat within the power of the mediæval sojceers and masters of the black art, and elaborate formulas for the purpose are gravely given in the books of magic. This unholy art was made punishable by death by James I., and his law remained upon the statute-book of England till the reign of George II. The worship of the devil was a usual feature of the witches' sabbath, and the name is often applied still to the strange dances and other religious rites by which many tribes in India and elsewhere avert the anger of malignant deities. It must be understood that there is no conscious homage to the principle of evil as opposed to good, as the objects of worship are merely deities powerful for harm as well as for help, considered almost as entirely outside any moral considerations, like the demons of unmixed primitive religion everywhere.

See the articles ANGEL, ANIMISM, DEVIL, EVIL, EXORCISM, HELL, SERPENT-WORSHIP, WERWOLF, WITCHCRAFT, ZOROASTER; also Horst, *Dæmonomagic* (2 vols. 1818), and *Zauberbibliothek* (6 vols. 1821-26); Ukert, *Ueber Dämonen, Heroen, und Götzen* (1850); Bastian, *Der Mensch in der Geschichte* (3 vols. 1880); Tylor, *Primitive Culture*; Roskoff's admirably learned *Geschichte des Teufels* (2 vols. 1869); Frazer, *The Golden Bough*; *The Encyclopedia of Religion and Ethics*; and for its facts, Mounire D. Conway's *Demonology and Devil-lore* (2 vols. 1879); also some of the older books, as Bodin, *De Magorum Demonumina* (1581), and the like.

**De Morgan**, AUGUSTUS (1806-71), son of Colonel De Morgan of the Indian army, was born in Madura, Madras Presidency. Educated at several private schools, he 'read algebra like a novel' (novels themselves he devoured insatiably); but after four years at Trinity College, Cambridge, he graduated as only fourth wrangler (1827). As a result of his revolt from his early evangelical training he did not take orders. He was appointed first professor of Mathematics in University College, London, after its foundation in 1828. In 1831 he resigned this office, but was reappointed in 1836, and continued in that capacity till 1866. An energetic worker, he was secretary of the Astronomical Society (1831-38 and 1848-54), and held other offices therein. His writings are very numerous. Besides being a mathematician of the first order, he was extensively and minutely versed in the history of the mathematical and physical sciences. He also devoted himself to the development of Aristotelian or 'Formal' Logic, to which he gave so symbolical a shape as to make it seem like a branch of Algebra (see *Formal Logic*, 1847; ed. Prof. A. E. Taylor, 1926), and wrote on the calculation of insurances and on decimal coinage. His best-known work is his *Budget of Paradoxes* (1872; new ed. 1915) reprinted from the *Athenæum*. See the Life by his wife (1882). His son, WILLIAM FREND (1839-1917), born in London, studied art, and specialised in stained glass and, ultimately, ceramics. Not till 1905, when sixty-six, did he take to literature. His first novel, *Joseph Vance: An Ill-Written Autobiography* (1906), with its suggestion of Dickens and the Victorians, seemed to have strayed from the 19th into the 20th century. *It Never can Happen Again* and a dozen other stories followed, but none equalled *Joseph Vance* in solid merit and popularity. See A. M. W. Stirling, *William de Morgan and his Wife* (1922).

**Demosthenes**, an able Athenian general, who in 425 B.C. assisted Cleon to reduce Sphacteria,

and who in 413, being sent to Sicily to the relief of Nicias, fell, fighting bravely, into the hands of the Syracusans, and was put to death.

**Demosthenes**, the greatest orator of Athens and of Greece, was born about 383 B.C. He lost his father at an early age. The considerable inheritance bequeathed to him was reduced by the neglect or the fraud of his guardians, and when he came of age he proceeded to prosecute them. The litigation was long and complicated, and though he gained verdicts in his favour, most of his inheritance was irretrievably lost. The importance of this litigation was that it compelled Demosthenes to the study of the law, gave the first exercise to that doggedness and strength of will which was to mark him through life, and by reducing him to poverty, drove him to the pursuit of law as a means of living. At Athens the parties to a suit were compelled to plead their cause themselves, but they could not be prevented from getting their speeches composed for them by a professional 'speech-writer' or 'logographer.' Demosthenes became a logographer, and soon acquired a lucrative practice. Up to the age of thirty Demosthenes confined himself to 'speech-writing,' and gained considerable reputation as a constitutional lawyer. His most famous constitutional law speech is one which he delivered personally in support of Ctesippus against Leptines (354 B.C.). He seems to have lacked by nature all the physical qualifications of a great orator, and to have acquired them solely by indefatigable self-discipline and training. At about the age of thirty he made his first appearance as a politician; he continued to practise as a logographer until he was about forty, by which time he had made a fortune sufficient to enable him to devote himself exclusively to political life until he died, at the age of about sixty-one.

At the beginning of his political career danger threatened Greece from the north, from Macedonia, a country which though at that time considered by the Greeks as semi-barbarous, and of no account in Greek politics, was destined within the lifetime of Demosthenes to destroy the liberties and the political existence of Greece. Demosthenes' claim to fame as a statesman rests on the fact that he foresaw the danger threatened by Philip of Macedon from the beginning, and that he from the outset advocated a policy which might have saved Athens and Greece. The three cardinal features of his policy were that the rich should submit to direct taxation for the purposes of the war; that the poor should submit, for the same purposes, to a diminution of the public expenditure on national festivals; and that rich and poor alike should render personal military service instead of employing mercenaries. Intelligent as was the Athenian democracy, it was not intelligent enough to see that Demosthenes' forecast was right, and his opponents' wrong; and, consequently, it was only when events justified Demosthenes, that is to say, when it was too late, that his policy was adopted. Philip's attack on the state of Olynthus gave occasion to the *Olynthiacs*, which, with the orations against Philip, the *Philippics*, are the greatest speeches made by Demosthenes. Athens made war with Philip on behalf of Olynthus, but having failed to save the city, found peace expedient. During the next few years (346-340) Demosthenes was engaged in forming an anti-Macedonian party, and in indicting Æschines for betraying Athens in the negotiations for the peace just concluded with Philip. War again broke out in 340, ending in the fatal battle of Chæronea (338). But Athens, having learned to trust Demosthenes, did not withdraw her confidence. The philo-Macedonian party, however, were encouraged to seize on a proposal to present Demosthenes with a public

crown as an occasion for his political destruction. The trial was at length held in 330, when in the famous speech *On the Crown* Demosthenes gloriously vindicated himself against Æschines. In 324 Harpalus, the treasurer of Alexander the Great (who had succeeded Philip), absconded to Athens with an enormous sum of money. This money was placed in the state treasury, under the care of Demosthenes and others, and when Alexander demanded it, half was missing. Demosthenes was accused, condemned, and escaped from prison into exile. The evidence does not seem to have warranted the verdict, which was probably given on political grounds, Demosthenes having offended both the Macedonian party and the extreme patriots. In 323 Alexander died, and Demosthenes was recalled from exile to head a fruitless attempt to throw off the Macedonian yoke. The battle of Crannon ended the revolt. Demosthenes fled to Calauria, and being there captured by Macedonian troops, poisoned himself, 322 B.C.

Demosthenes began life with a nervous, timid nature, and, unfortunately, as a boy was allowed by his mother to shirk the physical exercises and gymnastic training which formed part of the ordinary education of the young Athenian. He grew up with a tendency to effeminacy, which showed itself in an affection for luxurious clothing, and still more in his conduct as a citizen soldier; for although at Chersonæa he may have displayed no more cowardice than did the other Athenians who ran away, he was far from exhibiting the heroic bearing which distinguished Socrates at Delium. His timidity made him unsocial, and his water-drinking habits cut him off still more effectually from society. His luxury may have reached the point of extravagance: he was certainly lavishly generous in the discharge of all claims on him, public and private. Whether his effeminacy amounted to immorality, as was charged against him, is a question which cannot be answered off-hand in the negative. The natural defects which were to be seen in his private life may be traced in his public career; but here it is their conquest by force of will and determined adherence to a lofty purpose which has rightly given him his great name. His nervousness and timidity disqualified him for political life and public speaking; these defects he combated till he conquered them. His natural incapacity for amiability rendered him unsympathetic to the pleasure-loving Athenians; he compelled their respect by his intellectual power and the purity of his patriotism. The want of sympathy, however, he never overcame, and so he never obtained the hold over the Athenians which it would have been good for them that he should possess. In all democracies every politician who has led the masses at his own good-will has known on occasion how, if not to flatter, at least to say the thing that is pleasant; but Demosthenes' nature did not permit him to say pleasant things. Even this serious practical deficiency could not prevent his contemporaries from eventually recognising his force of character and steadiness of noble purpose. Still less has it weighed with posterity.

In the oratory of Demosthenes it is not difficult to trace the character of the man reflected. His resolute hard work and his infinite capacity for taking pains are seen in the high finish which distinguished his speeches above those of every orator. His moroseness is mirrored in the abuse of which he was too great a master; his want of amiability in the absence of humour. His nervousness betrays itself in his over-anxiety to argue, in his lack of ease and flow. But as in his life so in his speeches, all faults are blotted out by his unaffected earnestness, his entire devotion to his country, his intel-

lectual loftiness, and his high political morality. These great qualities are the source of the dignity, the pathos, the might, majesty, and dominion of his political orations. Even these qualities, however, would not have raised him to the highest pinnacle in the fane of eloquence had he not possessed the ear and the mind of the artist in words, the former of which gave to his speeches the marvellous melody they possess, the latter the variety of vocabulary, which is one of Demosthenes' characteristics. Nor must it be forgotten that the way for Demosthenes had been paved by great predecessors. The summit on which he stands rests on the labours of Lysias, Isocrates, and others. Finally, oratory, to be great, must have great themes, and it is not in every age that they are forthcoming. Demosthenes had the lot, tragic but triumphant, of saving, though all else was lost, the honour of his country.

For the life of Demosthenes. A. Schafer's *Demosthenes und seine Zeit* (2d ed. 1882-87) eclipses all other works, good as are the hand-books of Brodrick (1877) and Butcher (1881). The most exhaustive literary criticism is contained in Blass's *Attische Beredsamkeit* (1877). There are texts by Belcker (1854), Blass (1885-89), and Butcher (1903-7). Kennedy's English translation (5 vols. 1852-63) is a monument of scholarship.

**Demotica**, or DIMOTICA (Gr. *Didymoteichon*), a town of Thrace, on a tributary of the Maritza, 31 miles S. of Adrianople by rail. It is the seat of a Greek bishop, and has manufactures of silks and pottery. Pop. 16,000. Charles XII. of Sweden resided here from February 1713 to October 1714.

**Demotic Alphabet.** See **HIEROGLYPHICS**.

**Dempster**, THOMAS, a professor famous for his learning, and a miscellaneous and voluminous writer, was the son of Thomas, laird of Muirkirk, Aberdeenshire, and was born about 1579. He was educated at Turiff, Aberdeen, Cambridge, Paris, Louvain, Rome, and Douay. A zealous Catholic, he was elected to several provincial professorships, and at Paris he was for seven years professor in the Collèges des Grassins, de Lisieux, and de Plessy. But a brawl resulted, it is said, in Dempster's having to retreat to England. He soon returned to the Continent, bringing with him a beautiful wife, and at Pisa in 1616 obtained a professorship; but his wife's infidelities marring his peace, he removed to Bologna, where he became professor of Humanities, and where his wife completed her shame by eloping. Pursuing the fugitives, he was stricken with sickness, and died at Bologna, 6th September 1625. Dempster's not too veracious autobiography forms part of his *Historia Ecclesiastica Gentis Scotorum* (Bologna, 1627)—an erudite work in which, however, his desire to magnify the merits of his country often induced him to forge the names of persons and books that never existed, and unscrupulously to claim as Scotsmen writers whose birthplace was doubtful. It was edited by David Irving for the Bannatyne Club in 1829, and the manuscript is still preserved in the Bibliothèque Nationale, Paris. There is a selection from his Latin poetry in Johnston's *Delicia Poetarum Scotorum*.

**Demulcents** (Lat. *demulceo*, 'I soften'), bland and lubricating liquid substances, taken by the mouth, for the purpose of soothing irritation of the mucous membranes, and promoting the dilution of the blood, and the increase of the secretions. Demulcents are chiefly composed of Starch (q.v.), or Gum (q.v.), or of substances containing these, dissolved in water; sometimes also of oily matters, or the white of eggs, and other albuminous or gelatinous substances largely diluted. The decoction of althæa, or marsh-mallow, is a favourite form of demulcent.

**Demurrage** is an allowance made to a ship-owner by the freighter, for the detention of the ship in port beyond the specified time of sailing. The demurrage is properly the delay itself, but the term is generally used to signify the compensation due for the delay. A certain number of days, called lay-days or lie-days, are allowed for receiving and discharging cargo, and it is usually stipulated in charter-parties that the freighter may detain the vessel, either for a specified time, or as long as he pleases, after the expiration of these days, on paying so much *per diem* for overtime. Whether the days for which demurrage is due are *working days* (i.e. with Sundays and holidays excepted) or *running days* will, in the absence of special agreement, depend upon the custom of the port. All the ordinary causes of detention, such as port-regulations, the crowded state of the harbour, and the like, are at the risk of the freighter, and demurrage must be paid, though it be proved that the delay was inevitable. But demurrage is not due where the delay arose from detention of the ship by a public enemy, or from hostile occupation of the port; and it cannot, of course, be claimed where the fault lay with the owners themselves, or the master or crew of the vessel. The demurrage ceases as soon as the vessel is cleared for sailing, though she should be prevented from actually doing so by adverse winds. When the days of demurrage are limited by special contract, and the ship is detained beyond them, the sum due as demurrage under the contract will be taken as the measure of the loss for the further time which may be claimed in the form of damages. It will be open, however, to both parties to show that the rate thus fixed *per diem* is either too high or too low. When the time allowed for loading and discharging expires, including the extra days if such be stipulated, the master will be entitled either to sail or to claim damage for detention.

The term is now extended to other means of carriage, as railway wagons; and is also applied to the bank charge for giving coin in exchange for bullion.

**Demurrer**, in English law, is a form of pleading whereby a party, admitting, for the sake of argument, his opponent's allegations, says they are not sufficient in law to support his opponent's case. A demurrer must be argued in court before the pleadings can proceed further. Demurrer to evidence and demurrer to a criminal indictment are now obsolete. If a prisoner wishes to object to the sufficiency in law of an indictment, his best course is to plead to the indictment, and, if convicted, to move in arrest of judgment.

**Demy**, a particular size of paper. In that of printing paper, each sheet measures 22 inches by 17½; drawing-paper, 22 by 17; and writing-paper, 20 by 15½.

**Demy** (i.e. *half-fellow*), the name borne by the scholars of Magdalen College, Oxford.

**Denain**, a town in the French department of Nord, near the Scheldt and Selle rivers, 20 miles NNE. of Cambrai by rail. It lies in the centre of an extensive coalfield, and has important iron-works, with manufactures of glass, beetroot sugar, and brandy. An obelisk marks the scene of Marshal Villars' victory over the allies under Prince Eugene, 27th July 1712. Pop. 23,500.

**Denali**, native name of Mount McKinley (q.v.).

**Denarius** (*deni*, 'ten each'), the principal silver coin among the Romans, was equal to ten *asses*, but upon the reduction of the weight of the *as*, the denarius equalled sixteen of it. It was first coined 269 B.C. Its weight at the end of the Roman commonwealth is estimated at 60 grains, while under the empire the weight was 52½ grains of silver. The value of the denarius under the republic

was thus rather more than 8½d., and of the later



Denarius of the earliest kind, actual size; weight, 60·6 grains.

period about 7½d. From *denarius* come the Persian *dinār* and the English slang *deaner*, 'a shilling.'

**Denary Scale.** See SCALES OF NOTATION.

**Denbigh**, a municipal borough, the county town of Denbighshire, 30 miles W. of Chester by rail. It stands near the middle of the Vale of Clwyd, on the sides and at the base of a rugged steep limestone-hill. The castle, whose imposing ruins crown this hill, was built in 1284 by Henry Lacy, Earl of Lincoln, on the site of a fortress erected by William the Conqueror. The newer part of Denbigh was built at the bottom of the hill, after the destruction and desertion of a great part of the town on the top of the hill, about 1550. Denbigh has manufactures of shoes and leather; but it is more a place of genteel retirement than of commerce. Pop. 7000. With Ruthin, Holt, and Wrexham, Denbigh (now merged in the county) sent one member to parliament till 1918. In 1645 Charles I. took refuge in the castle after the battle of Rowton Heath. The garrison surrendered to the parliamentary forces after a siege of two months. It was shortly afterwards dismantled. The fortifications have an area of a square mile in extent. A lunatic asylum for the five counties of North Wales was erected near the town in 1848. A noble institution for the maintenance and education of twenty-five orphan girls, and twenty-five day pupils, was built here in 1860, with funds in the hands of the Drapers' Company of London, from money left to them in 1540 by one Thomas Howell, a Welshman.

**Denbighshire**, a county of North Wales, on the Irish Sea, and between the Dee and the Conway. With 8 miles of coast, it is 41 miles long, 17 broad on an average, and 666 sq. m. in area, being the sixth in size of the Welsh counties. The surface is partly rugged and mountainous, with some beautiful and fertile vales, as the vale of the Clwyd, 20 miles by 7, and those of the Dee and Conway. In the north is a range of hills, convex to the coast. The highest hill is Cader Idronwen, 2563 feet; and many others rise above 1500 feet. The rocks are chiefly Silurian clay and graywacke slates, with some granite and trap, and bands of Devonian, Carboniferous, and Permian strata. There occur coal, iron, slates, flags, millstones, limestone, lead, zinc, and copper. The chief rivers are the Dee, Conway, Elwy, and Clwyd. The Rhaiadr waterfall is 200 feet high in two parts. Llangollen vale is famed for romantic beauty and verdure, amid hills of savage grandeur. The climate is mild in the lower parts, but cold and bleak among the hills, where small hardy sheep and ponies are reared. About two-thirds of Denbighshire are under cultivation; its corn, cheese, butter, and live-stock are greatly esteemed. It is also well timbered. Salmon are caught in the rivers. The chief towns are Denbigh, Wrexham, Ruthin, Holt, Llangollen, Llanrwst, Abergele, and Rualon. Pop. (1801) 60,299; (1841) 88,478; (1921) 154,847. Denbighshire returns two members to parliament. It was anciently occupied by the Ordovices, a powerful tribe, not entirely subdued by the Romans till the

time of Agricola. Of British or pre-Roman remains there still exist tumuli, two kistvaens or stone cells, barrows, and forts. To the times of the Welsh and Saxon struggles are referable the Pillar of Eliseg, near Llangollen, and the dikes of Offa and Watt. The dike of Offa, king of Mercia, to keep out the Welsh, was a ditch, with small forts on mounds at intervals, and ran from Herefordshire to the estuary of the Dee; Watt's dike ran on the east side of Offa's dike, and parallel to it. Wrexham Church is one of the 'seven wonders of Wales.' Chirk Castle is a fine Edwardian stronghold, restored.

**Dendera** (Gr. *Tentyra*; Coptic *Tentore*, probably from *Téi-n-Athor*, the abode of Athor), a village of Upper Egypt, once a populous town, and the capital of the sixth nome of the 'southern kingdom,' situated near the left bank of the Nile, in 26° 10' N. lat., 32° 40' E. long., is celebrated on account of its temple, one of the finest and best preserved structures of the kind in Egypt, dating from the period of Cleopatra and the earlier Roman emperors. The temple measures about 300 feet in length by 135 in breadth, and includes a noble portico or hypostyle hall supported on twenty-four columns. The walls, columns, &c. are covered with figures and hieroglyphics, among which are still to be seen the contemporary portraits in profile of Cleopatra and her son; but the beauty of the Egyptian queen is not apparent in her portrait, which belongs to almost the most degraded period of conventional art in Egypt. Certain zodiacs among the decorations turn out to be late, and the theories based on their antiquity fall. Beyond the portico are a hall of six columns and several rooms, which once contained altars, the sacred boats, perfumes, vestments, and offerings of first-fruits, and the like (Mariette, *Denderah*, 1869-80). There are several other sacred buildings at Dendera, including a temple of Isis. The temples stand within a wall of unbaked bricks, 1000 feet long on one side, and in some parts 35 feet high. As worshippers of Athor, consort of Horus, who was the enemy of the hippopotamus of Set, the Tentyrites were hostile to the people of Ombos, near Coptos. See Juvenal, *Satire* xv., and Petrie's *Denderah* (1900).

**Dendermonde** (Fr. *Termonde*), a town of Belgium, in the province of East Flanders, situated at the confluence of the Dender and the Scheldt, 17 miles E. of Ghent. The principal buildings were the town-house and the church of Notre Dame, containing two pictures by Van Dyck. The manufactures are linens, cottons, and beer. Louis XIV. besieged it in vain in 1667, but Marlborough succeeded in taking it in 1706. Its fortifications, destroyed in 1784, were restored in 1822. The town was taken by the Germans in September and in October 1914, and burned. Pop. 10,000.

**Denderpeton**, a small lizard-like Carboniferous Labyrinthodont, first found in the hollow trunk of an upright *sigillaria* in Nova Scotia.

**Dendrites**, the name given to thin films of mineral matter which assume branching shapes that resemble moss or seaweed. These films occur as coatings on the faces of fissures and joints in rocks or on the surfaces of bedding-planes, and have often been mistaken for fossils.—**DENDROLITES** is a name sometimes given to fossil stems, branches, or other fragments of trees.

**Dendrophis**, or TREE-SNAKE, a genus of Colubrid, non-venomous tropical snakes; see SNAKES.

**Deneholes**, or DANEHOLES, well-like shafts sunk through superincumbent strata to the chalk beneath, familiar in Kent and Essex and in the French valley of the Somme. The name seems to have been transferred from excavations believed to have been made by Danish invaders; but the

deneholes specifically so called have been variously described as places for hiding plunder, retreats for fugitives in time of war, or as shafts sunk to get at the chalk and flints, especially for the supply of Flint Implements (q.v.). Bone picks have often been found in deneholes. See an elaborate article by F. C. J. Spurrell in the *Archæological Journal* for 1881; *Notes and Queries*, series vi. and vii.; *Nature*, June 1907; W. Johnson, *Folk Memory* (1908).

**D'Enghien**. See ENGHEN.

**Dengue**, or BREAK-BONE FEVER, also called DANDY and BUCKET FEVER, is a disease first certainly known to have occurred in 1779-80 in Egypt, parts of the East Indies, and probably in Philadelphia. Since that time there have been great epidemics in India and Further India (1824-25), America and West Indies (1826-28), Southern United States (1850), East Africa, Arabia, India, and China (1870-73), besides numerous minor outbreaks. The disease occurs almost exclusively in the tropics, in hot weather, and in towns either near the sea-coast or on large rivers. It is characterised by sudden onset, with high fever, and extremely violent pains in the bones, muscles, and joints; by a remission, usually at the end of one or two days, during which the patient feels almost well; and after one or two days more by a second period of fever, less severe than the first, which lasts for two or three days. Each attack of fever is often accompanied by a well-marked skin-eruption. Though often followed by much emaciation and loss of strength, it is very rarely fatal or succeeded by serious after-effects. It occurs almost always in well-marked epidemics; and the infection, though its nature is not known, is believed to be transmitted by the bite of a mosquito (*Culex fatigans*).

**Denham**, SIR JOHN, a Caroline poet, was the only son of an Irish judge, himself of English birth, and was born at Dublin in 1615. He was educated in London and at Trinity College, Oxford, where Wood tells us he was 'a slow dreaming young man, and more addicted to gaming than study'—a taste for which his own essay against gaming (1651) did not cure him. In 1634 he married and went to live with his father at Egham in Surrey, an estate to which he succeeded four years later. At the outbreak of the Civil War he was high-sheriff of Surrey, and he immediately joined the king. He fell into Waller's hands on the capture of Farnham Castle, and was sent prisoner to London, but soon permitted to repair to Oxford. In 1641 he produced *The Sophy*, a feeble tragedy which was acted with great applause at Blackfriars. Next year was issued his long poem, *Cooper's Hill*, a poetical description of the scenery around Egham, itself still read, but more famous in the merits of its greater successor, Pope's *Windsor Forest*, which was avowedly an imitation of it. The final form of the poem is that published in 1655, all the changes in which, according to Pope, were made 'with admirable judgment.' Here first appeared its finest lines—the famous apostrophe to the Thames:

O could I flow like thee, and make thy stream  
My great example, as it is my theme!  
Though deep yet clear, though gentle yet not dull,  
Strong without rage, without o'erflowing full.

In 1647 Denham was engaged in the performance of secret services for Charles I., but these being discovered, was obliged to flee to Holland and France. In 1650 he collected money for the young king from the Scots resident in Poland, and he made several journeys into England on secret service. At the Restoration he was appointed surveyor-general of works, and created Knight of the Bath. He was a better poet than architect,

but he had Christopher Wren to his deputy. In 1665 he married a young girl, who soon showed open favour to the Duke of York. The poet became crazy for a few months, and about the time of his recovery his wife died suddenly, not without suspicion of poison—a charge which Pepys and Marvell evidently believed. Denham's last years were miserable betwixt poverty and the satires of Butler and others. He died early in 1669, and was buried in Westminster Abbey. His *Elegy on Cowley*, written in the short interval between recovery from frenzy and his death, is one of his most successful poems, and is much less obscure and laboured, ungrammatical, and overlaid with tedious moralising, than usual. His other works, as the *Destruction of Troy*, a paraphrase of part of the *Æneid*, and especially his satirical doggerel verses, are comparatively worthless. 'Nothing,' says Dr Johnson, 'is less exhilarating than the ludicrousness of Denham; he does not fail for want of efforts; he is familiar, he is gross; but he is never merry.' His fame rests securely on *Cooper's Hill*, but more securely still on the commendations of Dryden, Pope, Swift, and Johnson. He is especially eulogised for his *strength*, as Waller is for his *sweetness*; indeed, Dryden's critical judgment stands expressed in the words that *Cooper's Hill* 'for the majesty of its style is and ever will be the standard of exact writing.'

**Denia**, a port on the coast of the Spanish province of Alicante, near Cape St Martin. It exports grapes, raisins, and fruit, and has a population of 13,000.

**Denikin**, ANTON, Russian White leader, born in 1872, son of a serf, entered the army in youth, and in 1917 was in command in Rumania. Kerensky made him chief of staff to Alexeiev and afterwards Brusilov. Arrested after the Kornilov rising, he escaped, and joined the anti-Bolshevik forces in the south, of which the deaths of Kaledin, Kornilov, and Alexeiev left him leader. In 1919 he swept northwards and westwards, taking Kharkov, Poltava, Odessa, Kiev, and Orel, and establishing some sort of contact with Koltchak's army in the east. His aim of a united Russia alienated the Ukrainians; Koltchak's collapse left the Bolsheviks free to concentrate against him; help from the Allies was diminished; and Denikin was quickly driven back to the Black Sea. Novorossisk, his last base, was taken in March 1920.

**Denina**, CARLO GIOVANNI MARIA, an Italian author, was born 28th February 1731, at Revello, in Piedmont, studied at Turin, and in 1758 became professor of Rhetoric in the university of Turin. In 1777 he published anonymously at Florence his *Discorso sull' Impiego delle Persone*, in which he sought to show how monks might be transformed into useful members of society. This cost him his chair, and caused his banishment. In 1782 he went to Berlin on the invitation of Frederick the Great. Here he lived for many years, and wrote many historical works. In 1804 he dedicated to Napoleon his great *Clef des Langues*, and was in consequence appointed imperial librarian at Paris, where he died 5th December 1813.—Denina's principal works are *Delle Rivoluzioni d'Italia* (3 vols. 1770) and *Storia dell' Italia Occidentale* (6 vols. 1810), besides works on ancient Greece, Frederick the Great, and Prussia.

**Denis**, St, the traditional apostle of France and first Bishop of Paris, who suffered martyrdom in the 3d century. He was sent from Rome about 250 to preach the gospel to the Gauls. After various detentions at Arles and other places, he arrived in Paris, where he made numerous proselytes. The Roman governor of this part of Gaul ordered

Denis to be brought before him, along with other two Christians. As they continued firm in their faith, in spite of threats, they were cruelly tortured, and afterwards beheaded, in 273 or in 290. Gregory of Tours, Fortunatus, and the Latin martyrologists, state that the bodies of the three martyrs were thrown into the Seine, but were recovered and buried by a Christian woman. At a later period a chapel was built over their tomb. In 636 King Dagobert founded on the spot an abbey, called St Denis, which soon grew to be one of the richest and most important in the whole kingdom, and was long the sepulchre of the French kings. The collection entitled the *Acts of St Denis*, written about the end of the 7th or beginning of the 8th century, has no historical value. The Greek Church identifies St Denis with Dionysius the Areopagite, first Bishop of Athens. The Western Church celebrates his memory on the 9th of October. For a long period his name was the war-cry of the French soldiers, who charged or rallied to the words 'Montjoye Saint-Denys!'

**Denis**, MAURICE, French post-impressionist painter and art-critic, was born at Granville (Manche) in 1870, and was much influenced by Gauguin and Cézanne. His mural work is notable.

**Denison**, JOHN EVELYN, for fourteen years Speaker of the House of Commons, and afterwards Viscount Ossington, was born 27th January 1800, at Ossington, Nottinghamshire. Educated at Eton and Christ Church, Oxford, he entered parliament in 1823, and was a Lord of the Admiralty 1827–28. In 1872 he retired from the Speaker's chair, and shortly after was created Viscount Ossington. He was a D.C.L. of Oxford; and it was on his suggestion that the *Speaker's Commentary* to the Bible was undertaken. He died 7th March 1873.—His brother, GEORGE ANTHONY DENISON, Archdeacon of Taunton, was born in 1805, and educated at Eton and Christ Church, Oxford, in 1828 being elected a Fellow of Oriel. In 1843 he became Vicar of East Brent, Somerset; in 1851 Archdeacon of Taunton. In 1854 proceedings were taken against him for heresy, contained in three sermons on the *Real Presence*, and he was condemned to be deprived of all ecclesiastical preferments; but on appeal to the Court of Arches and the Privy-council, this judgment was quashed. A leader of the High Church party, he opposed secular education, advocated confession, and was chairman of the Committee of Convocation which condemned *Essays and Reviews* and Bishop Colenso's works. He died 21st March 1896. See his delightful *Notes of my Life* (1878–93).—Other brothers were Edward, Bishop of Salisbury (1801–54), and Sir William Thomas, Governor of New South Wales and Madras (1804–71).

**Denman**, THOMAS, BARON, was born in London, 23d February 1779, graduated at Cambridge, and entered Lincoln's Inn in 1806. He was associated with Brougham in the courageous defence of Queen Caroline (1820), and shared his consequent popularity. He sat in parliament in 1818–26, and was Attorney-general in Earl Grey's administration in 1830–32; he succeeded Lord Tenterden as Lord Chief-justice of England in 1832, and was raised to the peerage in 1834. He retired from the bench in 1850, and died 22d September 1854. See *Memoir* by Sir Joseph Arnould (2 vols. 1873).—His seventh son, the RIGHT HON. GEORGE DENMAN, was born 23d December 1819, studied at Cambridge, and was called to the bar in 1846. He represented Tiverton in parliament in 1859–65 and 1866–72; in 1872 he was raised to the bench of the Court of Common Pleas, and in 1873 he became a judge of the High Court of Judicature. He retired in 1892, being made a Privy-councillor, and died 21st September 1896.

**Denmark** (Dan. *Danmark*), the smallest of the Scandinavian kingdoms, consisting of the peninsula of Jutland, some of the North Frisian Islands, a group of islands in the Baltic, and the Faeroes, is situated between 54° 33' and 57° 45' N. lat., and 8° 4' and 12° 47' E. long., excepting the small island of Bornholm, which reaches 15° 10' E. long., and the Faeroe Islands in 62° N. lat. and 6° W. long. Denmark is bounded on the N. by the Skagerrak; on the E. by the Cattegat, the Sound, and the Baltic; on the S. by the Baltic, Little Belt, and Schleswig-Holstein; and on the W. by the North Sea. The area is more than half that of Scotland; the population over two-thirds. The population in 1870 was 1,784,741; in 1921 it had increased to 3,289,195. In 1921 the population of Copenhagen was 561,344 (with suburbs, 710,353); and including these suburbs there were five other towns with over 30,000 inhabitants—Frederiksberg (105,000), Aarhus (74,000), Odense (49,000), Aalborg (42,000), Gentofte (34,000). Next in size are Horsens (28,000), Randers (26,000), Vejle (22,000), Esbjerg (21,000), Fredericia, Kolding, and Elsinore (Helsingør).

The following table gives the main divisions of the kingdom, along with its dependency:

	Area in Eng sq miles	Population in 1921
Copenhagen .....	81	666,159
Islands in the Baltic, comprising Zealand, Funen, Læ- land, Fåltet, &c., without Copenhagen .....	5,180	1,103,198
Peninsula of Jutland .....	11,467	1,498,479
Faeroe Islands .....	540	21,864
Denmark .....	17,168	3,289,195
Colony—Greenland (region free from ice) .....	38,000	18,459
Total .....	50,168	3,302,654

Except in Bornholm (q.v.), the surface of Denmark is very similar in every part of the kingdom, and is uniformly low, reaching its highest point in Eiers-Bavnehøj, in south-east Jutland, which is only 564 feet above sea-level. The country presents little variety, except in its low isolated hills, but does not leave an impression of monotony; in the islands and in the south-east of Jutland the landscape is broken by noble forests, green meadows, and fertile fields; and even in the west and north of the mainland the wide stretches of moorland are clothed with heather, and have a solemn beauty of their own. The coast seldom rises even to low cliffs; generally it is flat, skirted by sand-ridges and shallow lagoons, especially along the west side. The east coast is much indented by bays, useful for navigation and valuable for their fisheries; and here and in the islands are many good harbours. Both the continental portion and the islands are penetrated deeply by numerous fjords, the largest being Limfjord, which intersects Jutland, and has insulated the northern extremity of the peninsula since 1825, when it broke through the narrow isthmus which had separated it from the North Sea. From its formation, the kingdom can have no rivers, properly so called; its streams, called *Aa*, are mostly large brooks. There are several important canals, however, including in Jutland works for the canalisation of the Guden-Aa, its largest stream, and of the Limfjord; and lakes abound in all parts of the kingdom, the most considerable being found in Zealand. The centre and west of Jutland were nearly bare of wood, but in modern times there has been much planting of Norway spruce and mountain pine. In other parts of the peninsula and in the islands there are forests. About 6 per cent. of the whole

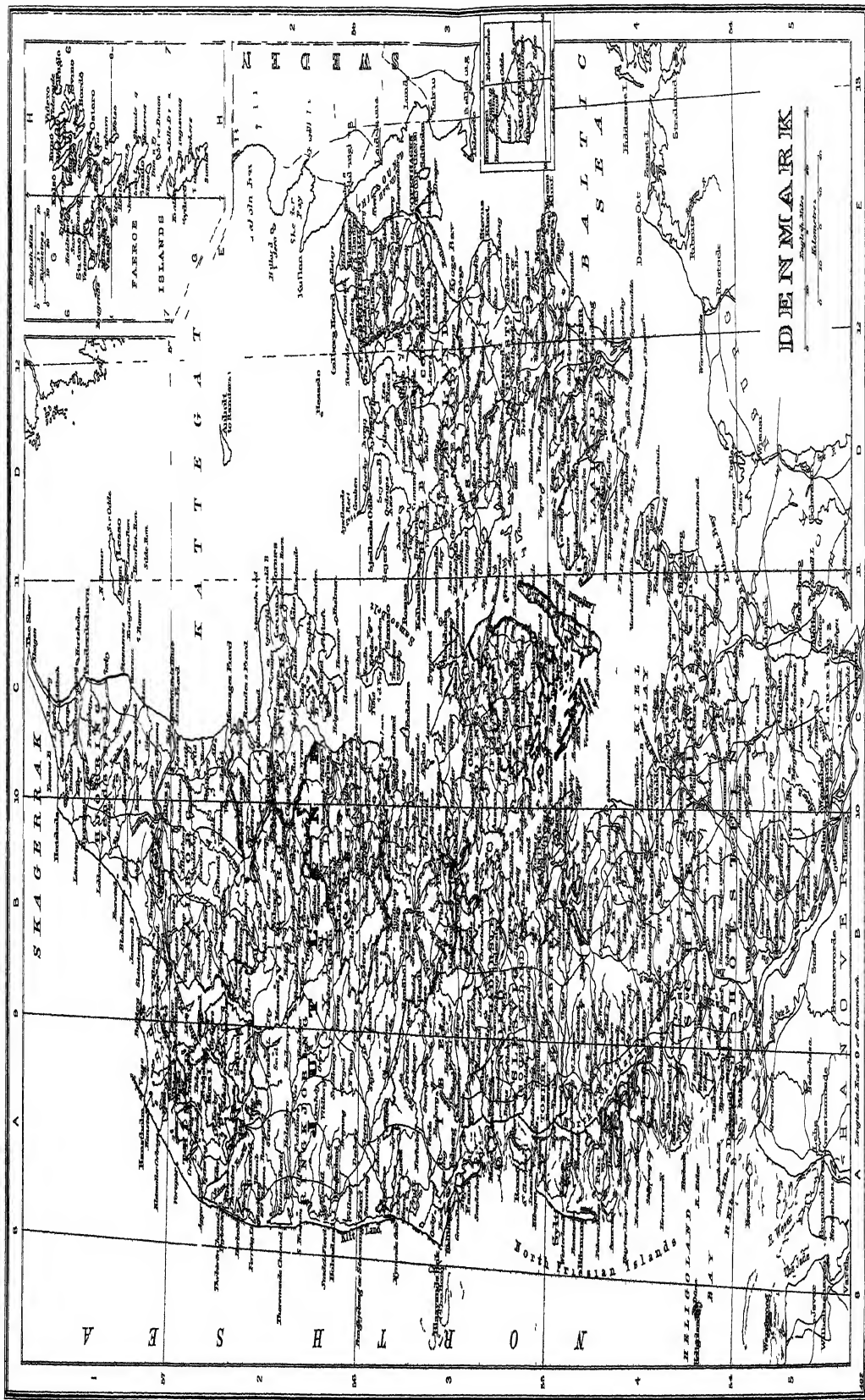
productive area is under wood. The beech, which flourishes more luxuriantly in Denmark than in any other land, is almost universally predominant, although three centuries ago the oak, now comparatively rare, was the characteristic Danish tree. Peat, which is got in abundance from the bogs, brown coal or lignite, and seaweed generally take the place of wood as fuel. In minerals Denmark is poor. Porcelain clay and some coal are found in Bornholm, and fuller's earth, potter's clay, saltpetre, chalk, and a poor marble occur in several parts of the kingdom, while some amber is collected on the west coast of Jutland. The climate is modified by vicinity to the sea, and is considerably milder, and the air more humid, than in the more southern but continental Germany. Mists are frequent, as are also sea-fogs on the west coast; and rain, snow, or hail falls over the country on 150 days on an average in the year. The annual rainfall is 23 to 25 inches. Westerly winds prevail; in the spring a cold, dry wind blows from the north-west, and whiffs clouds of fine sand from the coast inland, frequently doing irreparable damage to the crops. The mean temperature ranges from 44° to 47° F. The transitions between winter and summer are rapid, and scarcely broken by the intervention of spring or of autumn. The climate is, however, not unhealthy, except in the low-lying islands, such as Lolland, where the short and sudden summer conduces to fevers.

The soils of Jutland are generally light, but those in the south-east part and in the islands are stronger; about 80 per cent. of the area of Denmark is productive, and of the remainder about one-sixth is in peat-bogs. Nearly half the population lives by agriculture; the land for the most part is parcelled out into small holdings, and this is encouraged by the laws, which since 1849 have prohibited the throwing of small farms into large estates. Of tenancies, very few exceed a quarter of a square mile in extent; there are many cottars and labourers cultivating land of from three to twelve acres; and the 'peasant farms'—the majority under 50 acres—are also numerous. A third of the whole kingdom is arable, while over two-fifths is in meadow, pasture, or fallow land. The chief grain crops are oats, barley, and rye, but wheat is also grown. Flax, hemp, potatoes, and leguminous plants are raised; lucerne has been introduced, and the cultivation of the beet-root has increased. Barley is largely exported, but the imports of breadstuffs greatly exceed the exports. The raising of cattle more and more took the place of arable farming in Denmark, till it became one of the chief sources of wealth. Much progress has been made in this direction owing to the efforts of government and of various institutions; bull and stallion shows have been promoted by royal grants, breeding farms have been similarly encouraged, and the farmers have been instructed by lectures on the various forms of cattle disease and other subjects. The stock of horses, cattle, swine, and sheep is very large; in 1922 there were in Denmark 576,000 horses, 2,525,000 head of cattle, 442,000 sheep, and 1,899,000 swine. Many animals are exported. The live-stock trade is now overshadowed by that in dairy produce, bacon, and eggs, which has largely developed, owing to improved methods, to the spread of scientific instruction, and to the co-operative dairy system, now worked successfully on a large scale. Much brandy and beer is produced.

About a third of the inhabitants are engaged in manufacturing industries, which, although not yet of great importance, show a marked advance. Machinery, porcelain and delf, bricks, and margarine are leading manufactures; beet-root sugar refineries are increasing, distilleries declining;







IDENTIFIK



there are ironworks, shipyards, tobacco-factories, and several paper-mills in Copenhagen, Silkeborg, and elsewhere; and there are many large steam corn-mills. Generally, in spite of the scarcity of fuel in the country, steam-mills are taking the place of the windmills, and though the peasants still continue to manufacture much of what they require within their own homes, linens and woollens, as well as wooden shoes, are now increasingly made in factories. The fisheries (including the lobster and oyster fisheries) and the mercantile marine employ less than 3 per cent. of the people.

The principal articles of export are butter, meat, eggs, fish, hams, grain, ships, hides, cattle, sheep, swine. Among the imports are coal, metal goods, oil-cake, textile fabrics, cereals, flour, and timber goods. The bulk of the foreign trade is with Germany, Great Britain, the United States, Sweden, Russia, and Norway. There are 2700 miles of railway open, of which 1300 belong to the state; and there are extensive telegraph lines, mostly state property.

Elementary education is widely diffused, although in this regard Denmark is no longer so pre-eminent as formerly; it is compulsory for children between the ages of seven and fourteen years, and for the most part gratuitous in the government and parochial schools, of which there are about 3500. There are training-colleges for teachers, and classical and other higher education is afforded by a large number of colleges in the more important towns, with the university of Copenhagen for the centre of the entire system. There are three public libraries in Copenhagen, of which the Royal Library, with 500,000 volumes, is especially rich in oriental and Icelandic MSS. The established religion is Lutheran, to which the king must belong; but complete toleration is enjoyed in every part of the kingdom. The Reformation was introduced in 1536, when the church revenues were seized by the crown. Denmark is divided into eight dioceses. There were in 1921 3,222,000 Protestants (mostly Lutherans), 22,000 Roman Catholics, 6000 Jews, and 18,000 others. The only overseas possession of Denmark is Greenland (q.v.). The Danish West India islands (see VIRGIN ISLANDS) were sold to the United States in 1917. Iceland was recognised as a sovereign state in 1918.

The government of Denmark is a constitutional monarchy, the king being assisted by a cabinet. The crown was elective until 1660, when the people and clergy, impelled by hatred towards the nobles, invested the sovereign (Frederick III.) with absolute power, and declared the succession to the throne hereditary. From that time the crown exercised absolute rule till 1831, when a constitution was granted. This, proving unsatisfactory, was superseded in 1848 by the form of government which, with some alterations, Denmark enjoyed till 1915, when important changes were made. The national assembly or Rigsdag consists of the Folkething and Landsting, which meet annually, the members receiving an allowance which varies according as their homes are in Copenhagen or elsewhere. The Landsting is composed (since 1920) of 76 members, 56 indirectly elected for eight years by proportional representation for large electoral divisions, and retiring in two sections; 1 for the Faeroes; 19 elected for eight years by proportional representation by the outgoing house. The former privilege of the larger taxpayers has been abolished. The 149 members of the Folkething are directly elected for four years by practically universal suffrage, on the system of proportional representation, 31 seats being allotted to candidates unsuccessful in the constituencies. Women have the franchise, and are eligible for both houses. To the Folkething body all budgets must first be submitted; but in the years 1877-87, when the

government had a minority in the lower house, the king was induced to give the royal ratification to successive 'provisionary budgets,' which had never received the assent of the Rigsdag. The financial condition of Denmark is sound and prosperous. The decimal system was introduced in 1875, the unit being the *krona*, or crown, of 100 *ore*; the average rate of exchange is 18.16 *kroner* to the pound sterling. Compulsory service prevails, and the period is divided into eight years in the first ban, and eight in the second. Service begins at the age of twenty. After 150 days' training in the infantry, or a longer period in the engineers or cavalry, a minority remain in the army for a further period of 2½ to 8½ months. There are subsequent short periods of training. On emergency over 100,000 men could take the field. The navy is recruited by levies from the coast districts, and is maintained for purposes of coast defence. Copenhagen (q.v.) is a fortress, but its land defences were abolished in 1920-22. The arsenal is at Copenhagen.

*History.*—The early history of Denmark is lost in the twilight of the saga-period, out of which loom dimly the figures of its heroes, their brave deeds, and daring voyages. Within its borders the Cimbrii had first their home, and from its shores the Jutes sailed in the 5th century to the conquest of England; while in their place the Danes from Zealand settled on the deserted lands, extending their sway as far south as the Eider. One of their earliest kings, Harald Hildetand, fell in battle against the Swedes in 695; and shortly afterwards a branch of the Ynglinger occupied Jutland, where they held a footing for two centuries. One of their kings, Harald Klak, received baptism in 826 from Ansgar (q.v.); but the introduction of Christianity did not at once place any check on the long-accustomed inroads on Frankish territory, or on the piratical expeditions of the Vikings, although the country was soon torn by dissensions between the adherents of the old and new faiths. Gorm the Old, who drove the Ynglinger from the peninsula, and first united the mainland and islands under one rule, was the bitter enemy of Christianity; and although his death in 936 gave fresh vigour to the diffusion of the new faith, yet even its ultimate success was only ensured by the zealous support it received from Gorm's great-grandson, Cnut (q.v.). On his death in 1035 the three kingdoms of his Anglo-Scandinavian empire separated, and his sister's son, Svend Estridsen (1047-76), ascended the throne of Denmark, founding a princely line that flourished 400 years. Internal dissensions and external wars weakened the country, and the introduction of a feudal system raised up a powerful nobility, and ground down the once free people to a condition of serfdom. Waldemar I. (1157-82) added Rügen to the other Wendish districts of Mecklenburg and Pomerania, and extended his sway over Norway also. Under Waldemar II. the conquests of Denmark extended so far into German and Wendish lands that the Baltic was little more than an inland Danish sea. The jealousy of the German princes and the treachery of his vassals combined to rob him, however, of these brilliant conquests, and his death in 1241 was followed by a century of anarchy and inglorious decadence of the authority of the crown, during which the kingdom was brought to the brink of annihilation. Under his great-grandson, Waldemar IV., Denmark made a transient recovery of the conquests of the older Waldemars, rousing the jealousy of the Hanseatic League (q.v.), and the national laws were codified. From his death in 1375 till 1412, his daughter, the great Margaret, widow of Hakon VI. of Norway, ruled not only that country and Denmark, but in

course of time Sweden also, with so light yet firm a hand that for once in the course of their history the three rival Scandinavian kingdoms were content to act in harmony. Margaret's successor, Eric, the son of her niece, for whose sake she had striven to give permanence, by the act known as the Union of Calmar (1397), to the amalgamation of the three sovereignties into one, undid her glorious work with fatal rapidity, lost the allegiance and the crowns of his triple kingdom, and ended his disastrous existence in misery and obscurity. After the short reign of his nephew, Christopher of Bavaria (1440-48), the Danes exerted their ancient right of election to the throne, and chose for their king Christian of Oldenburg, a descendant of the old royal family through his maternal ancestress, Rikissa, the great-granddaughter of Waldemar II. Christian I. (1448-81), who was at the same time elected Duke of Sleswick and Holstein, was the founder of the Oldenburg line, which continued unbroken till the death of Frederick VII. in 1863. His reign was followed by half a century of international struggles in Scandinavia. The insane tyranny of Christian II. (q.v.) cost that monarch his throne and freedom; the Danes chose his uncle Frederick I. to be their king, while Sweden was for ever separated from Denmark, and rose under the Vasas (see GUSTAVUS I.) to be a powerful state.

Under Christian III. (1536-59), the Reformation was established in Denmark. Christian IV. (q.v.), after his brief share in the 'Thirty Years' War, proved one of the ablest of all the Danish rulers. His liberal and wise policy was, however, cramped in every direction by the arrogant nobles, to whose treasonable supineness Denmark owes the reverses by which she lost (1658) all the possessions she had hitherto retained in Sweden; and with the relinquishment of these, and consequently of the undivided control of the passage of the Sound, the country's former international importance came finally to an end. The national disgraces and abasement which followed led, in 1660, under Christian's son, Frederick III., to the rising of the people against the nobles, and their surrender into the hands of the king of the supreme power. For the next hundred years, chiefly marked by wars with Sweden, the peasantry were kept in serfdom, and the middle classes depressed; but by the end of the 18th century the peasants had been gradually emancipated, while many improvements had been effected in the mode of administering the laws, and the Danish kings, although autocrats, exercised a mild rule. The miseries of the reign of Frederick VI., who governed as regent from 1784, brought the country to the verge of ruin. Denmark having joined Russia in a compact of the Northern Powers hostile to England, a fleet was sent into the Baltic, and considerable injuries were inflicted by an attack on Copenhagen, in 1801, under Parker and Nelson. From this the country rallied; but in 1807 the British government, suspicious of an intention on the regent's part to violate his neutrality and take sides with Napoleon, demanded the surrender of the entire Danish navy, to be restored at the conclusion of peace. A refusal was followed by the bombardment of Copenhagen in September 1807, and the fleet was given up; but this treatment drove Denmark into Napoleon's arms, and with him the kingdom was obliged to co-operate until the close of 1813.

By the congress of Vienna, Denmark was compelled to cede Norway to Sweden. From this period a spirit of discontent grew up in the duchies, degenerating into mutual animosity between the Danish and German population, which led to an open rupture with Denmark in 1848, immediately after the accession of Frederick VII. (For the

whole question, see SLESWICK-HOLSTEIN.) After alternate hostilities and armistices, the war was virtually concluded in 1850, by the victory of the Danes at Idsted; but in 1863 the quarrel was renewed. On the death of Frederick in that year, Prince Christian of Sleswick-Holstein-Glucksborg ascended the throne under the title of Christian IX., in conformity with the act known as the Treaty of London of 1852, by which the succession to the Danish crown had been settled on him and his descendants by his wife, Princess Louise of Hesse-Cassel, niece of King Christian VIII. of Denmark. A pretender, backed by German influence and help, at once started up in the person of the eldest son of the Duke of Augustenburg, who assumed the title of Duke Frederick VIII. of Sleswick-Holstein; but his cause was speedily merged and lost sight of by Prussia and Austria in their direct aim of incorporating the duchies with the German Confederation. Denmark, unaided by England and France, allies on whose support she had relied, was forced to go single-handed into the unequal contest. After a brave but utterly futile attempt at resistance, the Danes found themselves forced to submit to the terms dictated by their powerful foes, and resign not only Lauenborg and Holstein, but the ancient crown-appanage of Sleswick (1864). The dissensions between Prussia and Austria led to the Austro-Prussian war of 1866, and the duchies remained an integral part of Prussia. The Treaty of Versailles divided Sleswick into three zones, whereof the southernmost (with Holstein) should remain definitively German, the northernmost should as a unit choose by plebiscite between Germany and Denmark, and if it elected to be Danish, a plebiscite of the middle zone should then be taken by communes. The northern zone voted for Denmark (about 3 to 1), the middle zone for Germany (4 to 1). Northern Sleswick thus became a Danish province (Sonderjydske Landsdele, 1500 sq. m., with 163,622 inhabitants in 1921). See SLESWICK. Meanwhile socialism has spread. Political dissensions ranged the government and Landsting, supported by the press of the capital, against the Folkething and majority of the people; but the constitution was reformed in 1915 (see above). Another crisis arose in 1916 over the sale of the Danish West Indies to the United States. Since 1918 Iceland has been a separate kingdom with the same king, with provisional arrangements for mutual privileges and co-operation. In 1920 the king's action in dismissing the government was held by socialists and others to be unconstitutional. A general strike was declared, and a republic talked of. A compromise was reached, however, with no greater change than an electoral reform, which extended proportional representation. Denmark's claim to the whole of Greenland was contested by Norway in 1921-22. The Stauning (Socialist) Government took office after an election in 1924.

See Carlsen, Olrik, and Starcke, *Le Danemarck* (1900); Harvey and Rappien, *Denmark and the Danes* (1915); Miss Thomas, *Denmark Past and Present* (1902); Miss Bröchner, *Danish Life in Town and Country* (1903); Rider Haggard, *Rural Denmark and its Lessons* (1911); F. C. Howe, *Denmark: A Co-operative Commonwealth* (1922). For the history, *Danmarks Riges Historie*, by several authors (1897-1905), Nisbet Bain's *Scandinavia* (1905), and Stefansson's *Denmark and Sweden* (1916).

**DANISH LANGUAGE AND LITERATURE.**—The Danish language has sprung from the south-eastern or Danish-Swedish branch of the *dōnsk tunga* (or *lingua danica*), which was the common name by which the language of all the Scandinavians was designated in the middle ages by the southern peoples of the Teutonic stock. From the 11th to the 13th century the Danish-Swedish branch of the old Scandinavian became more and more

markedly distinct from the Norwegian-Icelandic branch, through its replacing the old diphthongs with single long vowels, and dropping the initial *h* before *l*, *n*, and *r*; while the latter became characterised by a further modification of the *a* sound, by the loss of *v* before *r*, and by a series of contractions of consonants. In the provincial laws of the 12th and 13th centuries, which (after the Runic monuments) are the earliest specimens of this Danish-Swedish language, there are three dialects—that of Skaane (the southmost province of Sweden) and those of Zealand and Jutland, the first of which is nearest the old language, while the last two have deviated from it by dropping the final consonants from the old inflexional endings and changing their vowels *a*, *i*, *u* to a less distinct *e* or *æ*, retaining, however, the hard mutes *p*, *k*, *t* after vowels, as on the whole is still the case in Swedish and spoken Norwegian. The dialect of Zealand in the 14th and 15th centuries forms the foundation of modern Danish. The original vowels in almost all endings are there replaced by half-vowels, and the dental aspirate *p* by *t* or *d*; *p*, *k*, *t*, when following long vowels, are changed to *b*, *g*, *d*; masculine and feminine are merged in one common gender; nouns have no other case-ending than the possessive *s* for both numbers; verbs cease to indicate person (except in the imperative); and the singular number begins to supersede the plural, as it does everywhere in the spoken language from the 16th century. Danish, like Swedish, retains the suffixed definite article, which is characteristic of the Scandinavian languages. Its form is *-et* in the neuter, *-en* in the common gender, and *-ne* in the plural of both.

The influence of the Hanseatic League and the Oldenburg dynasty (from 1448) brought in a great number of Low-German words, especially relating to navigation and trade; while that of the order of St Bridget contributed a considerable Swedish element. In the first half of the 16th century the Danish language was chiefly used by religious writers, and the translation of the Bible (1550) is the first important monument of modern Danish. After this period Latin became once more the language of learning and culture, and for a century and a half there was no Danish writer of eminence. The influence of French was predominant in the 17th century, and that of High-German, which had been constant since the Reformation, culminated in the 18th century under the Struensee administration, when it was the language of government and public instruction. The result is, that Danish is indebted to German for fully one-third of its vocabulary. It was not till Holberg that the Danish written language began to be enriched from the stores of native expression in the spoken tongue. From the end of the 18th century revived study of Old Scandinavian and the development of a national poetic literature unfolded the language in a hitherto unsuspected richness and fullness, and since that time Danish prose has to a considerable extent worked itself out of its poverty and dependence. Danish is the softest of the Scandinavian languages, though less euphonious than Swedish. It is the language of the educated class in Norway, where it is considerably augmented from the native dialect, and is spoken with a somewhat harder pronunciation.

*Literature.*—After the Danish dialect had gradually separated itself from the Old Scandinavian as a softer and simpler speech, with a strong infusion of German ingredients, it was little used in writing down to the time of the Reformation. Saxo Grammaticus (i.e. 'the learned') in the second half of the 12th century wrote in Latin his *Historia Danica*, the only literary production of

medieval Denmark that retains any interest. The earliest writings in Danish are the church laws of Skaane (1162) and Zealand (1170), and the civil laws of Skaane (1160), Zealand (1170), and Jutland (1241); and after these a number of chronicles, partly in verse, of which the best known is the *Rimkrønike*, which was the first Danish book printed (in 1495). It is essentially an abridgment of Saxo. The famous Danish ballads called *Kæmpeviser* ('hero-songs'), some of which are said to belong to the latter part of the 11th century, were handed down orally from generation to generation, and were first collected, to the number of 100, by A. S. Vedel in 1591. In 1695 Peder Syv published a new edition with 100 more, and in 1812-14 appeared a selection of 222, edited by Abrahamson, Nyerup, and Rahbek. The fullest collection is in Svend Grundtvig's *Gamle Folkeviser* (1853-91; completed by Olrik). They are about 500 in number, and treat of the adventures of heroes, love, enchantment, spectres, and historical events. Doubtless they were sung to the dance, as is still the case in the Farø Islands. They must have suffered much by their not being written down till the 16th and 17th centuries.

The Reformation only emancipated Danish culture from Latin to bind it fast to German, which at the death of Frederick I. in 1533 was the language of the upper classes. About that time Christian Pedersen set up a printing-press at Malmo, at which he published a great number of popular books, and finally in 1550 the first complete translation of the Bible. Pedersen (1480-1554) is justly called the father of Danish literature. The hymns and translations of the Psalms by his contemporary Tausen (1494-1561), as also by Kingo (1634-1703), Vormondsen (1491-1531), and Arnebo (1587-1637), and the national history (10 vols. Copenhagen, 1595-1604) of Hvittfeld (1549-1609) were well received; but the Danish language was still banished from higher society till the advent of the Norwegian Holberg (1684-1754), the founder of Danish comedy. He found Denmark on the point of being absorbed in Germany. 'The common people,' he says, 'had no histories but dry lists of dates; no poetry but congratulatory verses; no theology but homilies and funeral sermons; and for plays, nothing but old stories about Adam and Eve.' He wrote histories of Denmark, of the Jews, and of the Church; and the irresistible humour of his comedies and satires covered with ridicule the imitators of foreign speech and manners. What Holberg did for Danish prose, another Norwegian, Tullin (1728-65), did for Danish poetry. Equally dissatisfied with the current imitations of the 17th century court-poetry of France, and with the poetic reform of Klopstock (at Copenhagen from 1751), Tullin followed the guidance of the English poets Pope, Young, and Thomson, and in this was followed by most of his countrymen who were settled at Copenhagen, while the Danes clung to German models. Ewald (1743-81), an ardent disciple of Klopstock, was Denmark's first great lyric poet and tragic dramatist. His verse shows an unsurpassed mastery of form, and is expressed in pure, clear, and noble language. Wessel (1742-85), by his 'tragedy,' *Love without Stockings* (1772), a humorous parody of the Danish imitations of the classical French drama, succeeded in laughing them off the stage. Nordahl Brun (1745-1816), preacher and poet, Claus Frimann (1746-1829), 'the Burns of the Norwegians,' Claus Fasting (1746-91), Jonas Rein (1760-1821), Jens Zetlitz (1761-1821), and others, formed themselves (1772) into a 'Norwegian Society' at Copenhagen, under the leadership of Wessel. It was the literary manifestation

of the Norwegian aspiration to separate nationality, which afterwards led to the foundation of the university of Christiania in 1811. From the death of Wessel in 1785 to the beginning of the present century the literature became entangled in rationalistic and political polemics, and produced little that is noteworthy. Its chief writers were P. A. Heiberg (1758-1841) and Malte Konrad Brun (1775-1826), both of whom were driven into exile in 1799-1800, the latter afterwards famous as a geographer; the critic Rahbek (1760-1830); the dramatists Samsø (1759-96) and Sander (1756-1819); and the lyricist Thaarup (1749-1821).

The poet and humorist Baggesen (1764-1826) forms the link between the 18th century and the early part of the 19th, when Danish literature took an entirely new departure, partly owing to the study of Kant, Fichte, and Schelling, and the influence of Schelling's follower Steffens (1773-1845); partly also to the strict censorship of the press in force from the year 1799. The educated classes turned from their controversies on points of literary criticism and theology to scientific inquiry; and the people, whose national feeling had been aroused by the French Revolution, by the share of Denmark in the Napoleonic wars, and especially by the events of 1801 and 1807, the war with Sweden (1808), and the loss of Norway (1814), welcomed with enthusiasm the rise of a new school, led by the romantic poet Oehlenschläger (1779-1850), who was equally distinguished as a lyrical and dramatic writer, and is still regarded by many as the greatest Danish poet. Contemporary with him were the poets Schack-Staffeldt (1769-1826) and Grundtvig (1783-1872), afterwards more eminent as a theologian; Ingemann (1789-1862), long the most popular novelist of Denmark; J. L. Heiberg (1791-1860), director of the royal theatre at Copenhagen, writer of numerous vaudevilles, and of the still popular national play, *Elves' Hill* (1823); Hauch (1790-1872), dramatist, novelist, and critic; and Blicher (1782-1848), who in his tales of Jutland was the first worker in the field which has since been cultivated in Switzerland and Germany by Jeremias Gotthelf and Berthold Auerbach. Of the other novelists of this period the chief are Blosbøll (1816-1900); Fru Gyllenbourg-Ehrensvard (1773-1856), mother of J. L. Heiberg; Saint-Aubain, or 'Karl Bernhard' (1798-1865); and the still more popular Winther (1796-1876), the charming poet of Danish country life. Herz (1798-1870), from the time when his *Ghost Letters* (1830) surprised the public with a poetic revival of the muse of Baggesen, now with his lyric poems, now with his tales, now in romantic and national tragedies, now in comedies and light vaudevilles, provided his countrymen with artistic and attractive works. Overskou (1798-1874) was a skilful dramatist, and Hostrup (1818-92) a popular author of comedies. All these writers are surpassed by Hans Christian Andersen (1805-75), whose wonderful stories are known throughout the civilised world. Less popular, but more profound, was the versatile writer Fr. Paludan-Müller (1809-76), who from his play *Love at Court* (1832) to his great epic poem *Adam Homo* (1841-48) wooed all the muses in succession. Here may be mentioned Bergsøe (1835-1911), writer of novels and popular works on scientific subjects; Goldschmidt (1819-87), editor of the influential democratic journals, *The Corsair*, *North and South*, and *Home and Abroad*, and afterwards author of numerous romances; Holst (1811-93), a writer of pleasing lyrics and tales; Kaalund (1818-85), with his two collections of poems, *A Spring* and *An Autumn*; the erotic and piquant and sometimes frivolous song-writer Aarestrup (1800-56); and Lembeke (1815-97), the translator of Shakespeare.

A great impulse was given to all branches of science from the beginning of the 19th century. The leading theologians were Grundtvig, the enthusiastic champion of the faith of his fathers against rationalism, and advocate of a union of the Scandinavian kingdoms, but with the church separated from the state; Mynster (1775-1850), Bishop of Zealand; Clausen (1793-1877), the disciple of Schleiermacher, and theological opponent of Grundtvig; Martensen (1808-84), Bishop of Zealand, and author of standard works on systematic theology and ethics; and Kierkegaard (1813-55), the most original thinker of Denmark. The chief exponents of philosophy were Sibbern (1785-1872), Nielsen (1809-84), and Brochner (1820-76); and in natural science the greatest names have been those of Oersted (1777-1851), the discoverer of electro-magnetism, the botanist Schouw (1789-1852), the geologist and chemist Forchhammer (1794-1864), the zoologist and archæologist Steenstrup (1813-98), and the physicist Niels Bohr. Much has been done for the study of Scandinavian antiquity by the *Sagabibliothek* of Müller (1776-1834), and the researches of Finn Magnusson (1791-1846) in mythology, and of Thomsen (1785-1865), Worsaae (1821-85), and Sophus Müller in archæology. The chief 19th-century writers of national history were Werlauff (1781-1871), Molbech (1783-1857), Allen (1811-77), Schiern (1816-82), and K. P. Paludan-Müller (1805-82); and of the history of the national literature and language, Petersen (1781-1862). In philology, Rask (1787-1831) and Madvig (1804-86), Nyrop (b. 1858) and Otto Jespersen (b. 1860), have a European fame.

About 1850 the enthusiasm for the national past, which had been excited by Oehlenschläger in Denmark, and by Tegnér, Geijer, and others in Sweden, together with the hatred of Germany aroused by the war of 1848-50, rose to a pitch of fanaticism. 'The northern force which had controlled the world' was extolled by Ploug and others as 'the only means whereby the victory of the Cause of Humanity could be achieved.' After Ploug (1813-94) the chief exponents of this great historic mission of the northern kingdoms were C. K. F. Molbech (1821-88), a euphonious lyricist and skilful dramatist, and translator of Dante; and Erik Bøgh (1822-99), a fertile writer of *feuilletons* and adapter of plays. A cosmopolitan reaction set in about 1870, led by Georg Brandes (b. 1842), who proved in his lectures on literature that Denmark was only a side-chapel in the temple of European thought and art, and that this overstrained 'Scandinavianism' was but the northern phase of the reaction from the tendencies of the 18th century, which had been experienced in England, France, and Germany many years before. Brandes withdrew to Berlin for some years from the storm of popular opposition. Not only in Denmark, but in Norway and Sweden also, his followers are now the prevailing party. The most conspicuous of these have been Jacobsen (1847-85), translator of Darwin and author of *Mogens* (1872) and other novels, and (till in 1883 he became Conservative) Holger Drachmann (1846-1908). Other noteworthy writers are Schandorph (1836-1901), equally happy in his sketches of the Zealand peasant and the Copenhagen snob; the versatile writer Hermann Bang (1858-1912); and the dramatist Edvard Brandes (b. 1847), brother of Georg Brandes. The novels of Johannes Buchholtz and Martin Andersen Nexø are well known outside of Denmark.

Of all the Scandinavians, the Danes have shown the greatest aptitude for the imitative arts, and their art is the most independent. While the painters of Norway have been mostly trained at

Düsseldorf, and the Swedes at Paris, the Danes have been especially attracted to Rome. The sculptor Thorwaldsen (q.v.) has left a great monument of his genius in the works contained in the Thorwaldsen Museum at Copenhagen. Of later artists may be mentioned the painters Marstrand, Carl Bloch, Exner, Kroyers, Henningsen, and Otto Bache. Of music, the chief composers in the 19th century were Hartmann, Gade, and Heise.

See Nyerup and Rahbek, *Den danske Digtekunsts Historie*, 4 vols. (1800-8), and *Udsigt over den danske Digtekunst under Frederik V. og Christian VII.* (1819-28); Nyerup and J. E. Kraft, *Almindeligt Litteraturlæxikon for Danmark, Norge og Island* (Copenhagen, 1818-20); Petersen, *Den danske Litteraturs Historie*, 6 vols. (1853-64); Overskou, *Den danske Skueplads i dens Historie* (1859-74); Andersen and Petersen, *Illustreret dansk litteraturhistorie* (1916 et seq.); G. Brandes, *Ludvig Holberg og hans Tid* (1884); the general treatises in Danish by Thorsens (1814; 6th ed. 1866), Heiberg (1831), Molbech (1839), Ström (1871), Erikson (Christiania, 1878), Winkel-Horn (1880), and Hansen (new ed. 1902); and in German by Strodtmann (1873), Wollheim de Fonseca (1874-77), and Winkel-Horn (1880); Gosse's *Studies in the Literature of Northern Europe* (1879), and his *Two Visits to Denmark* (1912); also the *Urford Book of Scandinavian Verse*, ed. Gosse and Craigie (1925).

**Dennery**, ADOLPHE PHILIPPE, a French dramatic writer of Jewish extraction, was born at Paris on June 17, 1811. At first clerk to a notary, he soon became a successful dramatist, and was so prolific that between 1831 and 1881 he produced, by himself or in concert with others, about two hundred miscellaneous pieces, including regular dramas, vaudevilles, and operatic texts. One of the most successful was the drama, *Marie Jeanne* (1845). He was the creator of the Norman watering place, Cabourg. He died 25th January 1899.

**Dennewitz**, a small village in the province of Brandenburg, Prussia, 42 miles SSW. of Berlin. Here was fought, on the 6th of September 1813, a battle in which 70,000 French, Saxons, and Poles, under Ney, were routed, after obstinate fighting, by 50,000 Prussians, under Bülow.

**Dennis**, JOHN, critic, was born in London in 1657, the son of a prosperous saddler. He had his education at Harrow, and Caius College, Cambridge, where he graduated B.A. in 1679. After a tour through France and Italy, he took his place among the wits and men of fashion, and brought a sufficiently rancorous pen to the assistance of the Whig party. His acquaintance with Dryden and Wycherley and other distinguished wits, as well as his native bent, made him a playwright. His plays had but little success. Of the nine, the two most famous were *Liberty Asserted* (1704) and *Appius and Virginia* (produced 1709). Pope's *Essay on Criticism* (1711) contained a contemptuous allusion to the latter, answered by Dennis next month in *Reflections, Critical and Satirical*, which was the commencement of a long and embittered feud between the poet and the critic. Pope's *Narrative of Dr Robert Norris, concerning the Strange and Deplorable Frenzy of John Dennis, an officer in the Custom-House* (1713), was a virulent, vulgar, and officious attack made on Addison's behalf, in which that genial author, through Steele, disavowed any complicity. Dennis was poor and blind during his last years. A few weeks after a theatrical performance, got up for his benefit by Pope and some others, he died, 6th January 1734. Dennis was embroiled in controversy all his life, and his naturally impatient temper became completely soured. He made many enemies, and his name, which his own writings could scarce preserve, will live for ever in their contempt and hate. He is one of the best-abused men in English literature. Swift lam-

pooned him, and Pope not only assailed him in the *Essay on Criticism*, but finally 'damned him to everlasting fame' in the *Dunciad*. Yet he was no fool, and his *Advancement and Reformation of Modern Poetry* (1701) and *The Grounds of Criticism in Poetry* (1704) will still repay perusal. 'Spite of the growling of poor old Dennis,' says Lowell, 'his sandy pedantry was not without an oasis of refreshing sound judgment here and there.'

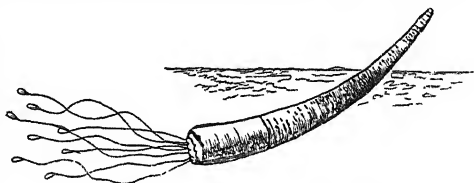
**Dénouement** (Fr. *dénouer*, 'to untie'), a French term naturalised in England, applied generally to the termination or catastrophe of a play or romance; but, more strictly speaking, to the train of circumstances solving the plot, and hastening the catastrophe.

**Dens**, PETER, a well-known Roman Catholic theologian, was born in 1690, at Boom, near Antwerp. Little is known of his early life; but from the epitaph on his tomb in the chapel of the archiepiscopal college of Malines, it appears that he was reader in theology at Malines for twelve years, *plebanus* or parish priest of St Rumold's, and president of the College of Malines for forty years. He died 15th February 1773, in the eighty-fifth year of his age. The work which has rendered Dens's name familiar, even to the Protestant public, is his *Theologia Moralis et Dogmatica*. It is a systematic exposition and defence—in the form of a catechism—of every point of ethics and doctrine maintained by Roman Catholics, and is extensively adopted as the text-book of theology in their colleges. It appears to owe its popularity more to its being a handy and usable compilation than to any great talent exhibited by its author. The casuistical parts of the work have been severely criticised by Protestant moralists. An edition was published at Dublin in 1832.

**Density**. See SPECIFIC DENSITY.

**Dental Formula**. See TEETH.

**Dentalium** (Lat. *dens*, 'a tooth'), or Elephant's Tusk Shell, a remarkable genus of molluscs, type of a small class called Scaphopoda. The shell is tubular, like an elephant's tusk, open at both ends, and lined by an almost completely tubular 'mantle.'



Dentalium, in natural position in sand.

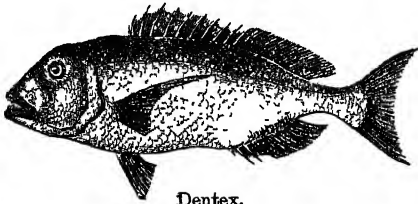
The animal has an indistinct cylindrical head with a mouth at its extremity, surrounded by a circle of tentacles. Two pads at the base of the head and above the foot bear ciliated contractile filaments, possibly respiratory. The 'foot' is long and divided into three at the end. The mouth includes a rasper. There are no eyes, but an ear-sac is present. Neither heart nor gills are developed. The sexes are similar and separate. The larva is ciliated and free-swimming. The type is of much zoological interest, but its affinities are still uncertain. The animal lives with the anterior end plunged into the sand on the sea-coast, at depths of ten to a hundred fathoms. By means of the foot they can creep slowly. They feed on minute animals, and have an almost cosmopolitan distribution. The class includes two or more other genera. *D. entale* occurs off British coasts; and about forty living species are known. The genus occurs as a fossil from Carboniferous strata (or

perhaps earlier) onwards. The shells are used for currency and for ornament by the Indians of the northern Pacific coast of America.

**Dentaria**, or CORAL-ROOT (both names due to knobbed root-stock), is a small genus of Cruciferae, represented in Britain by the rare *D.* (or *Cardamine*) *bulbifera*, in which the upper leaves bear bulbils (see BULB), while the pods rarely ripen. The root-stock, being pungent, was formerly dried as a remedy for toothache. *C. diphylla*, a North American species, is called Pepper-root (q.v.) from the same property. The name Coral-root (q.v.) is also applied to the orchid *Corallorhiza*, while the true Toothwort (q.v.) is *Lathraea squamaria*.

**Dent du Midi**, a picturesque and imposing peak of the Alps of Valais, 10,450 feet high, on the frontiers of Savoy, 5 miles SW. of St Maurice in the lower valley of the Rhone. It is a conspicuous feature of the view from Lausanne and Montreux. The Aiguille du Midi is a peak (12,600 feet) of the Mont Blanc group.

**Dentex**, a genus of acanthopterous fishes near perches. One species (*D. vulgaris*), the Dentex of the ancient Romans, abounds in the Mediterranean,



Dentex.

and has occasionally been taken on the southern shores of Britain. It is an excessively voracious fish, with large sharp teeth, and attains a large size, sometimes three feet in length, and 20 to 30 pounds weight. Great numbers are taken in the mouths of rivers in Dalmatia and the Levant, where they are cut in pieces, and packed in barrels with vinegar and spices, just as the ancients used to treat them.

**Dentifrice.** See TEETH.

**Dentine**, or IVORY, the principal constituent of mammalian teeth. See TEETH.

**Dentistry.** The practice of dentistry is doubtless of great antiquity. Mention of teeth bound with gold occurs in the laws of the twelve tables (5th century B.C.). Modern dentistry, founded on rational practice, in accordance with scientific principles, and recent histological, bacteriological, and pathological research, owes its creation to the workers and investigators among its practitioners since the middle years of the nineteenth century. Previously little or nothing was known of the etiology of dental and oral conditions, the importance of a sepsis and antisepsis was not recognised, and treatment rested on an empirical rather than a scientific basis.

The art of the dentist applies itself to the care and treatment of the human teeth and the associated structures, and falls naturally into two divisions: operative dentistry or dental surgery, and mechanical dentistry or dental prosthesis.

Operative dentistry deals with (1) preventive or prophylactic measures; (2) remedial or curative measures. Prophylaxis begins even before the birth of a child, with the instruction of the mother in the care of her own health, and the adoption of a suitable diet. The young child must be prevented from forming such habits as thumb-sucking, and the use of 'comforters' must be prohibited, as they cause deformities of the jaws and malpositions of

the teeth. The diet should contain a sufficient proportion of the calcium salts and of the vitamins requisite for the calcification and growth of the developing teeth. After the teeth are cut attention to their cleanliness is essential, and cannot be begun too soon. It is advised that the meals of children should end with food of a fibrous consistency—e.g. a piece of apple—which demands mastication, and cleanses the teeth, rather than with soft pappy puddings, which stagnate and decompose on the surfaces and interstices of the teeth. Some occupations involve danger to the teeth and jaws, and in the case of match-makers and other workers with phosphorus legislation has made prophylactic measures imperative.

Remedial or curative measures are called for in the following conditions: caries or decay of the teeth, odontalgia or toothache, neuralgia, erosion, abrasion, fracture, injury, or dislocation of teeth; exposure, inflammation, irritation, hyperplasia, degeneration, sepsis and necrosis of the pulp or nerve of a tooth; inflammation or injury of the dental periosteum, alveolar abscess, alveolar necrosis, inflammation, suppuration, or ulceration of the gums or mucous membrane of the mouth or tongue; periostitis of the jaw, necrosis of the jaw, exostosis of roots of teeth, pulp-stones, absorption of roots; malposition or irregularity of teeth, supernumerary teeth, non-erupted teeth, tumours or growths in connection with the teeth, especially odontomes, which are regarded as aberrations of development, salivary calculus or tartar, pyorrhoea alveolaris (a chronic purulent discharge from the sockets), abscess or empyema of the maxillary sinus, dislocation or fracture of the jaw.

Of all these conditions caries, or decay of the teeth, is by far the most prevalent, and that which makes the most frequent call on the services of the dentist. Inspection of the teeth of school children in the elementary schools reveals an appalling state of affairs in this respect; in some districts not more than 10 per cent. to 20 per cent. of the children are found to be exempt. The institution of school dental clinics will, it is hoped, do something to cope with this widespread defect, and may greatly improve the health of the children. In the treatment of caries the dentist either attempts to remove and arrest the decay, and to supply the place of the destroyed tissue by a filling or stopping, or, if that be impossible, he extracts the tooth.

In the production of caries there are two stages. The first is the solution of the enamel by acids produced in the mouth as the result of fermentation of debris of food. The bread of to-day, made from flour ground to an impalpable powder, having hardly any crust, underfired, eaten fresh from the oven, and containing so much water that it forms a paste in the mouth, which is bolted without proper mastication and admixture with saliva, furnishes a sticky, slimy mass, which adheres to the teeth with great tenacity, and rapidly undergoes lactic acid fermentation. This bread, along with the excessive use of sugar, must be blamed for the general prevalence of caries in civilised communities. Once the dentine which forms the bulk of the tooth is exposed by the solution of the enamel, bacteria gain an entrance, they multiply with great rapidity in an environment so favourable, the dentine is destroyed, and a cavity of decay is formed. The *stopping* or *filling* of such cavities constitutes the bulk of the dentist's work, and requires great delicacy and skill. The preparation of the cavity is of prime importance. It must first be opened up so as to get free access. All affected or overhanging enamel is cut away with enamel chisels, or by means of burs, which are small rotary files rapidly revolved in a suitable hand-piece of the dental engine, driven either by the foot or by an electric motor. All decayed or decaying

dentine is cleared away; for this purpose slender steel instruments, called excavators, are used. They are of such varied shapes as to permit all parts of any cavity in any tooth to be reached. These are supplemented by burs and stones in the dental engine. When performed by a skilful hand, and with sharp instruments, little or no pain may be felt during this process; but if the dentine is sensitive, 'obtusendents,' such as carbolic acid, oil of cloves, eugenol, or desiccation with alcohol and hot air may be used to diminish the sensitivity. If the pulp is exposed, or if the decay approaches it so nearly as not to leave a sufficient layer of sound dentine to protect it from pressure, heat, or cold, the 'nerve' or pulp must be killed. Devitalisation of the pulp may be effected by sealing in a small quantity of arsenious acid and cocaine for twenty-four to forty-eight hours, or by paralyzing it with cocaine in solution, applied under pressure. The pulp, when devitalised, is removed by special barbed instruments called nerve-extractors or nerve-bristles, and the pulp-chamber and root-canals, having been cleaned and sterilised, are filled with an antiseptic substance, such as wax impregnated with iodoform or trikresol-formalin paste. In stopping a cavity the objects are to remove all decay, to sterilise the prepared cavity, and to fill it with a sterile substance which will take the place of the tissues decayed and removed, will prevent the recurrence of decay, and will restore the tooth to functional activity. The ideal filling substance would be easy of introduction, undistinguishable from the natural tooth, absolutely resistant to the action of such chemical or mechanical agencies as it is exposed to in the mouth, and a non-conductor of thermal or electrical stimuli. Such a material has yet to be found. During the insertion of a filling moisture must be excluded, as unless this be done the cavity cannot be sterilised, nor can its sterility be maintained. The best means is by the adjustment of the rubber-dam; the tooth to be filled and the teeth adjoining it are passed through holes punched in a sheet of thin india-rubber, which is held in place by waxed silk ligatures tied round the necks of the teeth, or by specially devised clamps. The saliva which gathers in the mouth is drawn off by a saliva-ejector, in the form of a Sprengel pump worked by a minute water-tap. Another saliva-ejector has a compressible rubber bulb which the patient manipulates. Dexterous operators sometimes dispense with the rubber-dam for short operations, and rely on aseptic napkins, or cotton-wool rolls, to exclude moisture. The cavity being properly shaped, excavated, sterilised, and dry, the filling is inserted. The method varies with the material.

**Gold.**—The gold used is chemically pure, it is in the form of foil, either in sheets, or rolled round a broach and cut in short lengths to form loosely rolled cylinders. It is also prepared folded into square pellets, and in that peculiar form known as sponge-gold or crystal gold. Various modes of packing the gold are adopted, according as the gold is cohesive, when advantage is taken of the fact that it welds at ordinary temperatures, or non-cohesive. In the latter case the cavity must be of such a shape as to retain the filling, which is made by tightly wedging the gold so that it forms a homogeneous mass with absolutely watertight adaptation to the walls of the cavity. Cohesive gold can be adapted to a cavity of any shape, provided that small portions are first of all tightly fixed in small pits, slots, or recesses made in the floor of the cavity. To the gold fixed in these 'retention points' small successive portions are welded till the cavity is full. Gold-pluggers are used for welding and condensing cohesive gold, which must be further condensed by an automatic

mallet, an instrument which is run in the dental engine, and gives a succession of blows the force of which can be regulated. Where the placing of retention points presents difficulty, the cavity may be partly filled with cement, into which crystal or sponge-gold is pressed. The filling is then built up in the usual way after the cement has hardened. In any case, the filling when completed must be trimmed, polished, and burnished, by means of finishing-burs, stones, discs, wooden points, felt cones, abrasive strips, polishing powders, and burnishers.

**Amalgam.**—An amalgam is a combination of two or more metals, one of which is mercury, and the utility of dental amalgam alloys depends upon the property possessed by mercury of dissolving other metals to form compounds which in a short time harden or set. The dental alloys most in favour contain silver, tin, copper, and zinc. The alloy is cut into fine filings or shavings, and rubbed in a mortar with mercury sufficient to make a paste. This paste is inserted into the cavity while plastic, packed with blunt-ended instruments, and allowed to set hard. A widely adopted practice is the lining of cavities with cement into which, while still soft, amalgam is pressed, thus producing a combination filling with the adhesive property of the cement, and the strength and durability of the amalgam. By this method the discoloration of the tooth attendant on the use of amalgam alone is avoided.

**Cements.**—These are largely used on account of their adhesive properties, and because they are more sightly in the front of the mouth than metal fillings. They comprise the oxychloride cement, and the three classes of oxyphosphates. All consist of a powder and a liquid, which are mixed with a spatula on a glass or porcelain slab to a consistency varying from cream to putty-like, and must be put into the cavity without much delay, as they set quickly. In the oxychloride cement the powder is calcined zinc oxide, the liquid is zinc chloride. The three classes of oxyphosphates are: (1) basic zinc phosphates, in which the powder is zinc oxide plus colouring matter, the fluid is glacial phosphoric acid; (2) oxyphosphates of copper, in which oxide of copper instead of zinc forms the powder; (3) silicate cements, so called. These contain in the powder silicon and oxides of other metals than zinc, such as beryllium, aluminium, and calcium. The liquid is phosphoric acid, modified by the addition of other constituents, such as zinc phosphate and aluminium phosphate. These 'silicate' or translucent cements lack to some extent the adhesive properties of the basic zinc phosphates; per contra, they approach very closely in appearance and lustre to the natural enamel. In most mouths cements tend to undergo solution and disintegration, and usually require renewal from time to time.

**Gutta-percha.**—The juice of the *Isonandra Gutta*, dried, purified, and afterwards mixed with zinc oxide, or zinc oxide and mercuric sulphide, to form the white or pink varieties, is largely used for temporary stoppings. It is softened and made plastic by dry heat, and inserted warm. It is soluble in chloroform and in eucalyptus and cajuput oils; a solution is used for filling root-canals and for setting crowns and bridges.

**Tin,** in the form of foil, is used in the same manner as non-cohesive gold. Large cavities may be partly filled with tin and finished with cohesive gold. Tin may also be used in combination with gold to make a 'tin-gold' filling, a sheet of tin-foil being sandwiched between two sheets of gold-foil, or a sheet of tin and one of gold may be rolled together. The combination gives a hard and durable filling.

**Inlays.**—These may be made of either porcelain

or metal; the inlay is prepared to fit exactly the prepared cavity into which it is cemented. Some operators insert ready-made inlays of standard sizes, by cutting the cavity with special trephines and burs to fit the inlay; but the generally adopted procedure is to shape the cavity so that an impression can be taken of it, or that a matrix adapted to its walls and margins can be withdrawn without distortion. For porcelain inlays a matrix is essential. It may be of platinum or of gold, according to the high or low fusing-point of the porcelain body used. A matrix giving an exact reproduction of the shape of the cavity having been secured, either direct from the cavity, or by swaging in a plaster or metal model thereof, the porcelain body, mixed with water or alcohol, is put in the matrix and baked in an electric furnace. Several bakings, and gradual additions of porcelain body till the inlay is built up to the required shape, will be needed. In the preliminary bakings the body should be 'biscuitted' only; not till the final baking should it be glazed. When finished the inlay must be grooved on its inner surface with diamond discs or etched with hydrofluoric acid to afford retention to the cement that fixes it in place.

Metal inlays are made either of gold or of alloys specially prepared for the purpose. The *cire perdue* process is that generally employed. A wax model of the proposed inlay is made either direct from the cavity or from a model of it. This has a sprue wire attached to it and is invested in a mixture of plaster of Paris and other materials in a casting flask or ring. When the investment has set hard the sprue wire is removed, leaving the channel by which the molten gold or other metal is introduced after the wax has been dispersed by heat. The melted metal is forced into the mould in various ways by casting machines. Some use superheated steam to propel the metal by direct pressure, some depend on suction by the production of a vacuum in the mould, others on centrifugal force. Metal inlays can also be made by melting the metal in a platinum or gold matrix.

**Extraction of Teeth.**—The instruments used are forceps and elevators. A formidable and unscientific tool called the 'key' was once in great favour, but fortunately it has fallen into disuse. Hundreds of different shapes and sizes of forceps have been designed by misguided ingenuity, but the skilful operator needs very few; indeed, the Edinburgh School teaches that two pairs of forceps are all-sufficient. The principal points to observe in the operation are: that the blades of the forceps should be sharp, that they should be capable of embracing accurately the root or roots of the tooth to be extracted, that the root or roots should be firmly grasped by the forceps, that the operator should take a firm grip of the margins of the jaw at the site of the tooth to be extracted, with the finger and thumb of the left hand, and that the extractive force should be applied in the direction of least resistance, and in such a manner as to produce the least possible fracture, laceration, or disturbance of the parts. Teeth with conical roots—viz. the upper incisors and, to a varying degree, the canines—should be rotated; all others should be carried outwards, unless they are so abnormal in form and situation as to render this impossible. In no case will a pulling force be found effectual. The elevator is used to turn out roots or teeth to which it is difficult or inconvenient to apply the forceps. All instruments used must be thoroughly cleaned and sterilised before and after use, and an antiseptic mouth-wash should be prescribed.

**Anæsthetics.**—Tooth extraction is extremely painful, and the use of anæsthetics during its performance is therefore often desirable. Nitrous oxide, or laughing-gas, as it is sometimes called,

is of all general anæsthetics that most frequently employed by dentists, and has by reason of its great safety enjoyed unbroken popularity. The mixture of nitrous oxide and oxygen has many advantages over nitrous oxide alone, and there is little doubt that with the advent of simplified apparatus for its administration, and more extended instruction in the method of using it, this combination, unsurpassed for its freedom from danger to life, or even unpleasant symptoms during induction and after recovery, will become the anæsthetic of choice for extractions. Nitrous oxide or nitric oxide and oxygen may be used in combination with a small dose of ethyl chloride (3 c.cm. should be regarded as the maximum), or with ether vapour if a very prolonged operation is anticipated. Chloroform is at once the most unsuitable and the most dangerous anæsthetic to use for a dental operation, and its use in this connection should be regarded as unjustifiable. Local anæsthetics have a sphere of usefulness in the extraction of single teeth. Cocaine, stovaine, novocaine, eucaine, alypin, and quinine with urea hydrochloride, are the analgesics most in favour. Solutions of these drugs are injected into the tissues in the neighbourhood of the tooth to be extracted, a local analgesia is produced, and a more or less 'painless extraction' is effected. Aseptic technique must be rigidly observed, and no injection anæsthesia should be practised when a septic condition of the parts already exists. The neglect of these precautions by the ignorant or careless operator entails the risk of blood-poisoning. Freezing the part involved by the rapid evaporation of ethyl chloride or ether spray is sometimes practised for the production of analgesia.

**Scaling.**—This is the removal of deposits of tartar from the teeth; the operation is effected with instruments called scalers. Deposits of tartar are termed salivary calculus or serumal calculus, according to their supposed deposition from solution in saliva or in the blood plasma. Tartar of either variety, wherever deposited, acts as an irritant, causing inflammation and absorption of the soft tissues, and rendering them susceptible to bacterial invasion and to the production of pyorrhœa alveolaris, which, if untreated, leads to the destruction of the sockets and loss of the teeth. Pyorrhœa alveolaris is one of the forms of oral sepsis which modern physicians regard as a frequent cause of pernicious anæmia and various toxæmias. The importance of removing deposits of tartar from the teeth must, therefore, be urged with insistence. The process is long and difficult, and its perfunctory performance is worse than useless. When pyorrhœa is established, careful scaling and the use of tartar solvents, with the application of stimulating and antiseptic substances, either locally or by the process of ionisation, may cure it. The use of autogenous vaccines is sometimes beneficial, sometimes disappointing. In many cases extraction of the teeth the sockets of which are affected is the only remedy.

**Regulation of Teeth, or Orthodontics.**—This is concerned with the correction of irregular positions of the teeth in the dental arches, leading to perversion of the normal relations of the occlusal surfaces of the teeth when the jaws are closed, or, in short, to mal-occlusion. Mouth-breathing, often due to adenoids, bad habits, as thumb-sucking, loss of the first permanent molars, and heredity are cited as frequent causes of irregularity and mal-occlusion. The correction of irregularity depends on the application of a continuous force or pressure exercised upon the teeth it is desired to move. Many devices have been invented. Of these Angle's Arch, with its adjunctive bands, ligatures, and levers, is, perhaps, the most commonly used, and the most useful. Other means, such as split expansion-plates,

traction-screws, jack-screws, spiral springs, wire springs, elastic bands, expansible wedges, inclined planes, &c., are occasionally utilised. After the mal-occlusion is corrected, which may take a considerable time, the teeth must be kept in their new positions by a retention apparatus, which may have to be worn for six months or longer.

*Radiography* is of great help to the dentist in showing the presence of unerupted teeth, abnormalities of roots, pulp-stones, absorption areas in chronic apical abscesses, cysts, new growths, fractures, and other diseased or abnormal conditions.

*The Treatment of Fractures and Dislocations of the Jaws* falls within the province of the dentist.

*Mechanical Dentistry, or Dental Prosthesis*, deals with (1) the construction and adaptation of artificial substitutes for teeth which have been removed, shed, or lost, by operation, injury, disease, or accident; (2) crown and bridge work, in which one or more artificial crowns are inserted in the mouth, supported by sound remaining teeth or roots; (3) the making of obturators for the closure of congenital cleft palate or of perforations of the palate; (4) the replacement by artificial appliances of parts of the jaws or face removed by operation or destroyed by accident or disease.

In the great majority of cases artificial teeth are mounted on plates of metal or vulcanite. These plates are retained in the mouth by reason of their accurate fit and atmospheric pressure—these are the so-called 'suction' plates; by clasps or bands fitted round sound remaining teeth; or sometimes by gold spiral springs. The teeth themselves are made of a high-fusing porcelain, and are obtainable of every conceivable size, shape, and shade. Diatoric teeth, which are suitable only for vulcanite plates, have in their substance holes or undercut cavities, on which they depend for their retention in the vulcanite. Pin teeth, which are available for either metal or vulcanite plates, have two platinum pins baked into their lingual aspect. Pin teeth are also made with gold pins, or with base metal pins. Tube teeth have a platinum tube baked lengthwise in the middle of the tooth. Gum blocks have an artificial gum of porcelain. Special teeth are made for what is known as continuous gum work. Here platinum forms the base on which the set of teeth is built up with porcelain body, which, when baked in an electric furnace, closely simulates the appearance of the natural gum and palate.

Before artificial teeth can be inserted with safety and comfort, the mouth and any remaining teeth must be put in a healthy and hygienic state. Loose, useless, or very badly decayed teeth should be extracted, also any roots that are not crowned; all stoppings that are required must be done, and the remaining teeth scaled and cleaned.

The making of a set entails (1) taking an impression of the jaws with plaster of Paris or modelling compound, and casting plaster models from the moulds so obtained; (2) taking the bite—i.e. getting the relative positions of the upper and lower jaws in closure, and fixing the models in that relationship on an articulator; (3) setting up the case—i.e. assembling the teeth selected in the exact positions they are to occupy in the finished case; (4) trying in, and finally adjusting the trial set; (5) finishing. If the case is to be of vulcanite, the model and wax set are invested in plaster in a specially devised two-part flask; the flask is opened, the wax scalded out, and replaced by dental rubber; the flask is closed, heated, pressed, and clamped. The case is now vulcanised by superheated steam under pressure, and when cold taken out of the flask, filed up, smoothed, and polished. When the plate is of gold or other metal it may be either cast or 'struck.' In the

first case the set is made up as if for vulcanite, is invested in a special casting ring; by means of sprues, channels are left for molten metal to flow into the mould left by the burning off of the wax. The metal, usually gold, is driven into the mould by steam pressure, or by the production of a vacuum in the mould. Several ingenious casting machines have been devised to accomplish this process. More generally the plate is 'struck.' The original model is duplicated in gun-metal or zinc; this is the 'die,' and from it a 'counter die' is taken in tin or lead. The plate, cut to pattern, is swaged between the die and counter, being stamped out, as it were, on an anvil or block with a heavy swaging-hammer. It is trimmed, and any bands or clasps fitted and soldered. The teeth are now fitted to the plate. The mode of attachment varies. Tube teeth are fixed by a pin soldered to the plate and passing up the tube. Pin teeth are backed with gold plate soldered to the pins, and the backing is soldered to the plate.

*Crowning* is the adaptation of an artificial crown to a root. A crown is fastened to a root either by means of a dowel-post or pin of gold, platinum-iridium, or other suitable metal cemented into the root, which is drilled out for the reception of the post, or by means of a collar of like material closely embracing the root. Crowns for the front teeth should be either all porcelain or porcelain-faced; for back teeth hollow shell crowns of gold are often used. It is essential that the root to be crowned should be absolutely healthy.

In *Bridge-work* sound, healthy teeth or roots are used as the piers to carry a bridge bearing artificial teeth across spaces from which teeth are absent. The piers may be crowned, so that hollow crowns on the bridge slip over them; they may have tubes cemented into them to receive split-pins fixed to the bridge, or many other clever devices may be employed. Bridge-work should be removable, as it is impossible to keep a fixed bridge clean, and its wearer has always an unhealthy mouth and a foul breath.

*Laws as to Dentistry.*—The Dentists Act, 1878, established the Dentists' Register. To the Register were admitted those in practice before the passing of the act, and those who, before or after its passage, obtained a diploma or licence in dental surgery from one of the Royal Colleges of Surgeons, a British university, or other examining body recognised for the purpose by the General Medical Council. The curriculum is laid down by the council, and extends over a period of four years. The 1878 Act enabled the public to distinguish between qualified and unqualified practitioners of dentistry by restricting the use of the titles 'dentist' and 'dental practitioner' to those on the Dentists' Register or the Medical Register. It did not limit or prohibit practice by the unqualified or the assumption by them of misleading titles. Recognition of the evils of unqualified practice, with its attendant dangers to the public, led to the passage of the Dentists Act, 1921. This act, following the lead of most of our colonies and dominions, prohibits the practice of dentistry by unregistered persons, sets up a Dental Board of the United Kingdom to administer the act, and provides for the admission to the Register, under specified conditions as to age, character, and length of time in practice, of present unqualified practitioners.

The literature is voluminous; a few of the best-known books are: *The Science and Practice of Dental Surgery*, edited by N. G. Bennett; *Diseases and Injuries of the Teeth*, by Smale and Colyer; *Dental Surgery*, by Sewill and England; *Text-book of Operative Dentistry*, by Kirk; *Dental Surgery*, by Tomes; *Extraction of Teeth*, by Gibbs; *Text-book of Prosthetic Dentistry*, by Essig and Turner; *Mechanical Practice in Dentistry*, by Booth

Pearsal; *The Dental Laboratory, &c.*, by Rose; *Malocclusion of the Teeth*, by Angle; *Operative Dentistry*, by Black; *Dental Metallurgy*, by Essig and Koenig. Periodicals are the *British Dental Journal*, *British Journal of Dental Science*, *Dental Record*, *Dental Cosmos*.

**Dentition.** See TEETH, TEETHING, HORSE.

**Denton**, a manufacturing and coal-mining town and urban district of Lancashire, 4 miles NNE of Stockport. Reservoirs of the Manchester water-works are near the town. Pop. 18,000.

**D'Entrecasteaux Islands**, since 1884 part of British New Guinea (Papua), lie north of the south-eastern extremity of New Guinea. With an area of 1200 sq. m., they comprise three chief islands separated by narrow channels. They are named after the French admiral and explorer, Bruni D'Entrecasteaux (1739-93), who visited these waters in 1792. His name is also preserved in D'ENTRECASTEAUX POINT on the south-west coast of Western Australia; and in D'ENTRECASTEAUX CHANNEL, separating the south of Tasmania from Bruni Island.

**Denudation**, in Geology, means the laying bare of underlying rocks by the removal of superficial matter, and also the process by which the earth's surface is broken up and the loose material carried away. The more important agents of denudation are wind, rain, running water (springs, underground streams, brooks, and rivers), frost, snow, ice (glaciers), the sea (waves, breakers, currents), plants, and animals. The action of wind is seen in the erosion of rocks produced by the sand and grit which in certain dry regions is swept by the winds against projecting rocks, an action often resulting in the undermining of cliffs and the downfall of rock-masses. The sand produced by the superficial disintegration of rocks is carried forward and heaped up in the form of dunes or sandhills (see DRIFT). Rain is also a potent agent of denudation, its action being both chemical and mechanical. Rocks are more or less altered and decayed, and the decomposed materials carried off in solution by rain-water. The more soluble rocks, such as rock-salt, gypsum, and limestone, readily succumb, but there are very few rocks indeed which are not more or less acted upon chemically by rain. So that in many places the rocks are thus 'weathered' to considerable depths, the decomposed crusts varying in thickness from a mere line up to many feet or even yards. The mechanical action of rain consists chiefly in the sweeping away of this disintegrated material, which often accumulates in hollows, forming what is called *rain-wash*. Running water acts also chemically and mechanically. Thus, the rain that sinks underground and rises to the surface again in springs, brings about many changes in rocks. Immense quantities of mineral matter are brought up in solution, and thus, in time, underground cavities are formed, especially in the more soluble rocks. In regions of calcareous rocks, the whole drainage is sometimes conducted underground, the ingulfed streams and rivers acting both chemically and mechanically, and giving rise to a large series of subterranean tunnels (see CAVES). The action of underground water often brings about local subsidences, falls of rock, and great landslips. The denuding action of superficial terrestrial waters is seen in the excavation of gullies, ravines, and river-valleys, one of the most remarkable examples of river erosion being the Grand Cañon of the Colorado (q.v.), which is a chasm nearly 400 miles long, with approximately vertical walls rising to a height of 4000 to 7000 feet above the bed of the river.

Frost acts with great intensity at high levels and in high latitudes, but even in temperate regions its action is very marked and productive of great disin-

tegration of rocks. Indeed, in the production of the weathered crusts of rocks, frost is hardly less active than rain. It is in arctic and mountainous countries, however, that its action is most conspicuous. The rocks under its influence are ruptured and shattered to such a degree that frequently the parent rock-masses become buried under shivered heaps of their own debris. Glaciers are likewise powerful denuding agents. They are not only instrumental in transporting the rock-rubbish which is showered down upon them from overhanging cliffs, &c. (see BOULDERS), but by means of the blocks and debris which they drag forward on their beds, they grind, furrow, and smooth the rocks over which they flow. The peculiarly muddy character of the water that escapes from the terminal front of a glacier shows how powerful this erosive action must be, for the mud carried in suspension is simply the fine flour of the rocks which has resulted from the grinding action. The sea, again, acts like a great horizontal saw, which is continually rasping away the rocks along the coast. Cliffs are in this way undermined, rock-falls take place, and the tumbled rock-masses are by-and-by pounded down into shingle, gravel, and sand, which are hurled by the waves against the cliffs, and thus ere long the latter are again undermined, and further rock-falls take place.

The chief denuding agents have now been mentioned, but the destructive action of plants and animals cannot be ignored. Thus plants aid in the demolition of rocks by sending their roots into rock-crevices and wedging the masses asunder, and hence they aid the freer percolation of water, and prepare the way for the better action of frost. Vegetation also, by attracting rain, tends to increase the flow and erosive action of streams and rivers, while its decomposition yields to rain those organic acids which so greatly increase the chemical action of that agent. The destructive action of animals, again, is seen in the weakening of rocks on a sea-coast produced by the drilling and boring of *Saxicava*, *Pholas*, &c., and by annelids, echini, and sponges. Rocks so weakened fall more readily before the battering of waves and breakers. Thus, the whole surface of the land, from the summits of mountains down to the sea-coast, is subject to denudation. Little change may be perceptible in a lifetime or even during many centuries, but an examination of the rocks shows that many thousands of feet of solid strata have been gradually removed from the surface of a country. Thus, in many districts where faults occur, no inequality at the surface betrays the presence of dislocations; the whole area has been reduced by denudation to the same level, hundreds or even thousands of feet of strata having been removed from the upcast side of the faults (see DISLOCATION). Some attempts have been made to form a rough estimate of the rate at which the general surface of the land is reduced by denudation. As the sediment of gravel, sand, and mud which a river carries down to the sea represents the actual loss sustained by the surface of the area drained by it and its tributaries, it is obvious that if we could correctly estimate the amount of sediment transported to the sea by the rivers of any given area, we should at the same time ascertain the rate at which that area is denuded. Observation has shown that this denudation proceeds more rapidly in some regions than in others, and, therefore, that the work of no individual river can be taken as a standard by which to estimate the general rate of erosion all the world over. Much depends on physical and climatic conditions, and much on the geological structure of a country and the composition of its prevalent rock-masses. Thus, the Mississippi is said to remove

from the general surface of its basin 1 foot in 8000 years, the Rhone 1 foot in 1528 years, the Po 1 foot in 729 years. To the matter mechanically suspended in the water or swept forward on the beds of rivers we have to add the matter carried in solution, which in many rivers is very considerable. Rivers like the Rhine, the Danube, the Elbe, and the Rhone, contain in every 6000 parts by weight one part of dissolved mineral substance. These rivers, therefore, carry seawards their own weight of dissolved matter in 6000 years. Thus, subaerial denudation progresses more rapidly than we should at first be led to suspect, and those geologists who have made a special study of this question do not hesitate to assert that the action of the subaerial agents of denudation is far more effective than that of the sea, for whereas the action of the latter is confined to a narrow belt of land, that of the former has no such limitation. The whole land surface is exposed to attack, and the loose material carried down to the sea far exceeds in amount the waste of the coast-line by waves and breakers.

**Denver**, the capital of Colorado, is situated on the South Platte River, 922 miles W. of St. Louis. It lies on a level plain, 5169 feet above the sea, beyond which rise the snow-capped peaks and deep blue shoulders of the Rocky Mountains. Denver was founded on a barren waste, dry and treeless, in 1858, and the close of the Civil War saw it a rising frontier town; in 1870 the population was 4759; in 1880, 35,629; in 1900 it had increased to 133,859. In thirty years the mining-camp had been transformed into the 'Queen City of the Plains,' with stately buildings of brick and yellow stone, and wide, shaded streets, provided with electric light and electric tram-cars, and had become the meeting-point of a great network of railways, with four direct routes to the east. In 1910 the population was 213,381; in 1920, 256,491. Among the public institutions and buildings are the state capitol, of Colorado granite and marble, built in 1887-95; the federal building, with U.S. custom-house and post-office, the county court-house, the U.S. mint, the auditorium, the mining exchange, the university (Methodist), with its observatory and other out-buildings, colleges of medicine, law, theology, and music, hospitals, sanatoriums, a zoological garden, the Jesuit college, the Carnegie library, several museums, the episcopal cathedral and many imposing churches, public schools, and theatres. There are many beautiful parks, and an abundant water-supply. The clear invigorating air and dry climate of Denver are famous; the mean annual temperature is 48° F., and the rainfall 17 inches. Denver is the centre of a great agricultural and mining district, and has a large trade in cattle, hides, wool, and tallow, with varied manufactures. It is chiefly to its position as the centre of a great mining region that Denver owes its marvellous progress; the discovery, in 1878, of the fabulous wealth of the Leadville Hills attracted capital and immigration from all parts of the continent. It has a United States assaying mint, and is an important ore market. The neighbourhood produces not only metals—lead, copper, iron, gold, and silver—but also coal, which has created a large smelting industry. It is, in fact, the emporium of the rich gold and silver mining districts of the state, and the chief centre of the coal trade in that region. See also COLORADO.

**Deoband**, a town in the United Provinces of India, 15 miles N. of Muzaffarnagar by rail, with manufactures of fine cloth, and a trade in grain, sugar, and oil. Almost two-thirds the inhabitants are Mohammedans. Pop. 19,000.

**Deodand**. A personal chattel which was the immediate and accidental occasion of the death of a reasonable creature, was, by the law of England, forfeited to the crown, in order that it might be applied to pious uses, or given to God (*Deo dandum*), as the term implies. The law of deodand was abolished by statute in 1846.

**Deodar** (DIODAR), a petty native state in the Palanpur Superintendency, Bombay presidency, with an area of 364 sq. m., and about 30,000 inhabitants. It is a flat, open plain, with sandy soil and a hot climate; there are no rivers, and the numerous ponds are not employed for irrigation. Clarified butter is the only export.

**Deodar**. See CEDAR.

**Deodorisers** are chemical substances employed for the purpose of absorbing or destroying the odouriferous principles evolved especially from decomposing animal and vegetable matter. Thus, freshly burned charcoal is a powerful deodoriser because it absorbs sulphurous acid gas, ammonia, and other odorous gases. They belong to the classes of substances known as Antiseptics (q.v.) and Disinfectants (q.v.).

**D'Eon**. See ÉON.

**Deontology** (Gr. *deon*, 'that which is binding,' and *logos*, 'a discourse'), a term for the science of duty, Ethics (q.v.).

**Deoxidation**, or REDUCTION, is the process of withdrawing the oxygen from a compound, as in the reduction of the native peroxide of iron in the smelting-furnaces to the condition of metallic iron. On the small scale, in experimental inquiries, the process of deoxidation may be carried on before the Blowpipe (q.v.), where the inner or reducing flame is essentially a deoxidising one.

**Department** (Fr. *département*), a term used to denote a territorial division in France. Previous to the Revolution, France was divided into provinces; but in 1790 a decree of the Assembly ordered the abolition of the old provincial divisions (34 in number), and the redistribution of the land into 83 departments. During the year 8 of the Revolution, these were increased to 98; in 1814 the Empire consisted of 130; and the war of 1870-71 reduced it from 89 to 87, including the sadly diminished Haut-Rhin, now Belfort. The war of 1914-18 added Haut-Rhin, Bas-Rhin, and Moselle. The departments, each presided over by a prefect, are again subdivided into *arrondissements*. See FRANCE.

**Dephlogisticated Air**. See PHLOGISTON.

**Depilatories** (Lat. *depilo*, 'I pull out the hair') are chemical agents employed for removing superfluous hair from the skin. They were extensively used by the ancients, but are now restricted in their employment to the face, and to the removal of the hair from the scalp in the treatment of certain diseases. They should only be used under medical advice.

**Deponent**, a term in Latin Grammar applied to verbs having a passive form but an active signification. They are so called because they, as it were, lay down (Lat. *depono*) or dispense with the signification proper to their form. Such verbs had all originally a reflexive meaning, like the middle voice in Greek verbs; thus, *vescor*, 'I eat,' means radically, 'I feed myself.'—*Deponent* is also used for a person who makes a Deposition (q.v.).

**Deposit**, a term much used in Geology, to characterise those rocks which have been formed from matter that has settled from suspension or solution in water. Thus, sandstone and shale are rocks composed of materials which have settled from suspension in water; while stalactites and stalagmites have been precipitated from solution

in water. Deposits are characterised according to the conditions under which they were formed, as marine, lacustrine, fluvial, chemical, and so forth. See SEA, OOZE.

**Deposit**, in English law, is a branch of bailments, defined by Story to be 'a bailment of goods, to be kept by the bailee without reward, and delivered according to the object and purpose of the trust.' See BAILMENT.

**Deposition**, the testimony of a witness set down in writing. Depositions are taken either by a judge or by a commissioner specially appointed by him for that purpose. The questions to which the depositions are answers are usually put by the legal representatives of the parties to the suit, under the control of the court or commissioner, and the answers are taken down by the clerk of court, or by a clerk specially appointed for the purpose. It is a rule in the laws of evidence of all countries that the deposition cannot be read where the witness might be himself produced, because his oral testimony is the best evidence, and secondary evidence is never admissible.

**Depot**, MILITARY, in this country is a place in which recruits are trained and stores kept for Mobilisation (q.v.), and to which reservists come in on the order to mobilise. By the Military Forces Localisation Act of 1872, the United Kingdom was divided into seventy brigade depots. These were afterwards called regimental districts and renumbered. See ARMY.

**Depression**, or DIP. See HORIZON.

**De Profundis** ('out of the depths'), the first words of the Vulgate version of the 129th psalm (A.V. 130th), which is one of the seven 'penitential psalms,' and forms a portion of the liturgy of the Catholic Church, and is sung when the bodies of the dead are committed to the grave. A tender melancholy pervades the psalm, which, however, brightens at the close under the conviction that with God there is 'plenteous redemption.'

**Deptford**, on the south bank of the Thames,  $\frac{1}{2}$  miles below London Bridge, forms one of the metropolitan boroughs and part of another. In 1885 it was constituted a parliamentary borough, returning one member. The parish of Deptford St Nicholas, close on the river-bank, is included in the metropolitan borough of Greenwich. St Paul's parish is the only one in the borough. A royal dockyard, dating from the time of Henry VIII., was repeatedly visited by Queen Elizabeth, who here knighted Captain Francis Drake when he returned from his voyage round the world. It was closed in 1869. Twenty-one acres of its site were bought by the corporation of London, and fitted up as a foreign cattle-market. The Royal Victualling Yard is also here. The Trinity House Corporation has property here; and for sixteen years before his death, the Duke of Wellington as Master went in procession to St Nicholas Church with the Elder Brethren. Since then the ceremony has been disused, and the annual celebration takes place at Trinity Hall, London. Deptford was long famous for horticulture, but the gardens have mostly been built over or used for railway purposes. There is little ship-building now, but there are large and famous marine engineering establishments. In 1888-89 the Electric Lighting Company spent hundreds of thousands of pounds in erecting buildings and laying down plant for supplying London with light. Peter the Great worked here as a shipwright. Lord Howard of Effingham, John Evelyn, author of the *Diary*, Admiral Benbow, Grinling Gibbons, Captain Fenton the associate of Frobisher, and other famous persons lived here; and Christopher Marlowe the dramatist was killed here, and is buried in St

Nicholas churchyard. Deptford is divided from Greenwich by the Ravensbourne, and over the creek there is a bridge where formerly the *depe ford* crossed the river. The lower portions of Deptford were improved in 1888-89, at a cost of about £100,000; the upper portions, New Cross, and Hatcham abound in pleasant residences. The population has grown rapidly, from 27,896 in 1851 to 76,732 in 1881, and 112,500 (metropolitan borough) in 1921.

**Deputy**, one who exercises power which properly belongs to another who has placed him in his stead. The appointment of a deputy does not free the principal from responsibility. See SHERIFF.

**De Quincey**, THOMAS, author of *Confessions of an English Opium-eater*, and of many volumes of essays, criticism, and narrative, was born in Manchester on 15th August 1785. His father, Thomas Quincey, was a linen-merchant with a turn for literature; his mother, whose maiden name was Penson, was a woman of superior position and culture. Of eight children, Thomas was the fifth. An elder brother of imaginative temperament exercised much influence over him; and he records that he was profoundly impressed in childhood by the death of an infant sister. His early years were spent at a mansion built by his father near Manchester, named Greenhay; there his father died of consumption in 1792, leaving his widow and family well provided for. Thomas attended school first at Salford, then at Bath grammar-school, later at Winkfield, Wiltshire, and lastly at Manchester grammar-school. He was an apt scholar; he could converse fluently in Greek at fifteen. In 1802, when he was seventeen years of age, his health failed; and as his guardians refused to remove him from school, he ran away, to wander and study in Wales. He was allowed a guinea a week; but restlessness and want of books and of social intercourse impelled him towards London. There, failing to raise money on his expectations, he underwent singular experiences and privations, related with picturesque power in the *Confessions*. Ultimately he was sent to Worcester College, Oxford, on the inadequate allowance of £100 a year. He disliked and perhaps despised the university system, and left in 1807.

It was in Oxford that De Quincey first resorted to opium to allay pain; the use of the drug for that purpose, and also as a mental stimulant, subsequently became an overmastering and lifelong habit. His mother had now settled near Bath, and at Bristol De Quincey became acquainted with Coleridge's family; and through that connection visited Wordsworth and Southey at the Lakes. In 1808 he revisited Oxford; then went back to London, where he associated with Knight, Lamb, Hazlitt, and other men of letters. In 1809, having provided himself with an ample library, he settled to a literary career at Grasmere. Here, in 1816, he married Margaret Simpson, the daughter of a 'statesman,' one of nature's gentlewomen. They had eight children, three daughters and five sons, two of whom distinguished themselves as soldiers. For about a year (1819) he edited the *Westmoreland Gazette*, a weekly paper published at Kendal, and was an undistinguished contributor to *Blackwood's Magazine*, the *Quarterly Review*, and other periodicals, till his return to London in 1821. His *Confessions* appeared in the *London Magazine*, and at once made him famous. His *nom de guerre*, 'The English Opium-eater,' was used till he came to be known by his proper name, in writing which he assumed the Norman prefix *de*. From London he returned to his wife and family at Grasmere, but finally left Westmorland in 1828, and settled in

Edinburgh; and there, or at Lasswade, near Edinburgh, with only an occasional visit to Glasgow, he lived and worked till his death, on 8th December 1859. *Blackwood's*, *Tait's Magazine*, and latterly *Hogg's Instructor*, were for upwards of twenty years the successive receptacles of his brilliant though often diffuse and discursive papers. The *Logic of Political Economy* (1844), a philosophical contribution to that study, and a romantic story or novel, *Klosterheim* (1839)—his sole and not very successful effort in regular fiction—were issued as books; all his other writings appeared in magazines.

No 'periodical' writer of the 19th century holds a like high and apparently permanent place in English literature with De Quincey. Of several collected editions of his works, the first was one issued in America (1852-55), in 20 vols.; a second, revised by De Quincey, in 14 vols.; another, extended, in 17 vols.; and a fifth, in 1889-91, in 14 vols., ed. by Prof. Masson. De Quincey's writings range over a vast field of literary and semi-philosophical speculation and discussion; and there, as well as in his narrative, historical, critical, and biographical essays, almost faultless refinement of style and marvellous mastery of phrase are conspicuous and charming. In criticism he is original and acute, if not exhaustive or profound; in narrative he marshals facts and incidents in the most picturesque garb and order; in argument he is always subtle, and often vigorous. His playful fancy and wealth of whimsical and humorous allusion enliven almost every topic, and the daring conception and gorgeous colouring of his opium-haunted dreams are not less admirable than the pomp and refinement of the language in which he clothes those weird and wondrous visions. De Quincey is, however, often distressingly diffuse and provokingly addicted to complex involutions of phrase and statement—parenthesis within parenthesis. He is therefore at his best when those tendencies are under control, as in certain passages in the *Confessions*, or in the splendid apostrophes—examples of what he himself calls 'impassioned prose'—that glorify such papers as 'Joan of Arc.'

See Page (A. H. Japp), *Life and Writings of De Quincey* (1877), and *Memorials* (1891); Masson, *De Quincey* ('Men of Letters,' 1881), *Selections* (2 vols. 1888); J. R. Finlay, *Personal Recollections* (1886); Hogg, *De Quincey and his Friends* (1895); Sidney Low, *De Quincey* (1911); W. E. A. Axon, *The Canon of De Quincey's Writings* (Trans. Roy. Soc. Lit., 1912).

**Derain**, ANDRÉ, French figure, landscape, and still-life painter, was born in 1880. He combines the influences of Cézanne and Gauguin with the primitives, the Cubists with the *fauves*, reconciles the new movements with tradition, European and national, and has come to be looked to as their chief by his generation of French painters.

**Derajat**, the fluvial portion of Daman (q.v.), between the Suliman Mountains and the Indus, is, when duly irrigated, singularly fertile. It is now divided between the districts of Dera Ghazi Khan in the Punjab, and Dera Ismail Khan in the North-west Frontier Province.—Dera Ghazi Khan, the capital of one of the districts, is about 2 miles W. of the Indus; pop. 18,500.—Dera Ismail Khan, capital of the other district, is  $4\frac{1}{2}$  miles W. of the Indus; pop. 35,000.

**Derayah**, a town of Arabia, on the caravan route between the Red Sea and the Persian Gulf, 450 miles N.E. of Mecca, was formerly the capital of the Wahabis, and had a population of 60,000 prior to 1819, when it was taken and nearly destroyed by Ibrahim Pasha. The capital was removed to Riâd, 6 miles E.N.E.; and at present the place consists of five walled villages, built among the ruins, with about 1500 inhabitants.

**Derbend**, or DERBENT ('gateway'), a port and capital of the Russian republic of Daghestan, on the west shore of the Caspian, 140 miles N.W. of Baku. It is charmingly situated among vineyards and orchards and fields of maize and madder, on the declivity of a branch of the Caucasus, which here approaches very close to the water's edge. Derbend is surrounded by ancient walls. The upper city forms the citadel, and contains the splendid palace of the ancient khans, later the residence of the Russian governor. The harbour is inaccessible to all but small vessels; but a considerable trade is done at the four large markets held here yearly. Silk and cotton fabrics, earthenware, and weapons are manufactured, and saffron is cultivated. Pop. 40,000. Derbend was for long considered the key of Persia on the north-west side. It was captured by the Arabs in 728, by the Mongols in 1220, and frequently changed hands before it was formally incorporated with Russian Caucasia in 1813.

**Derby**, a parliamentary, municipal, and county borough and manufacturing town, the capital of Derbyshire, stands on the Derwent, 92 miles S.E. of Liverpool and 114 NNW. of London. The Roman station of *Derwentio* was at Little Chester, a northern suburb of Derby. It was one of the Danish Five Boroughs. Many early charters were granted to the bailiffs and burgesses of Derby; but it was not till 1638 that it was placed under the jurisdiction of a mayor. It has sent two members to parliament since 1295. The tower of All Saints (1509-27) is a grand example of Perpendicular architecture, 175 feet high, exclusive of the pinnacles. All Saints was selected for the cathedral of the new diocese of Derby, which it was decided in 1923 to detach from Southwell. The Roman Catholic Church of St Mary (1835) is a good specimen of Pugin's work. The ancient chapel of St Mary-on-the-Bridge still exists. The municipal buildings are unattractive. There is a good free library and well-filled local museum, occupying handsome and suitable buildings, the gift of Mr M. T. Bass, for thirty-five years M.P. for Derby. The grammar-school is a modern erection, but was founded in 1162. The choicely planted arboretum (23 acres), near the central railway station, was mainly the gift (1840) of Mr Joseph Strutt. Derby is a great railway centre, with vast offices, storehouses, workshops, and engineering establishments, and direct, speedy, and frequent access to all parts of the kingdom. Its manufactures are silk, cotton, elastic web, lace, hosiery, iron, lead, shot, spar, porcelain, and paper. Silk, one of its staple manufactures, was begun here first in England by John Lombe in 1719. The mill that he then erected still stands on an island in the Derwent. Porcelain was manufactured here by the Duesbury family from 1756 till 1814; and the Derby Crown Porcelain Company revived this beautiful industry with much success. 'Wright of Derby,' the painter, and Herbert Spencer, were natives; and Derby is identified with the 'Stoniton' of George Eliot's *Adam Bede*. Pop. (1841) 32,741; (1881) 81,168; (1891) 94,140; (1901) 105,785; (1911, with extended bounds) 123,410; (1921) 129,836.

**Derby**, EARL OF, a title conferred in 1485 on Thomas, second Lord Stanley, two months after Bosworth Field, where he and his family had greatly contributed to Richmond's victory. The Stanleys were descended from William de Stanley, who became forester of Wirral by marriage with an heiress in the 13th century. In 1405 Sir John Stanley, who had married the heiress of Lathom, got a grant of the Isle of Man (q.v.), which he and his descendants ruled till 1736. James, seventh Earl of Derby

(1606–51), fought on the royalist side throughout the Great Rebellion, and, taken prisoner after Worcester, was beheaded at Bolton; his countess, Charlotte de la Trémoille, is famous for her heroic defence of Lathom House (1644) and of the Isle of Man (1651).

EDWARD GEOFFREY SMITH STANLEY, fourteenth EARL OF DERBY, was born in 1799, at Knowsley Hall, Lancashire. He was educated at Eton and Christ Church, Oxford, where, in 1819, he gained the Latin Verse prize (subject, *Syracuse*). He was elected member of parliament for Stockbridge in 1820; in 1825 he married the second daughter of the first Lord Skelmersdale; and in 1826 he represented Preston, but lost his seat in 1830, on becoming Chief-secretary for Ireland under the administration of Earl Grey. A seat was soon found for him at Windsor. He took a distinguished part in the debates in favour of the Reform Bill, and signalled his Irish administration by two bold measures—one for National Education in Ireland, and another relative to the Irish Church Temporalities, which resulted in ten Irish bishoprics being abolished. The grievance of church-rates and first-fruits was also removed, and a graduated tax upon benefices and bishoprics substituted. In 1833 he became Secretary of State for the Colonies, and in the same year carried the bill for emancipating slaves in the West Indies. In 1834, being alarmed by the success of Mr Ward's motion for appropriating the surplus of the Irish Church temporalities to secular purposes, Mr Stanley seceded from the Whigs, carrying with him Sir James Graham, the Duke of Richmond, and the Earl of Ripon. In November, upon the dismissal of the Melbourne ministry, he declined to join the Peel administration, and the Stanleyites maintained an independent position for several years. He accepted, however, the colonial seals in 1841, and held them for four years. In 1844 he resigned his seat for North Lancashire, for which he had sat since 1832, and was called to the Upper House in his father's barony of Stanley of Bickerstaffe, having for ten years before borne the courtesy title of Lord Stanley, through his father's succession to the earldom of Derby. In December 1845, when Sir Robert Peel determined to repeal the corn laws, he retired from the cabinet. In 1846 he put himself at the head of the Protectionists, who, headed in the Commons by Lord George Bentinck and Mr Disraeli, waged a stout but ineffectual opposition to the free-trade measures of Sir Robert Peel. He was now regarded as the leader of the great Conservative party.

In 1851, on the death of his father, he succeeded to the earldom. In February 1852, on the resignation of Lord John Russell, he was intrusted with the formation of an administration, which was, however, displaced in December following by a hostile vote of the House of Commons condemnatory of Disraeli's budget. On Wellington's death (1852) he was elected Chancellor of the University of Oxford. In February 1858, when the Palmerston government resigned on the rejection of the Conspiracy Bill, he again became First Lord of the Treasury. At the meeting of parliament in the following year, his government brought forward a measure of parliamentary reform. A hostile amendment having been moved by Lord John Russell, and carried, he dissolved parliament, and appealed to the country. When the new House of Commons reassembled in June 1859, a vote of want of confidence was carried against his government, and he resigned. He returned to power in 1866, and, in conjunction with Disraeli, passed the Reform measure of 1867. In 1868 he resigned the premiership in favour of Disraeli. His last speech in

parliament was made (1869) in opposition to the disestablishment of the Irish Church. He died at Knowsley Hall, 23d October 1869. Lord Derby was styled by Lord Lytton 'the Rupert of debate,' and stood in the very first rank of parliamentary speakers. His power of invective was almost unequalled, and his vehement contentions with O'Connell on the Repeal of the Union did much to diminish the influence of the Irish agitator. Besides being an accomplished scholar, he was a keen sportsman and a popular landlord. But he cared little for office, and more than once injured the fortunes of his party by declining to form a ministry, notably on the fall of Lord Aberdeen in 1855. Lord Derby (who was offered the crown of Greece in 1862–63) published in 1864 a blank-verse translation of Homer's *Iliad*. See *Lives* by Keibel (1890), and Saintsbury (1892).

EDWARD HENRY SMITH STANLEY, fifteenth EARL OF DERBY, K.G., D.C.L., LL.D., F.R.S., eldest son of the above, was born in 1826, and educated at Rugby and Trinity College, Cambridge, where he took firsts in classics and mathematics. In 1848 he was elected member of parliament for King's Lynn, and in 1852 was appointed Under-secretary for Foreign Affairs in his father's first ministry. After declining to join Lord Palmerston's ministry in 1855, Lord Stanley became Secretary for India in his father's second administration (1858–59), and carried the important measure which transferred the government of India from the Company to the crown. He was Foreign Secretary in the third Derby and first Disraeli ministries (1866–68). He succeeded his father in the earldom in 1869. In 1874 he again became Foreign Secretary under Disraeli; but resigned in March 1878, when the majority of the cabinet determined to support the tottering cause of Turkey by calling out the reserves and occupying Cyprus. After holding aloof from politics for several months, he definitely joined the Liberal party in 1880, and was Secretary for the Colonies from 1882 to 1885. In 1886 he declined to follow Mr Gladstone on the question of Home Rule for Ireland, allying himself with the Unionist party. Lord Derby, who was Lord Rector of Glasgow University in 1868–71, and of Edinburgh University in 1875–80, died at Knowsley, 21st April 1893. His *Speeches and Addresses*, privately printed in 1893, were published with a *Memoir* by Lecky in 1894. His speeches on economical subjects were singularly suggestive.

His brother FREDERICK ARTHUR STANLEY, sixteenth Earl (1841–1908), Governor-general of Canada (1888–93), was succeeded by his son EDWARD GEORGE VILLIERS STANLEY, K.G., G.C.B., who, born 4th April 1865, had as Lord Stanley sat as a Conservative for West Houghton (1892–1906), and had been a Lord of the Treasury (1895–1900), Chief Press Censor in South Africa, and Private Secretary to Lord Roberts, Financier, Secretary to the War Office (1900–3), and Postmaster-general (1903–5). As Director-general of Recruiting, he managed the 'Derby Scheme.' He was Secretary for War under Mr Lloyd George, Mr Bonar Law, and Mr Baldwin, and ambassador to France, 1918–20.

**Derby Day** is the second day, the Wednesday, of the Summer Meeting which takes place at Epsom in Surrey, usually towards the end of May, but sometimes early in June. Upon this day, the most important on the list, and that on which the best horses run, the famous Derby stakes, instituted by the Earl of Derby in 1780, are contended for. When the first Derby was run for, there were only 36 subscribers at 50 guineas each (with 25 guineas forfeit in case of non-starters); and for the first half-century the subscribers never numbered 90; but after 1830 there was a rapid increase, and in

1879 (which completed the century) there were 278 subscribers, and the value of the stakes exceeded £7000. Subsequently the numbers diminished till, in 1888, there were only 158 subscribers, and no more than nine horses ran, while the value of the stakes was £3675. In order to increase the competitors in future, the conditions of the race were then altered. Since 1825 (when the subscription was changed from guineas to sovereigns) the fee has been £50 each, with £25 forfeit in case of non-starters; and the value of the stakes has varied with the number of subscribers. Under the new regulations (coming into operation with the Derby of 1890) there was a fixed prize of not less than £5000 for the winner, and smaller prizes for second and third; and any surplus from the entrance fees went to the winner. The full subscription is still £50, but there are two forfeits—viz. £10 only if the declaration of forfeit is made about eighteen months prior to the race, or £25 if made about six months before the race. The entries are made about two years before the race, when the animals are yearlings. The alteration of conditions proved attractive to racehorse owners, as the entries for the Derby of 1890 rose to 238. In 1903 the Derby was made a stake of £6500, with £400 and £200 for the second and third, or more according to subscriptions. In 1915–18 the race was run at Newmarket, owing to war conditions. The Derby Day is a great English holiday. To be present at Epsom on that occasion London empties itself, and proceeds to the Downs by modes of locomotion the most heterogeneous. For hours a continuous stream of vehicles moves tumultuously along the road to Epsom. Parliament used to adjourn; people of every condition come in countless numbers from all districts, and huge trains arrive every few minutes at the station, bringing their thousands, until the entire Downs are covered with a vast moving mass. At the Derby in 1861, the course, which is a mile and a half in length, was gone over in 2 minutes 43 seconds—the swiftest running, by 2 seconds, ever known on that course up to that time. In 1864 the race was run in the same time, although the horses carried 3 lb. more weight than before. In 1887 and again in 1888 the race was run in 2 minutes 43 seconds, although 4 lb. more had been added to the weight. When the Derby was first instituted the weights were 8 stone for colts and 7 stone 11 lb. for fillies; but they have been raised several times, until now colts have to carry 9 st. and fillies 8 st. 9 lb. It was run in 1910 in 2 minutes 35½ seconds; in 1920, in 2 minutes 34½ seconds.

**Derbyshire**, an inland county of the north midland district of England, lies between Yorkshire on the north and Leicestershire on the south, and is flanked on the east by Notts, and on the west by Staffordshire and Cheshire. The shire is of an irregular triangle shape, with the apex to the south; its greatest breadth is 34 miles, and its length 56; its area extends over 1016 sq. m., or 650,369 acres. Pop. (1801) 161,567; (1841) 272,202; (1881) 461,914; (1921) 714,539. The surface of the county is much diversified, the south being for the most part flat, the east of a varied and undulating character, but the north exceptionally hilly and rugged. The high land of the north, usually known as the Peak, is the southern termination of the Pennine Chain, and forms the watershed between the Trent and the Mersey. Several summits exceed 2000 feet in height. North Derbyshire is justly celebrated for its picturesque scenery, which chiefly centres in the valleys made through the limestone by the rivers Derwent and Wye. Matlock and Buxton, where there are warm mineral springs, are the two chief places of resort. Other chief towns are Derby, Chesterfield, Glossop, Ilkeston, Ashbourne, Bakewell, Belper, and Wirksworth.

The county now returns eight members to parliament, besides two for the borough of Derby.

In addition to important coal-mining, chiefly in the eastern division, Derbyshire is singularly wealthy for its area in a diversity of minerals and metals; iron, lead, zinc, manganese, copper, gypsum, pipeclay and chert for potteries, marble, fluor-spar, and alabaster being all worked within its boundaries. The chief manufactures are cotton, silk, elastic web, worsted, flax, lace, metallic goods, porcelain and pottery, and fluor-spar ornaments. Though more a manufacturing and mining than an agricultural country, Derbyshire is not undistinguished for its pastoral and corn-growing properties. The chief crops are wheat, barley, and oats. Of the total area, three-fourths is under crops of all kinds, bare fallow, and grass. There is much permanent pasture and large sheep-walks in the Peak district. Several dairies of repute are in the south of the county, and their produce is chiefly taken by cheese-factories on the American principle. There are ruins of abbeys at Dale and Beauchief, and peculiarly fine churches at Melbourne, Ashbourne, and Tideswell. The Saxon crypt and chancel of Repton, and the churchyard crosses of Eyam, Bakewell, Hope, &c., are the oldest ecclesiastical remains. Of feudal and domestic buildings may be named the castles of Castleton, Bolsover, and Duffield, the manor-house of South Winfield (ruin), Haddon Hall, and Hardwick Hall. Chatsworth (q.v.), the seat of the Duke of Devonshire, is unrivalled. The caves and numerous tumuli or 'lows' have yielded many evidences of prehistoric and Celtic man; whilst the traces of Roman occupation are numerous. Arbelow, near Youghreave, is the most important 'stone circle' in England next to Stonehenge. Though a turbulent county in English history, and ever taking part in all civil tumults, Derbyshire has not furnished the site of any remarkable battle nor played any special part in national affairs; its chief historic association is the retreat in 1745 of Prince Charles Edward, Derby being the turning-point in his bold but rash enterprise. The county claims as natives, Flamsteed the astronomer, Richardson the novelist, Chantrey the sculptor, and Brindley the engineer. Lombe first established an English silk-mill at Derby in 1719, and Strutt and Arkwright first made English calicoes at Gromford in this county in 1773.

See Pendleton's *History of Derbyshire* (1886); the works of Dr Cox, *Guide to Derbyshire, Churches of Derbyshire* (4 vols. 1876–79), and *Three Centuries of Derbyshire Annals* (1891); *The Old Halls, Manors, and Families of Derbyshire* (1891 *et seq.*); and the 'Victoria History' (1906 *et seq.*).

**Derbyshire Neck** is Goitre (q.v.).

**Derbyshire Spar** is Fluor-Spar (q.v.).

**Dereham**, EAST, a pleasant, thriving market-town of Norfolk, 17 miles WNW. of Norwich. Here, in 650, St Withberga founded a nunnery. It was burned by the Danes, but afterwards re-founded; and its cruciform church remains, with a detached belfry (the 'New Clocker'), a font of 1468, a good south porch, St Withberga's well, and the grave of the poet Cowper. Bonner was a vicar, and Wollaston and Borrow natives. Dereham has manufactures of agricultural implements. Pop. of urban district (1921) 5659.

**Derelict**, anything forsaken or left unoccupied, specially a wrecked ship; but it is necessary that the master and crew shall have abandoned the ship, without hope of recovery. When abandonment has occurred, the first-corners are entitled to take temporary possession of the ship. See SALVAGE, WRECKS. Wooden ships are more apt to become derelict than iron ones, and timber-laden ships are

specially liable to become dangerous in this way. The North Atlantic as the great ocean highway is most embarrassed by derelicts. In five years as many as 950 derelict ships have been reported at Washington between 52° W. lat. and the American coast. The British Board of Trade, the Washington Hydrographic Office, and the Deutsche Seewarte receive reports of derelicts noticed at sea, and issue information about them to shipmasters. Some ships have been known to float derelict for two or three years, and in that time to have drifted to and fro for 3000, 8000, or even 10,000 miles. See an article in *Chambers's Journal* for 1911.

**Derg**, ЛОУН, the largest lake expansion of the river Shannon, separating Tipperary from Galway and Clare, is 24 miles long, with an average width of 2 miles; greatest depth, 80 feet. Its surface is about 100 feet above the sea.—Another Lough Derg, in the south of Donegal county, is 3 miles by 2½, has many small isles and rocks, and wild dreary shores. Saint's Isle contains the remains of a priory. Station Island, the reputed entrance to St Patrick's Purgatory, was long the most celebrated place of pilgrimage in Ireland.

**Derketo**, Greek form of ATARGATIS, the name of the Syrian fertility goddess, female counterpart of Baal. She was worshipped, especially at Hierapolis, with phallic emblems, orgiastic rites, and self-mutilation. See Lucian, *De Dea Syria*.

**Dermaptera**. See FLYING ANIMALS, INSECTIVORA.

**Dermatogen**. See EMBRYO.

**Dermatology**. See SKIN.

**Dermatophytes** (Gr. *derma*, 'the skin,' and *phyton*, 'a growth' or 'plant'), vegetable growths, chiefly of the lowest fungi, moulds, &c., inhabiting the cuticle or epidermis, and giving rise to some forms of skin-disease, as Favus (q.v.), Pityriasis (q.v.), Ringworm (q.v.), &c.

**Dermestes**, a genus of beetles, one of which is *D. lardarius*, the Bacon Beetle. It lives in the open air on dead animals, but within doors attacks bacon, cheese, dried meats, furs, cabinet collections, &c. The brown larvæ are equally voracious.

**Derna**, an exposed port on the coast of the province of Barca or Bengazi, half-way between Bengazi and Sollum, on a fertile and well-watered coast strip, with a good deal of trade; pop. 11,000. It was occupied by the United States in 1805, and taken possession of by the Italians in 1911.

**Derrick**, a kind of Crane (q.v.), so named after Derick, an English 17th-century hangman.

**Derry**. See LONDONDERRY.

**Dervish**, signifying 'poor,' is a Persian word (derived from a root connected with 'door,' indicating the door-to-door mendicancy of the dervish) of which the Arabic equivalent is *Fakir* (q.v.). It designates, in Mohammedan countries, a class of devotees who correspond in their various aspects with the monks, the mendicant friars, and the freemasons of medieval Europe. Some are wanderers, depending upon alms, and often demanding charity with insolence; others are settled for the most part in convents, called Tekyas or Khânkâs, where they observe special rites, or devote themselves to solitary meditation and penance; others, again, are more like freemasons—ordinary tradesmen and labourers for most of the year, and exercising their special ceremonies only on stated occasions; whilst some, again, form a class of religious entertainers, who are hired out to chant their monotonous dirge or *Zikr* at public and private festivals. They belong to an infinity of orders or brotherhoods, among which the best known are the Kâdiris (commonly known in Europe as the 'howling dervishes,'

on account of their peculiar chant), founded 1165 A.D.; the Rifâ'is (1182), formerly famous for their feats of eating glass and live coals and swallowing swords, and also for the ceremony, recently abolished, of the *Döşeh*, where the sheikh of one of their sub-orders (the Sa'dis) rode over the prostrate bodies of the faithful in the streets of Cairo; the Mevlevîs (1273), or 'dancing'—i.e. whirling—dervishes; the Nakhshibendis (1319); Bektâshis (1357), whose founder blessed and named the famous corps of Janizaries (q.v.); the Jemâlis (1750); and the Kalerideris, the 'calenders' of the *Arabian Nights*, who are under a vow of perpetual tramping: the names are taken from those of their founders.



Mevlevîs, or Dancing Dervishes.

The various orders have distinctive dresses, and the sheikh or pir who commands them is also distinguished from his followers by his robes. The conical cap of the Mevlevî is well known. The rites of the different orders when they meet together vary, but consist chiefly in prayers, religious dances, monotonous recitations of the name of God and of certain pious formulas. Frequently the devotees work themselves into a state of spiritual frenzy which is accompanied by extravagant, and, to the vulgar, miraculous, feats of strength and endurance, and not unfrequently terminates in an epileptic seizure. The dervishes and their performances are held in the deepest veneration by the people, and sultans have often held them in high respect, and bestowed large endowments upon their tekayas.

It is difficult to say when these religious orders took their rise. From the earliest times, pious persons in the East have held it to be meritorious to renounce earthly joys, to free themselves from the trammels of domestic and social life, and to devote their thoughts in poverty and retirement to the contemplation of God. In this sense, poverty is recommended by Mohammed in the Koran, though monachism is distinctly repudiated. Tradition refers the origin of these orders to the earliest times of Islam, making the khalifs Abû-bekr and 'Alî found such brotherhoods; but most of them are of much later date.

**Derwent**, the principal river of Tasmania, issues from Lake St Clair, in the centre of the island; flows tortuously to the south-east; and enters Storm Bay at Hobart by an estuary 4 miles wide, after a course of about 130 miles. Up to Hobart the Derwent is navigable for ships of any burden.

**Derwentwater**, a sheet of water, stretching south from Keswick, the most beautiful of the Cumberland lakes. Lying 244 feet above sea-level, and engirt by steep wooded crags and hills, it is 3 miles long by 1½ broad, and 72 feet deep at the deepest. Near its foot rises Castle Head (529 feet),

commanding an exquisite view; whilst at its head are the celebrated Lodore Falls and Borrowdale (q.v.). This lake is an enlargement of the Derwent River, which traverses it in its course towards the Irish Sea at Workington. It has several wooded isles, sometimes a floating island. Perch are the most plentiful fish. See FLOATING ISLANDS.

**Derwentwater**, JAMES RADCLYFFE, EARL OF, one of the leaders in the rebellion of 1715, was born in 1689, and educated in France. He succeeded as third earl in 1705, on the death of his father, who had married Lady Mary Tudor, Charles II.'s daughter by Moll Davis. On the eve of the insurrection, at the close of 1714, warrants were issued on suspicion against several gentlemen in the north of England, and one, among others, against the young Catholic earl; but having been previously warned, he fled from Dilston, his seat in Northumberland, and found refuge in the cottage of one of his dependents. He soon afterwards placed himself at the head of a few retainers, under the impression that the whole body of the Jacobites either had risen, or were about to rise. From this point the history of the Earl of Derwentwater becomes the history of the Rebellion of 1715 (see JACOBITES), which ended in the disastrous encounter at Preston, where Derwentwater bore himself with the utmost heroism, but, with most of the rebel leaders, was taken prisoner, and conveyed to the Tower of London. Impeached of high treason at the opening of parliament, he was brought to trial in Westminster Hall, when he pleaded guilty, and threw himself upon the mercy of the king. His appeal was unavailing, and he was condemned to die. Every possible effort was made by his kinsfolk and friends to obtain a pardon, but their exertions were fruitless, and he was beheaded on Tower Hill, 24th February 1716. His youth and amiability, his rank and valour, combined to excite great sympathy for the hapless earl. He is the hero of a touching ballad of the day, and of *Dorothy Forster*, Sir Walter Besant's charming romance.

**Derzhavin**, GABRIEL ROMANOWICZ, the great poet of the age of Catharine, was born at Kazan, 3d July 1743 (o.s.), studied at the gymnasium of his native city, and in 1762 entered the army as a private soldier. His talents and superior education soon procured him promotion. In 1791 he became Secretary of State; in 1800, Imperial Treasurer; and in 1802, Minister of Justice. He died 9th July 1816. His poetry shows a vigorous imagination and strong power of expression, though his imagery at times verges on bombast. His lyric pieces are full of fire. His noblest, as well as his most popular ode, is his *Address to the Deity*, which has been translated into the western languages. His collected works have often been republished since 1798.

**Desaguadero** ('channel' or 'outlet'), the name of various waters in South America, of which the principal is the Rio Desaguadero in Bolivia (q.v.).

**Desaix de Veygoux**, LOUIS CHARLES ANTOINE, a famous French general, was born of a good old family at St Hilaire-d'Ayat, in Auvergne, August 17, 1768. Entering the army at fifteen, in 1796 he covered himself with glory by his heroic conduct in Moreau's famous retreat through the Black Forest. Behind the ruinous fortress of Kehl, Desaix resisted the Austrian army for more than two months, only capitulating in January 1797, when his ammunition was spent. His greatest achievement was the conquest of Upper Egypt, which he accomplished in 1799, after an eight months' campaign. His own soldiers used to compare him to Bayard, while the inhabitants named him 'the Just Sultan.' Desaix returned from Egypt just in time to take part in

the battle of Marengo, in which he was killed by a musket-bullet, 14th June 1800.

**De Sanctis**, FRANCESCO (1817-83), Italian critic, historian, and minister of education, was born at Morra. A teacher in Naples, he took office under the revolutionary government in 1848, and was imprisoned for three years on the restoration of the Bourbons. On his release he fled to Malta, and lectured in Turin and Zurich. In 1860 he was minister of education for Naples, and in 1861-62, 1878, and 1879-80 for Italy. In 1871 he was appointed to a chair in Naples university. As a critic he was the forerunner of Croce (q.v.). His works include *Storia della letteratura italiana*, *Saggi critici*, *Nuovi saggi critici*, *La letteratura italiana nel Secolo XIX.*, and studies of Petrarca and Leopardi.

**Desaugiers**, MARC, a once popular poet, whom some critics have set above Béranger, was born in 1772. After travelling abroad, he settled in Paris, where he became a writer of songs and vaudevilles. His subjects are generally love and wine; his verse is sweet and flowing. 'He is,' says Mr Saintsbury, 'the best light song-writer of France, with the single exception of Béranger.' He died in 1827.

**Desbarres**, JOSEPH FREDERICK WALLET, military engineer, was born 1722 in England, of Huguenot parentage, and in 1756 sailed as lieutenant in the 60th foot for America, where he raised, and for a time commanded, a corps of field artillery. In 1757 he gained over the Indians who had captured Fort Schenectady; and at the siege of Quebec he was aide-de-camp to Wolfe, who was mortally wounded while Desbarres was making a report. He conducted the subsequent engineering operations during the conquest of Canada, and was quartermaster-general in the expedition that retook Newfoundland (1762). He made a survey of the coast of Nova Scotia in 1763-73, and afterwards prepared charts of the North American coast for Lord Howe. He was lieutenant-governor of Cape Breton (1784-1804), and of Prince Edward Island (1805-13), having attained the rank of colonel only in 1798. He died at Halifax, Nova Scotia, 24th October 1824, at the age of one hundred and two. His principal publication was the *Atlantic Neptune* (4 vols. 1777), a splendid collection of charts.

**Des'cant**, in medieval music, was the art of adding a part or parts to a melody or subject. The latter being almost invariably given to the tenor, descant came to signify generally the upper part, or *air*, of a piece. See COUNTERPOINT.

**Descartes**, RENÉ (Latinised into RENATUS CARTESIUS), generally regarded as the father of modern philosophy, was born March 31, 1596, at the village of La Haye, near Tours. He was sent at the age of eight to the Jesuit College at La Flèche, where he soon became distinguished for his keenness of intellect, and made great and rapid progress in languages, mathematics, and astronomy. It was not long, however, before he became dissatisfied with the doctrines and method of scholasticism, and felt it impossible to acquiesce in what had hitherto been regarded as *knowledge*. The first thing that he did after leaving college, as we are informed in his treatise on Method, was to abandon books, and endeavour to efface from his mind all that he had hitherto been taught, that it might be free to receive the impressions of truth, whencesoever they should come. In pursuance of his plan he resolved to travel, and served successively in Holland, Bohemia, and Hungary, in the armies of the Prince of Nassau and the Duke of Bavaria. It was while he was in winter-quarters at Neuburg on the Danube (St Martin's Eve, 1619, as he himself informs us) that there first dawned

upon him the principles of the new method which he afterwards applied in philosophy and for the reorganisation of knowledge generally. So in 1621 he left the army, but continued to travel as a private gentleman, with occasional residences in Paris, till 1629. In that year he retired to Holland, where he lived in great seclusion for twenty years, devoted to the elaboration of his discoveries and the publication of his chief works. In time his doctrines attracted many disciples in the land of his adoption, but involved him at the same time in bitter controversy with the Dutch theologians. These unpleasant encounters had probably their share in inducing him to accept an invitation to go to Sweden, addressed to him by Queen Christina, who desired his learned intercourse and instruction. He left Holland in September 1648, but his constitution was not able to stand the rigour of the northern winter and the exposure involved in waiting upon the queen at five every morning for an hour's philosophical instruction. He died at Stockholm of inflammation of the lungs on 11th February 1650. Sixteen years later his body was brought to Paris, and buried in the church of Ste. Geneviève-du-Mont. In 1819 his remains were again transferred to St Germain-des-Prés, where they now rest.

The grand object towards which Descartes directed his endeavours was the attainment of philosophical certainty. The way whereby he sought to attain this end is explained in the Discourse on Method (*Discours de la Méthode*, published in 1637). This small but extremely interesting and important treatise contains a history of the inner life of the author, tracing the progress of his mental development from its commencement in early years, to the point where it resulted in his resolution to hold nothing for true until he had ascertained the grounds of certitude. The author also, in the same treatise, lays down the methodical rules by which he resolved to guide his inquiries, and by the observance of which he hoped to arrive at *absolute certainty*, if indeed it were at all attainable. The results of his inquiries are indicated in the Discourse, but are exhibited more particularly in his *Méditations de Prima Philosophiæ* (Amst. 1641), and the *Principia Philosophiæ* (Amst. 1644). Doubt, according to Descartes, is the philosophic starting-point, the solvent which we must bring to bear upon all our inherited beliefs and opinions. This doubt is to be distinguished from scepticism, which is a permanent state of mind and involves despair of truth. It is to be regarded simply as an instrument of philosophical inquiry, and as such has received the name of Cartesian doubt. Applying this test relentlessly to all that had hitherto borne the name of knowledge, Descartes found one, and only one proposition that seemed to him to stand firm, and of which the truth could not possibly be doubted: that proposition was that he existed, which he inferred from the fact of his possessing consciousness. He could not doubt that he felt and thought, and therefore he could not doubt that *he*, the feeler, the thinker, existed. This relation between consciousness and existence he expressed by the memorable words: *Cogito, ergo sum*. On inquiring further into the ground of his certitude in the case of this proposition, Descartes was able to assign no further reason than that he saw very clearly that in order to think, it is necessary to exist. He formulated, therefore, the following criterion of certainty—that *whatever is clearly and distinctly thought, must be true*. Amongst these clear and distinct thoughts he soon recognised the idea of God as the absolutely Perfect Being. This idea, he reasoned, could not be formed in our minds by ourselves, for the imperfect can never originate the perfect; it must be *connate*—i.e. part of the original

structure of our understanding, and implanted there by the Perfect Being himself. Hence, from the existence of the idea of perfection, Descartes inferred the existence of God as the originator of it; he inferred it also from the mere *nature of the idea*, because the idea of perfection involves existence. The latter is known as the ontological argument, which Descartes thus reintroduced into modern philosophy. But if God exist, then we have a guarantee, according to Descartes, of the previously determined ground of certitude, for God the Perfect Being cannot deceive, and therefore whatever our consciousness clearly testifies may be implicitly believed.

The most general fundamental principle of the philosophical system of Descartes is the essential difference or dualism of spirit and matter—the thinking and the extended substances—a difference so great, according to Descartes, that they can exert no influence upon each other. Mind or spirit is pure consciousness, and matter is mere extension; these attributes are mutually exclusive, and hence these two 'created substances' can be united (as we find them, for example, in the human being) only through the intervention of the infinite substance or God. This doctrine led directly to the system called *occasionalism*, the principle of which was that body and mind do not really affect each other, God being always the true cause of the apparent influence of one on the other. A volition on our part is merely the *occasion* of God's producing a corresponding bodily motion, and similarly the material processes in the nerves and brain are only the occasion, not the cause, of the ensuing mental result. This doctrine was further developed by Leibniz in connection with his doctrine of pre-established harmony (see LEIBNIZ). The human body being thus a mere machine accidentally united to a rational soul, it was an immediate consequence of the Cartesian doctrine that animals (in which the rational soul is absent) are literally automata; their cries no more imply feeling than the creaking of a machine. This ruthless product of logical consistency unfortunately led to cruelty in practice.

Descartes did not confine his attention to mental philosophy. His philosophy is in fact only the introduction to an elaborate system of physics. In this department it is noteworthy that he completely discarded final causes and proposed to himself the explanation of all physical phenomena from matter and motion. His celebrated theory of vortices, devised to explain the motions of the heavenly bodies, held the field till it was superseded, after a stubborn resistance, by the Newtonian theory of gravitation. It was in mathematics, however, that Descartes achieved the greatest and most lasting results. It was Descartes who first recognised the true meaning of the negative roots of equations; and we owe him the theorem, which is called by his name, that an equation may have as many positive roots as there are changes of sign in passing from term to term, and as many negative roots as there are continuations of sign, and not more of either kind. He gave a new and ingenious solution of equations of the fourth degree; and first introduced *exponents*, and thereby laid the foundation for calculating with *powers*. He showed, moreover, how to draw *tangents* and *normals* at every point of a geometrical curve, with the exception of mechanical or transcendental curves; and what perhaps was his highest merit, he showed how to express the nature and the properties of every curve, by an equation between two variable co-ordinates; thus, in fact, originating *Analytical Geometry*, which has led to the brightest discoveries.

Editions of Descartes' collected works were published in Latin in 1697 and 1713, in French by Cousin in 1824–26, and by Adam and Tannery (Centenary edition,

1897-1906). His philosophical works were translated by Miss Haldane and G. T. Ross (1911). His correspondence with Constantyn Huygens, 1635-47, is edited by Leon Roth (1926). See books by Millet (1887-71), Fouillée (1893), De Swarte (1904), Hoffmann (1922), Kuno Fischer (trans. 1887); and English works by Cunningham (1877); Lowndes (1878), Mahaffy (1880), Martineau (1885), and Miss Haldane (1906).

**Descendants.** See HEIR, CONSANGUINITY, PEDIGREE, SUCCESSION.

**Descent of Man.** See MAN, DARWINIAN THEORY.

**Deschamps, EUSTACHE**, a French poet, who was born at Vertus, in Champagne, in 1328. He was educated at Orléans University, and was in the course of his life a soldier, a magistrate, a court favourite, and a traveller in Italy and Hungary. He held several important posts in his native province, but his possessions were ravaged by the English, and he seems to have been a poor man when he died in 1415. He was both a popular and voluminous writer. He composed 1175 *ballades*, a multitude of *rondeaux*, *virelais*, and other lyrics, besides a long poem of 13,000 lines, entitled the *Miroir de Mariage*—his works in all amounting to more than 100,000 lines. Deschamps was an ardent patriot, in whose verse hatred of the English and of the native oppressors of the French poor finds repeated and bitter expression. His thought is, as a rule, grave and dignified, but his style is somewhat wanting in elegance and ease. Occasionally, however, as in his lament for Du Guesclin, his verse is both graceful and touching; and in at least one piece, an apologue exposing the exactions of the rich, he gives proof of a grim and trenchant satiric faculty. See the Marquis de Queux de Saint-Hilaire's edition (1878-95), Sarrafin's monograph (1878), Besant's *Early French Poets* (1868).

**Deschanel, PAUL EUGÈNE LOUIS** (1856-1922), born at Brussels, wrote on political subjects, Mme. de Sévigné, Lamartine, and Gambetta. He was president of the French Chamber and (January to September 1920) of the republic. The strain of office brought a nervous break-down. He fell from a railway train in May, and had at last to resign.

**Deseret.** See UTAH.

**Desert** is the geographical name applied to a barren and uninhabitable portion of the earth's surface. Four classes of desert may be distinguished.

(1) *Ice-wastes* occupy the central plateau of Greenland, the islands of the Arctic Sea, and probably the entire Antarctic continent. The ground is covered to an unknown depth by a vast ice-cap, hummocky on the surface, and moving outwards to the coasts in a continual procession of glaciers.

(2) *Tundras* are flat plains, little elevated above sea-level, fringing the Arctic shores of the northern continents, and specially characteristic in Siberia (q.v.). The soil remains frozen to a great depth all the year round, thawing superficially when the snow melts in summer, and becoming covered with coarse moss and dwarfed Arctic plants.

(3) *Arid wastes*, or deserts in the popular sense of the word, occur mainly in two zones encircling the world, and corresponding to regions of minimum rainfall (see CLIMATE). The more extensive extends from near the equator in an east-north-east direction across the whole breadth of North Africa, as the Great Sahara, Libyan and Nubian deserts, over the peninsula of Arabia, through Persia, Turkestan, the Gobi or Shamo Desert, in about 52° N. lat., to the Pacific Ocean (see ASIA). The great Indian Desert in the Punjab is the only extension of this belt south of the Himalayas. The ring is completed by the Great Basin of North America in 40° N. lat. The southern zone, less complete, comprises the Kalahari Desert in south-west Africa, the interior of

Australia, and small districts in the Argentine Republic and in the Andes. Deserts occur at all elevations, from considerable depths beneath sea-level to many thousand feet above it, and with all varieties of surface, from a flat expanse of sand, where the view for days of travel is bounded by a sharp circle as at sea, to rocky mountain-slopes rent by rough defiles all bare and chiselled by the driving sand. The essential character of an arid waste is its rainlessness, and the scarcity of water on the surface and of water-vapour in the atmosphere. Radiation in the clear air is intense, and desert climate is consequently of an exaggerated continental type. The sand in the Sahara becomes heated to over 150° F. during the day, and chilled below the freezing-point at night, while the diurnal and seasonal extremes in the lofty deserts of Central Asia are much greater. Thus desert-regions are most effective in producing land and sea breezes and monsoon winds in consequence of the marked periodical changes in atmospheric density. Another effect is the Mirage (q.v.), a phenomenon which, combined with the indescribable horror of loneliness that oppresses the occasional traveller, probably accounts for the widespread superstitions peopling deserts, above all other places, with evil and malicious spirits. The dreaded sand-storm or simoom is a kind of tornado or whirlwind which raises the sand in tall rotating columns sweeping over the surface with tremendous velocity. Sand-dunes, sometimes several hundred feet in height, are raised by steady winds, and gradually shift their position, extending the bounds of the desert to leeward. Desert vegetation is extremely scanty, consisting mainly of hard prickly plants of the cactus, euphorbia, and spinifex kinds, whose glazed surface exhales little of the hardly-won moisture. Animal life is correspondingly restricted both in variety and number of individuals. The Camel (q.v.) is *par excellence* the beast of burden for conducting traffic across arid wastes. When an overflowing river, such as the Nile, traverses a desert, the land becomes richly fertile in its immediate neighbourhood, and wherever a spring bubbles up through the sand there is an Oasis (q.v.) bearing palm-trees and grass. Artificial irrigation, especially the sinking of artesian wells, has done much to reclaim tracts of desert for agriculture in the Sahara (see ALGERIA), and to a less extent in Australia.

Geological considerations show that arid deserts are not permanent features of the earth's surface. The most level expanses have once formed part of the ocean-bed, or at least great inland seas. The orographical changes which cut off these seas and created inland drainage areas probably at the same time modified the rainfall of the locality. Excessive evaporation dried up the great lakes, leaving at present a series of diminishing salt lakes without outlet, receiving rivers which dwindle down by evaporation as they flow. The only commercial commodities yielded by deserts are the salts (common salt, borax, sodium carbonate, and sometimes sodium nitrate) left in the dried-up lake-beds. These salt lakes are subject to alternate long periods of desiccation and flooding; during the former the area of the desert extends, during the latter it contracts. These periods have been traced out in the case of the Great American Basin by a series of most interesting researches on the part of the United States Geological Survey.

(4) *Temporary deserts*, or steppe-lands, border the Asiatic deserts to the north and west. The saline steppes of the Caspian are true arid wastes; but the typical steppes in South Russia are luxuriantly clothed with verdure and flowers in spring. In summer they form a dusty plain of withered herbage, and in winter are wind-swept wastes of snow. The grassy *llanos* of the Orinoco present

a similar desert appearance in the dry season; in the wet season they are inundated marshes which burst into blade and bloom as the water subsides. The *pampas* of the Plate river-system under similar but less marked seasonal changes form a natural transition to the fertile prairie lands which, although naturally treeless, are always richly grassed.

**Desertas**, a group of three rocky islets in the Atlantic Ocean, to the SE. of Madeira, visited at certain seasons of the year by fishermen and herdsmen.

**Desertion** from the army or navy is the crime of absence without leave, coupled with the intention of not returning to the service, or of avoiding some important duty, such as embarkation for a foreign station or aiding the civil power, however short the time of absence or the distance to which the absentee may have gone. Under the Army Act of 1881 the very common offence of quitting one regiment to join another (formerly charged as both 'desertion and fraudulent enlistment'), inasmuch as it proves no intention to leave the service, is punishable by Court-martial (q.v.) as fraudulent enlistment only, but in the same way as desertion when not on active service—viz. by imprisonment up to two years for a first offence, and penal servitude for not less than five years for a second or subsequent offence, together with forfeiture of service, medals, &c., to which may be added stoppages of pay for loss of kit, and discharge with ignominy. By thus distinguishing between desertion and fraudulent enlistment, the number of soldiers annually convicted of the former crime has been reduced by one-half; short service, the abolition of Bounty (q.v.) on enlistment, and better education have had the effect of still further reducing this number. Beyond a published description of all absentees and deserters, recruiting officers have no means—such as formerly existed, when tattooing with the letter 'D' (erroneously called Branding, q.v.) always formed part of the sentence—of detecting a man who has been convicted of this crime and discharged with ignominy, or who endeavours fraudulently to re-enlist. Thus individual men often join five or six regiments, deserting immediately from each in turn and selling their kits. When a soldier has been absent without leave for twenty-one days, a Court of Enquiry is held, with evidence taken on oath, and its record is admitted as evidence in any future court-martial.

Desertion, or attempting to desert, when on active service, or under orders for active service, is much more rare, and is punishable with death. So is the crime of inducing a soldier to desert under those circumstances; and a civilian who is convicted of it, if subject to military law because accompanying a force in the field, as a newspaper correspondent or a camp-follower, is liable to this punishment. When not subject to military law, six months' imprisonment with hard labour may be awarded by any court of summary jurisdiction to a civilian who induces or assists a soldier to desert. Deserters from the United States army forfeit all pay and allowances due at the time of desertion. If in time of war, the penalty is death; in peace, they suffer such penalty as a court-martial may direct.

Desertion is equally a crime when committed by a seaman of the royal navy. A sailor absent from three successive musters is a 'runaway'; and when discovered and brought back, he is punished by a deduction from his pay. If his absence is continued, it amounts to desertion. All harbouring of deserters by other persons is punishable. In the navy of the United States, a temporary absence without leave with an apparent intention of return-

ing to duty, is regarded as 'straggling,' but an absence of ten days constitutes desertion. In either case the commanding officer decides the points, and causes the proper entries to be made on the ship's books.

**Desertion of the Diet.** See DIET.

**Desertion of Wife and Children.** See HUSBAND AND WIFE, PARENT AND CHILD.

**Desiccants**, in Medicine, are substances with astringent properties, which are serviceable in checking secretion and exhalation.

**Desiccation** is the process of drying by the employment of heat, dry air, or chemical agents which have an affinity for water. Examples of the class of *desiccants* or drying substances are fused chloride of calcium, quicklime, fused carbonate of potash, and oil of vitriol. The latter is employed by being placed in a separate vessel near the substance to be dried, and under a bell jar.

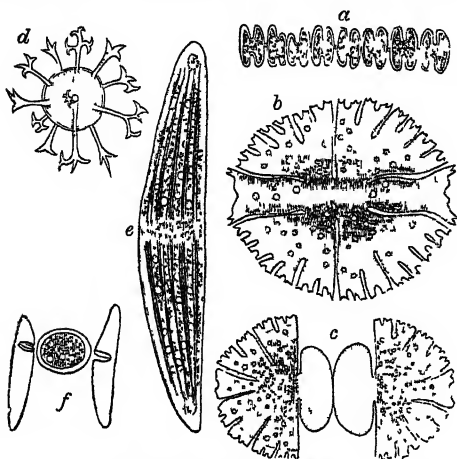
Not a few of the lower animals are said to be able to endure drying up without losing the power of recovery. Some of the Protozoa form protective sheaths or cysts from which they emerge on the return of moisture. Nematodes or thread-worms (paste-eels) have been known to revive after fourteen years' desiccation, but trials beyond this limit were unsuccessful. With those animals the interesting fact has been noticed that the longer the period of desiccation, the longer the time required for recovery. Rotifers are also described as reviving after prolonged and thorough desiccation, but experiments have shown that, in the case in question at least, only the associated eggs retained their life. The eggs rapidly developed on the return of moisture, but the adult organisms proved to be really dead. The bear-animalcules or Tardigrades have been thoroughly desiccated and even heated to a high temperature without, it is said, losing power of revivification. A state of latent life is also assumed in consequence of cold, absence of stimulus, &c., and a relative quiescence occurs naturally in hibernation, or pathologically in trance. Among the lower plants, resting spores, &c., may survive desiccation; and, among the higher, seeds are well known to have a similar power. See HIBERNATION, INSECTS, LATENT LIFE, MUD-FISHES, ROTIFERA, SLEEP, &c. For the desiccation of land-areas, see DESERT, ASIA.

**Desira'de**, a small island of the West Indies, belonging to France, and lying 4 miles E. of Guadeloupe, with an area of 10 sq. m., and a population of about 1600, engaged in fishery and the cultivation of cotton.

**Desman.** See MUSK RAT.

**Desmids** (*Desmidiaceæ*) are a family comprising over 2000 species (700 British) of freshwater unicellular conjugate Algae, related to such filamentous genera as *Zygnema* and *Spirogyra*. Desmids usually occur as free individual cells, varying in length from  $\frac{1}{16}$  to  $\frac{1}{4}$  inch, endowed with movement and floating or associated with larger aquatic plants. The individuals in some species are united into filaments (fig. a), while a few occur in gelatinous masses in water or on wet rocks. They are remarkable for their peculiar symmetry and diversity of form, which, with their ornamented and indented cell-walls and large, frequently lobed, brilliantly green chloroplasts, render them microscopic objects of great beauty. In the typical species each cell consists of two symmetrical halves termed semicells, often partially separated by a shallow or deep constriction (figs. b, c), although elongated forms (fig. e) may be unconstricted. The cell-walls are usually of a complicated structure, consisting of a delicate inner

layer of cellulose, and a stronger outer layer, through which pass numerous pores; other external ornamentations occur as variously shaped lines, dots, bosses, horns, and spines. Multiplication occurs by the division of the nucleus and protoplasm of each semicell, a daughter semicell



Desmids (mostly  $\times 100$ ):

a. Continuous filament of *Sphaerosoma vertebratum*; b. *Mictasterias rotata*; c. *M. denticulata*, dividing; d. Zygosporangium of the same; e. *Closterium lunula*; f. *Closterium* in conjugation.

from each being protruded at the median constriction (fig. c). The new half-cells grow, slowly or quickly, and assume the exact form and size of the parent semicells, pushing the old ones apart as they develop. Each of the two new desmids thus produced consists, therefore, of an old and a new semicell. Sexual reproduction occurs by the conjugation of two individuals, a zygosporangium forming between them (fig. f). The wall of the mature spore may be variously ornamented (fig. d); ultimately it produces two or more new individuals. In many respects desmids exhibit close analogy and possibly affinity with Diatoms (q.v.).

See J. Ralfs, *Brit. Desmidiaceae*; Pritchard, *Infusoria*, 4th ed.; Cooke, *Brit. Desmids*; West and West, *Brit. Desmidiaceae*, 6 vols.; and most works on the microscope.

**Desmodium Gyrans.** See TELEGRAPH PLANT, and PLANTS (MOVEMENTS OF).

**Des Moines**, the capital and largest city of Iowa, is situated on the Des Moines River, at the mouth of the Raccoon River, 340 miles W. of Chicago. Founded in 1846, the city has a fine state-house, a marble post-office and court-house, a university, and a state library. Half-a-dozen bridges over the two rivers connect the different parts of the town, and there is a public park, with fine groves of forest trees. Extensive coal deposits surround the city, large quantities being mined within the city limits. The shipping trade is extensive and important, and the manufactures are large and varied, including typewriters, bricks, sewer-pipes, white bronze, agricultural implements, and others. There are large pork-packing establishments, and the assurance business is among the greatest in the country. Pop. (1880) 22,408; (1900) 62,139; (1910) 86,368; (1920) 126,468.

**Desmoncus**, an American genus of climbing palms which represent the rattans (*Calamus*) of East Indian forests.

**Desmond**, EARLS OF, a line formerly all-powerful in the south-west of Ireland, numbered fifteen of the title, dating from 1329, and ended

with that Fitzgerald who rebelled against Elizabeth's government, sacked Youghal by night and murdered the people, and was proclaimed a traitor in 1579. He escaped the fate of the Spanish garrison at Smerwick (1580), and carried on the struggle for some time; but driven at last from his strongholds, he wandered about for over two years, and was finally killed, in 1583, in a cabin in the Kerry mountains, where his hiding-place had been betrayed to the English.

**Desmoulins**, CAMILLE, a famous figure in the French Revolution, was born 2d March 1760, at Guise, in Picardy. He studied law along with Robespierre at the Collège Louis-le-Grand, in Paris, but never practised owing to a stutter in his speech. His mind early became filled with lofty but confused notions of classical republicanism, which found vent on the eve of the Revolution in his pamphlets, *La Philosophie au Peuple Français* (1788) and *La France Libre* (1789), the latter published the day after the insurrection which destroyed the Bastille, in promoting which its author played a conspicuous and dramatic part. His next writing was the brilliant and vigorous *Discours de la Lanterne aux Parisiens*, which procured him the sinister title of 'Procureur-général de la lanterne.' In November 1789 he issued the first number of the *Révolution de France et de Brabant*, which appeared weekly until July 1792 (No. 86), and which for combined brilliancy of wit and irony, polemic force, power of sarcasm, and grace of form, remains without an equal in the whole range of journalism. His next paper, the *Tribune des Patriotes*, died in its fourth number. Camille had been a member of the Cordeliers' Club from its foundation, and early clung to the mighty Danton in an affectionate friendship of singular intensity. Elected by Paris to the National Convention which followed immediately after the march of the mob on the Tuileries (August 10), he voted with his party for the death of the king. In the struggle between the Girondists and the Mountain he took an active part, and in May 1793, urged on by Robespierre, published his truculent *Histoire des Brissotins*, with a gay heedlessness which had a terrible success, and caused him soon afterwards the most profound remorse. On the 5th December of the same year came out the *Vieux Cordelier*, a thrilling and eloquent expression of Camille's and Danton's longing for clemency. Robespierre, at first favourable, took fright at the reception of the papers after the third, and abandoned his old fellow-student to a fate of which his fragments of writings, as well as his letters and his young wife's journals and scrap-books, show us he had already a strange presentiment. It was only in December 1790, after three years of love, that her father had permitted him to marry the bright young Lucile Duplessis, a girl of a fanciful and romantic temperament, then hardly twenty years old. Their brief married life was one of singular happiness, and in their deaths they were hardly to be divided. Meantime Hébert and his party assailed him, and his freedom of wit made fatal enemies of Billaud-Varennes and Saint-Just. The last number of the *Vieux Cordelier* that appeared in its author's lifetime was the sixth (February 1794). Already he had been twice accused before the Jacobin Club, when on the night of the 30th March 1794 he was arrested with Danton and a group of their friends and partisans. When formally asked his age before the Revolutionary tribunal, he replied: 'J'ai l'âge du sans-culotte, Jésus, c'est-à-dire trente-trois ans, âge fatal aux révolutionnaires.' Camille's sensitive temperament could not face death with the boisterous heroism of the Titanic Danton. But on the scaffold he recovered the courage that had deserted him in the prison and on

the tumbril. 'Thus then,' he said, as he looked at the blood-stained guillotine, 'the first apostle of Liberty ends;' and with the words, 'Oh my poor wife!' he laid his head under the fatal knife. A fortnight later Lucile followed him to the same doom, dying with the heroic courage of the martyr. Their story is nobly told in Jules Claretie's *Camille Desmoulins and his Wife* (trans. Mrs Hoey, 1876). See Lives by Godart (1889), Claretie (1908), and Miss Methley (1915).

**Desna**, a river of Ukraine, flowing south-eastward to Biansk, and then south-westward till it falls into the Dnieper, almost opposite Kiev. It has a course of 550 miles, navigable nearly throughout, and is the channel of a large trade; its low banks are frequently inundated in spring. Its chief affluents are the Seim and the Snov.

**De Soto**, FERNANDO, Spanish discoverer, born at Jerez de los Cavalleros, in Estremadura, about 1496, of a good but impoverished family, accompanied Pedrarias Davila to Darien in 1519, served on the expedition to Nicaragua in 1527, and afterwards assisted Pizarro in the conquest of Peru, returning to Spain with a fortune of 'an hundred and fourscore thousand ducats.' Charles V. now gave him permission to conquer Florida at his own expense, and appointed him governor of Cuba; and in 1538 he sailed from San Lucar with a richly equipped company of 600 men, 24 ecclesiastics, and 20 officers. The fleet anchored in the bay of Espiritu Santo (now Tampa Bay) on 25th May 1539; the ships were sent back to Cuba, and the long search for gold was begun. For three years, harassed by hostile Indians, lured onward by reports of wealth that lay beyond, the ever-decreasing company continued their toilsome march over a route that cannot now be very clearly traced. In 1541 the Mississippi was reached and crossed, and the third winter was spent on Washita River. Returning to the Mississippi in the spring, De Soto, worn out by disappointments, died of a fever on its banks in June 1542; and that his death might be concealed from the Indians, his body, wrapped in a cloak, was lowered at midnight into the waters of the great stream he had discovered. In the following year his companions, reduced to half their original number, sailed down the river in seven frail boats, and finally reached the town of Panuco, in Mexico. See Lives by Wilmer (1858), Abbott, Shipp, and Cunningham-Graham (1903).

**Despard**, EDWARD MARCUS, conspirator, was born in Queen's County, Ireland, in 1751, and at fifteen obtained an ensigncy. From 1772 till 1790 he did good service in the West Indies, both as a soldier and as superintendent of the new territory of Yucatan. He was then recalled on the most frivolous charges, which for two years were kept hanging over him; nor, when they were dismissed, could he get the least compensation. His complaints brought him two years' imprisonment (1798-1800), on his release from which he engaged in a crackbrained conspiracy to assassinate the king and to seize the Tower and Bank of England. For this, with six of his associates, he was drawn on a hurdle, hanged, and beheaded, 21st February 1801. —His brother, JOHN DESPARD (1745-1829), British general, was present at twenty-four engagements, mostly during the American War of Independence.

**Despauterius**, the Latinised name of JAN VAN PAUTEREN (1460-1520), a Fleming, born at Ninove near Brussels, who studied at Louvain, and taught there and at s'Hertogenbosch, Comines, &c. His Latin grammar was in general use in France till the Port-Royalists superseded it, and in Scotland till the Reformation.

**Despenser**, HUGH LE. See EDWARD II.

**Des Périers**, BONAVENTURE, one of the most interesting prose-writers of the Renaissance period in France, was born at Autun in Burgundy about the year 1500. Little is known regarding his life beyond the fact that he was a member of the court of men of letters assembled by Marguerite of Navarre. In 1537 he published the *Cymbalum Mundi*, a work in dialogue, in which, under the pretence of attacking the superstitions of the ancients, he satirised the religious beliefs of his own day. The book raised a storm of indignation, against which Marguerite seems to have been powerless to shield Des Périers, who, rather than fall into the hands of his persecutors, is said to have killed himself in 1544. His *Nouvelles Récréations et Joyeux Devis* were published in 1558. They consist of 129 short stories, both comic and romantic, and are admirable examples of narrative art, though the laxity of the Renaissance is frequently apparent in the writer's choice of subjects. The style is vivacious and elegant; indeed, Des Périers is one of the greatest masters of French prose whom the 16th century produced. Besides writing the *Cymbalum Mundi* and the *Joyeux Devis*, it is by many critics believed that Des Périers was part author of the *Heptameron* associated with the name of Marguerite. See MARGARET OF NAVARRE, and the edition of Des Périers' works by Lacour (2 vols. Paris, 1856).

**Despoblado** (Span., 'desert'), a treeless, uninhabited plateau, nearly 10,000 feet above the sea, on the Bolivian and Argentine frontier.

**Desportes**, PHILIPPE (1546-1606), French poet, born at Chartres, went as secretary with the Bishop of Puy to Italy, where he studied Petrarca and Ariosto, and to Warsaw with Anjou, who as Henry III. of France continued to be his patron. Desportes greatly influenced the English Elizabethans, especially the sonneteers.

**Despoto Dagh**. See RHODOPE.

**Despréaux**. See BOILEAU.

**Dessalines**, JEAN JACQUES, emperor of Hayti, was born about 1758 in Guinea, Africa, and was at an early age imported thence into Hayti as a slave. He was bought by a French planter, whose name he afterwards assumed, and early became a prominent leader in the insurrection, second only to Toussaint L'Ouverture. In the struggle with the French he was always distinguished by his agility and swiftness of movement, as well as by his fearlessness and ferocious cruelty. After the first compromise he became governor of the southern part of the island, but soon began the war anew, and, after infamous cruelties, compelled the French to evacuate the island in October 1803. He was created governor in January 1804, when the people of the island declared themselves independent, and on 8th October had himself crowned as emperor of Hayti, under the name of Jean Jacques I.; but his despotism, debauchery, and cruelty soon alienated the sympathy and support even of those who had been his firmest adherents. In 1806, while trying to repress a revolt, he was cut down by Christophe (q.v.), who succeeded him as emperor of Hayti.

**Dessau**, capital of Anhalt, on the Mulde, not far from its junction with the Elbe, 70 miles SW. of Berlin. It is in general well built. Among the principal buildings are the ducal palace, a noble structure, built in 1748, and improved in 1875, with a valuable picture-gallery and library; a town-hall, an elegant theatre, and several churches. The *Philanthropin* of Basedow (q.v.) was here. The manufactures are sugar, woollen cloth, machinery, carpets, and there is a large trade in grain. Moses Mendelssohn was a native. Leopold, Prince of Anhalt-Dessau (1676-1747), a famous soldier in the wars of the 18th century, is

popularly known as *der alte Dessauer* ('the old Dessauer'); his statue adorns the market-place. Pop. 58,000.

**Desterro.** See FLORIANOPOLIS.

**Destouches**, PHILIPPE, one of the chief comic dramatists of France in the 18th century, was born at Tours in 1680. He wrote seventeen comedies, two of which, *Le Philosophe Marié* (1727), and *Le Glorieux*, his masterpiece (1732), are of a very high order of excellence. He died in 1754. His characters are truthfully drawn, and his plots interesting. In his style he imitated Boileau rather than Molière, and his verse has occasionally a happy epigrammatic turn. In his language he avoided the freedom of the older comedians, but the moral tone of his plays cannot be described as high.

**Destroyer.** See NAVY.

**Destructors.** See SEWAGE.

**Desuetude**, in Scots law, that repeal or revocation of a legal enactment which is effected not by a subsequent contrary enactment, but by the establishment of a contrary use, sanctioned by the lapse of time and the consent of the community. Neither the word nor the idea attached to it is familiar to the law of England—where the corresponding term is *non-user*. The rule in England is, that a statute once formally enacted by the legislature, remains in force, however unsuited it may be to the altered conditions of society, till it be repealed by another statute. The repeal may be by implication, but here the law watches with a jealous eye. Such repeal 'is to be understood,' says Blackstone, 'only when the matter of the later statute is so clearly repugnant that it necessarily implies a negative.' So far was this principle carried, that it was formerly the rule, that if a statute repealing another was itself repealed afterwards, the first statute was revived without any formal words for that purpose. But this rule was changed by 13 and 14 Vict. chap. 21. In Scotland, an opposite principle prevailed, and it is still held that acts of parliament made before the Union may lose their force by disuse, without any express repeal, or 'go into desuetude,' as it is commonly said. The same may be said of the general orders (Acts of Sederunt, as they are called) of the Court of Session. But by desuetude is meant something more than mere non-use for a period of time, however great. There must be contrary use of a positive kind, inconsistent with the statute, and of such a kind as to prove the altered sense of the community; there must, in short, be consuetudinary law in a negative sense; and the so-called desuetude thus amounts to a repeal of statute law by consuetudinary law.

Both rules are liable to objections. The result of that followed in England has been that statutes have remained on the statute-book without formal repeal after their enforcement had become morally impossible. A curious example of this occurred in the early part of the 19th century, in which one of the parties to an ordinary civil suit challenged his adversary to 'judicial combat,' founding his claim to do so upon an unrepealed statute, and it was held that in point of form his right could not be disputed (see DUELLING). But since 1869 the English statutes have been by the Statute Law Revision Acts weeded to a great extent of all obsolete and inconsistent enactments. The rule in Scotland is the same as the English for statutes made since the Union; but for older Scottish statutes it is difficult when contrary use justifies the plea of desuetude.

**De Tabley**, JOHN BYRNE LEICESTER WARREN, LORD (1835-95), educated at Eton and Christ Church, Oxford, was called to the bar at Lincoln's Inn in 1859, unsuccessfully contested

Mid-Cheshire as a Liberal in 1868, and succeeded his father as third baron in 1887. He published eight volumes of poetry (1863-75), two novels (1868-69), and a *Guide to Book Plates* (1880). *Philoctetes* and *Orestes* were powerful dramas. A selection appeared in 1893; *Orpheus in Thrace* and other poems in 1901.

See memoir by Sur M. Grant Duff prefixed to his *Flora of Cheshire* (1899), Gosse's *Critical Kat-Kats* (1896), and Professor Walker's biographical sketch (1903).

**Detaille**, JEAN BAPTISTE ÉDOUARD (1848-1912), military painter, was born at Paris, studied under Meissonnier, but, joining the army in 1870, found endless material for a long series of impressive pictures of the glories and horrors of war.

**Detective.** See POLICE.

**Determinants**, in mathematical analysis, a symbolical method by which, *inter alia*, the solution of equations becomes a matter of mere inspection. The development of the method is due mainly to the French mathematician Cauchy (q.v.). The determinant is the sum of all the products that can be formed from a group of quantities arranged as columns and rows in a square block; each product containing as a factor one from each horizontal row and one from each column; the sign being plus or minus, according as the arrangement of rows from which it is taken requires an even or odd number of transpositions to reduce it to the arrangement in the square. The deter-

minant of the third order  $\begin{vmatrix} a & b & c \\ a' & b' & c' \\ a'' & b'' & c'' \end{vmatrix}$  is equal to

$a b' c'' - a b'' c' + a' b' c - a' b c'' + a'' b c' - a'' b' c.$

**Determinism.** See WILL.

**Detmold**, capital of the German republic of Lippe, on the Werre, 47 miles S.W. of Hanover. The chief buildings are the old castle, the modern palace, and the theatre. Detmold has also a museum, a public library, a hospital, a gymnasium, and other schools. There are manufactures of tobacco, cards, and carved work in wood and stone, and breweries. On a hill 2 miles from Detmold is a colossal statue of Arminius (q.v.). Pop. 15,000.

**Detonation.** See FLAME, GUN-COTTON.

**Detritus**, applied in Geology to accumulations formed by the disintegration of rocks, may consist of angular and subangular debris, or of more or less water-worn materials, such as gravel, sand, or clay, or an admixture of these. See PLEISTOCENE.

**Detroit**, the chief commercial city and port of entry of Michigan, and seat of justice of Wayne county, is situated on a river of its own name ('the Dardanelles of the New World'), and is about 125 miles by water, or 178 by land, N.W. of Cleveland, Ohio, with which it is connected by daily steamers and by railway lines. Railways also connect Detroit with Chicago, 284 miles distant, and direct lines extend to all the principal places in Michigan. By way of Windsor on the opposite side of the river, the Grand Trunk Railway of Canada affords direct communication with the cities of the Dominion, and a large number of vessels ply between this city and the other ports on the Great Lakes. Detroit is substantially built upon rising ground, its streets are broad, well paved, and shaded with trees. It is well supplied with the best of water, pumped from the river by massive engines. Its fire and police departments are excellent, as also is the system of public schools and colleges. It has a public library and several educational libraries. The chief industry is automobile-building. There are besides immense railway-car works and iron-working establishments, numerous tanneries, and factories for tobacco, shoes, stoves, drugs, &c., and there is a large and increas-

ing trade in grain, flour, live-stock, lumber, wool, pork, and copper. The harbour is excellent, and much of the enormous shipping trade of the great lakes emanates from or otherwise benefits this city. About three-fourths of the total trade is with Canada, and the larger part of the remainder with Britain. The river is open for navigation about eight months in the year. The streets are regular, and many of them planted with trees. The public buildings embrace a Catholic cathedral and numerous churches of almost all denominations, a city-hall, a Board of Trade building, a convent, a United States marine hospital, &c. Numerous daily newspapers and weekly and monthly periodicals are published here, of which several are in German. Detroit was settled by French colonists as early as 1710, was transferred to the British in 1763, and in 1796 passed to the United States. It was incorporated as a city in 1824, and till 1847 was capital of the state. Pop. (1870) 79,577; (1890) 205,876; (1910) 465,766; (1920) 993,678.

**Detroit River**, so called, upon the north-western bank of which stands the city of the same name, is the strait through which the waters of Lake St Clair, and of the great upper lakes of the St Lawrence system, flow into Lake Erie, and thence to the Atlantic Ocean. It is about 20 miles in length, with a depth sufficient to float the largest vessels, and at Detroit forms an excellent harbour for shipping.

**Dettingen**, a village of Bavaria, on the Main, 7 miles NW. of Aschaffenburg, is noted as the scene of a battle during the war of the Austrian Succession, when, on 27th June 1743, George II. (q.v.) of England, commanding English, Hanoverians, and Austrians, defeated the larger French army under the Duc de Noailles. This was the last time a king of England took the field in person. —There is another Dettingen 10 miles E. of Reutlingen in Württemberg.

**Deucalion**, son of Prometheus, and husband of Pyrrha. When Zeus had resolved to destroy the race of men by a flood, after the treatment he had received from Lycaon, Deucalion built an ark or ship, in which he and his wife floated during the nine days' flood which drowned all the other inhabitants of Hellas. On the subsidence of the waters the ark rested on Mount Parnassus. To repopulate the world Deucalion and Pyrrha were told by the goddess Themis to throw behind them the bones of their mother. This they did with the stones of mother-earth, and from those thrown by Deucalion sprang up men, and from those by Pyrrha, women.

**Deuteronomy** (from the Greek *deuteronomos*, 'the second law,' or, according to the use of the word in the Septuagint, 'a duplicate of the law'), the fifth book of the Pentateuch. Its contents comprise: (a) A review of the history of Israel during the wanderings in the wilderness, chap. i.-iv. (b) An address of Moses to prepare the people for the reception of the law, chap. v.-xi. (c) The law itself, chap. xii.-xxvi. This constitutes the kernel of the book. (d) An epilogue enforcing the law by the promise of blessing for its fulfilment and the threat of curses for its infraction, ending up with an account of the death of Moses, chap. xxvii.-xxxiv. Modern scholars are generally agreed that the nucleus of the book represents the law which was discovered by Josiah in 621 B.C. It must have originated during the period which intervenes between the earlier prophets—e.g. Amos and Hosea—and Jeremiah. In religious tone and theological ideas it has many points of resemblance to the last named. There is more divergence of opinion as to the date at which the book was completed, but it was probably

between 621 and 586 B.C. Deuteronomy is characterised throughout by a religious fervour and a prophetic zeal which are in striking contrast to the tone of Leviticus; and it represents a higher spiritual level than any other book in the Pentateuch. Its legislation stands half-way between the Law of the Covenant in Exodus and the Priestly Code which is embodied in Leviticus (see BIBLICAL CRITICISM, PENTATEUCH). The critical problems connected with the book are fully discussed in Driver's *Introduction to the Literature of the Old Testament*, and in the articles in *Hastings's Bible Dictionary*, and the *Encyclopædia Biblica*. The most complete commentary in English is that of Driver (*International Critical Commentary*).

**Deutsch**, EMANUEL OSCAR MENAHEM, was born of Jewish parents at Neisse, in Silesia, 28th October 1829. His education was begun at the local gymnasium at the age of six, continued by his uncle, a learned rabbi, to whom he owed his mastery of Hebrew and Chaldee literature, and finally pursued at the university of Berlin. In 1855 he came to an appointment in the library of the British Museum, where 'for fifteen years with mighty ardour and magnificent industry he studied and wrote, enjoying life among his friends, yet more among his books; shedding sunshine wherever he went, attracting and attaching not a few.' He is best known by his brilliant article on the *Talmud* in the *Quarterly Review* (1867), to which he also contributed an article on *Islam* (1869). He wrote excellent articles on the *Targum* and the *Samaritan Pentateuch* for Smith's *Dictionary of the Bible*, and was a valued contributor to the first edition of *Chambers's Encyclopædia*, for which he wrote nearly two hundred articles. He had a remarkably vigorous and poetic English style.

**Deutschbrod** (Czech, *Brod Německý*), a town of 9000 inhabitants, in the south-east of Bohemia. Here in 1422 the Hussite general Ziska defeated the Emperor Sigismund.

**Deutz**. See COLOGNE.

**Deutzia**, a genus of Saxifragaceæ, natives of the north of India, China, and Japan. Some are favourite greenhouse plants in Britain, producing abundance of beautiful white flowers. The commonest species (*D. scabra*) is frequent in shrubberies.

**Deux-ponts**. See ZWEIFBRÜCKEN.

**Deux-Sèvres**. See SEVRES.

**De Valera**, EAMONN, born 14th October 1882 in New York, of Spanish and Irish parentage, was brought up in Ireland, studied at the Royal University, where he graduated in Arts and in Science, and taught mathematics in various colleges. He played a distinguished part in the Easter rising of 1916, but surrendered by order of Padraic Pearse. He was sentenced to death, but liberated, and in 1917 was elected member of parliament for East Clare, and, by the Sinn Féin convention, President of the Irish Republic. Imprisoned again in 1918 with other Sinn Féin leaders, he escaped from Lincoln jail in 1919, and went to America, where he strove hard for his cause. When the treaty with Great Britain was submitted to Dáil Éireann Mr de Valera vehemently opposed it as a compromise, resigned his presidency, was defeated by Mr Arthur Griffith on seeking re-election (1922), and took up arms (1922-23) against the Free State. He was arrested in August 1923, released in July 1924.

**Devanāgarī** (lit. 'town-script of the gods'), the character most widely understood by Hindu scholars, in which Sanskrit works are usually printed, unless when in Roman letters. See SANSKRIT, ALPHABET, WRITING.

**Devaprayaga** (better *Deoprayag*), a village in the district of Garhwal, United Provinces of

India, on a mountain side, 2266 feet above the sea, in the fork of the Alaknanda and the Bhagirathi, which join to form the Ganges (q.v.). Devaprayaga possesses a notable temple, and is a favourite place of pilgrimage for the Hindus.

**Development** is a term used in several special or technical senses. In mathematics it means the process by which any mathematical term is changed into another of equivalent value or meaning: in geometry specifically the unrolling of a cylindrical or conical surface, the unbending of any curved surface into a plane, is called development. The word is sometimes used of the whole field of Embryology (q.v.) and of Evolution (q.v.), but is specially applied rather to the theories of Lamarck (q.v.) than to the Darwinian Theory (q.v.); see also the articles BIOLOGY, HEREDITY, MAN, VARIATION, WEISMANN. The history of every science, art, or invention is a history of progress and development. (See ANTHROPOLOGY, ART, and the relevant sections of the articles on sciences, &c., throughout the work.) The word has its own meaning in Photography (q.v.); in music the development of a musical phrase or subject is the unfolding of its capacities by modification of melody, harmony, tonality, rhythm, &c. (see SONATA); and development of doctrine is dealt with in the articles DOGMA (q.v.), CHRISTIANITY, NEWMAN, and ROMAN CATHOLIC CHURCH.

**Deventer**, an old Hanse town of Holland, in the province of Overijssel, on the Yssel, 11 miles NNW. of Zutphen by rail. It has an 11th century cathedral and a fine town-house, and manufactures iron, carpets, cotton, tobacco, beer, and gingerbread. Thomas à Kempis and Erasmus were educated at Deventer. Pop. 32,000.

**De Vere**. See VERE.

**Deveron**, a beautiful salmon river of Aberdeen and Banff shires, rising 3 miles SW. of the Buck of Cabrach, at an altitude of 1847 feet, and thence winding 62 miles north-eastward, till it falls into the Moray Firth at Banff. See *Lauder's Moray Floods* (1830).

**Deviation**. See COMPASS.

**Device** (late Lat. *divisa*, 'a drawing'), if in a wider sense, applicable to emblems on shields, such as described by Homer, is, in a more restricted use of the word, a decoration with accompanying legend, assumed by an individual rather than a family, and for the purpose not of publicity, like the badge (with which it has sometimes been confounded), but of mystification, with covert allusion to the circumstances of the bearer. It is, in fact, a rebus or painted riddle, with a legend allusive to it, as the knot borne by Sir Thomas Heneage, of a shape suggestive of a heart, with the inscription 'Fast though untied'; and the heart borne by Lord Latimer, with the legend 'Dieu et ma fiancée.' See BADGE.

**Devil**, THE, and SATAN, the names bestowed by the New Testament and Christian theology upon the supreme impersonation of evil, who is regarded as a real being—the head of the kingdom of darkness, the source of all temptation and sin, and the lord of evil spirits. This conception of Satan is of comparatively late origin. It is not found in the earlier literature of the Old Testament, and only occurs in three of the post-exilic writings—Job, Zechariah, and 1 Chronicles, and even in these it has not yet assumed the fixed and definite characteristics which are so marked in the New Testament and later Christianity. In the older books of the Old Testament God is often described as the source of the evils which afflict men—e.g. the hardening of Pharaoh's heart, the smiting of the first-born—though in some cases the evil results

are attributed to the agency of wicked spirits. We find a very good illustration of the contrast between the earlier and later thought of the Old Testament, when we compare the parallel explanations of David's sin in numbering the people in 2 Sam. xxiv. 1 and 1 Chron. xxi. 1. The Samuel passage reads, 'And again the anger of the Lord was kindled against Israel, and he moved David'; whereas in Chronicles we are told, 'And Satan stood up against Israel, and moved David to number the people.' It is clear from this comparison that what is ascribed to God in the early period is ascribed to Satan in the later, and we may conclude that it was in the period between 700 and 300 B.C. that the figure of Satan was evolved. But even in the book of Job the conception is still indefinite. Satan is described as taking his place in the heavenly court among the 'sons of God,' and suggesting that a test should be applied to Job to find out if his religious devotion is genuine or not. Satan himself is commissioned to apply the test, which takes the form of an infliction of a series of misfortunes. There is nothing in Job to prove the existence of radical antagonism between God and Satan. The most that can be said is that while God is anxious that Job's character should be vindicated, Satan seems to desire to prove that he is a mere time-server. The nearest approach to the New Testament conception of Satan is found in the third chapter of Zechariah, in which Satan is depicted as the adversary and accuser of mankind, anxious to secure the condemnation of Joshua the high priest. There is nothing, however, in this passage, or in the Old Testament as a whole (apart from the hint in 1 Chron. xxi. 1), to show that Satan was regarded as responsible for the sin of the world.

It is in the intermediate period, and more especially in the Apocalyptic literature, that the figure of Satan takes on its New Testament dress. In the book of Wisdom, for instance, the fall of Adam is represented as due to his instigation: 'By the envy of the Devil sin entered the world.' Elsewhere he is described as 'the seducer of the desert,' who tempted Eve to her destruction. The *Apocalypse of Adam and Eve* gives an account of the fall of Satan himself. After Adam had been created in the divine 'image and likeness,' God summoned his angels and bade them 'worship the image of God.' All the rest obeyed, but Satan refused, saying: 'I am his senior in creation; it is his duty to worship me.' For this refusal, God banished Satan and his angels from glory and hurled them down to the earth. A different explanation of the downfall of Satan is given in the *Book of the Secrets of Enoch*: 'And one from out the order of angels, having turned away with the order that was under him, conceived an impossible thought, to place his throne higher than the clouds above the earth that he might be equal in rank to my power. And I threw him out from the height with his angels, and he was flying in the air continuously above the bottomless pit.' It is stated several times in these books that in the ideal kingdom there will be 'no Satan.'

When we turn to the New Testament we find the conception of Satan clear and well-defined. He is called by a variety of names—e.g. Satan (i.e. the adversary), the Devil (i.e. the accuser), 'the prince of demons,' 'the prince of this world,' 'the god of this world,' 'the prince of the power of the air,' 'the tempter,' 'Beelzebub,' 'Beliar' or 'Belial,' 'the enemy,' 'the wicked one,' 'the old serpent.' These titles convey the idea that in the minds of the New Testament writers the Devil was a personal being—the head of a hierarchy of evil spirits who are his ministers and servants,

the originator and instigator of sin and its penalty death, the source of all physical maladies and evil generally, the antagonist of God and man. Jesus is reported to have described him as 'a murderer from the beginning.' 'He stood not in the truth, because there is no truth in him; . . . he is a liar and the father thereof' (John, viii. 44). The evil spirits who torment men are his emissaries, and the casting out of these spirits is represented as a defeat of Satan himself. When the disciples returned from their mission and reported their success in vanquishing these evil spirits, Jesus said, 'I beheld Satan fallen like lightning from heaven' (Luke, x. 18). The ultimate victory of God over Satan is definitely predicted. 'Everlasting fire' has been 'prepared for the Devil and his angels' (Mat. xxv. 41). According to the book of Revelation, he is 'cast into the lake of fire and brimstone' to be 'tormented for ever day and night' (Rev. xx. 10).

The New Testament, therefore, presents us with a complete and comprehensive conception of the Devil as a real personality engaged in active and even violent opposition to the work of Christ, attempting in every way to thwart the grace of God. There is no absolute dualism, as in the Zend-Avesta, where the universe is ruled by two equally-balanced powers—Ormuzd and Ahriman—because the New Testament never for a moment wavers in its intense conviction that God is supreme and omnipotent, but still, for all practical purposes, we are left, for the present at any rate, with a dualism of two contending empires, each under its own king, struggling for the supremacy. Beyschlag has attempted to argue that the demonology of the New Testament is simply poetry which later Christianity turned into prose. The language of the New Testament, however, is too precise and definite to be set aside in such a cavalier fashion. If words mean anything, it is impossible to evade the conclusion that the belief in Satan and the world of demons is an essential element in the teaching of the New Testament. We may, of course, take up another position, and say that this side of early Christian belief reflects the spirit of the age; at that time the belief in Satan, in some shape or form, was universal, and Jesus and his followers upon this point simply adopted the common thought and speech of the age. We must, however, be in possession of overwhelming arguments against the possibility of the existence of Satan before such a position is likely to secure general support.

The New Testament conception was carried over and developed in Christian thought and theology. The Devil plays a much bigger part in the Christian life of the Church during the patristic and mediæval periods than he does in the Christian outlook of recent times. For over a thousand years, right up to the time of Anselm, the popular explanation of the doctrine of the Atonement regarded the Crucifixion as a ransom offered by Christ to the Devil for the redemption of the human race; and even the life of Luther teems with illustrations of the place occupied by the Devil in the conceptions of the time. The moral struggle was regarded as a personal fight with Satan. The well-known incident of Luther 'throwing an inkpot at the Devil' is only an example of the current belief of his day. It is difficult for us to conceive of any one writing in modern times as he wrote on one occasion, 'I heard some one walking on the floor above my head, but as I knew it was only the Devil, I went quietly to sleep.'

It would be interesting to follow out the development of the conception of the Devil in modern literature, but space makes it impossible to do more than refer to Masson's book on *The Three*

*Devils*, in which he compares and contrasts (1) the mediæval devil—a ghoulis figure with horns and hoofs; (2) Milton's Satan—a fallen angel, indeed but still splendid in his fall; (3) Goethe's Mephistopheles, a fine gentleman in appearance, but a scheming trickster at heart.

Since the Reformation, the belief in the Devil has gradually declined. Several causes may be assigned for this change which has come over Christian thought. (1) In the middle ages the belief in the Devil was associated with and made the centre of a great deal of superstition. The superstition has died a natural death and involved the belief in Satan in its fall. (2) The development of science found a natural explanation for the maladies and physical disasters which had previously been attributed to the agency of the Devil. Gradually Satan was ousted from the natural sphere, and as a result lost his place in the moral realm as well. (3) The great characteristic of modern philosophy has been its desire to find a monistic explanation of the universe. The belief in a devil leaves us with a dualism, and there is a widespread feeling that no dualistic hypothesis can possibly solve the ultimate problem. (4) The belief in the existence of a rival power challenging the authority of God has some difficulties for the Christian theologian. The old question, 'Why does not God kill the Devil?' is not easy to answer. The existence of the Devil seems to limit either the omnipotence or the love of God.

The first definite attack on the belief in the existence of the Devil came from Schleiermacher, and his views received the support of Schenkel, Biedermann, Lipsius, Pfeleiderer, and many others. On the other hand, the orthodox position has been strongly affirmed by theologians of such repute as Luthardt, Rothe, Julius Muller, Martensen, and Dörner. The orthodox position to-day relies upon the following arguments: (1) Belief in the existence of the Devil is clearly and definitely involved in the teaching of Jesus and the inspired writers of the New Testament, and we cannot set their authority lightly on one side. (2) The denial of the belief may solve some difficulties, but it raises others in a very acute form. The problem of evil is very greatly intensified in the absence of a devil. 'Nature, red in tooth and claw, With ravine shrieks against the creed.' There would be an easy explanation of many difficulties if we could hold with Tennyson that 'after God had made the world, the Devil came and added mosquitoes.' (3) The philosophical arguments for the existence of Satan are as strong as those for the existence of God. If God is the unity in which all the noblest virtues and ideas inhere, do we not need a unity for the vices and sins of men? (4) The intensity of the moral struggle is only explicable on the hypothesis of the existence of a personal agent, tempting mankind to sin.

See Masson, *The Three Devils*; Roskoff, *Geschichte des Teufels* (1869). The articles on 'Satan' in Smith's and Hastings's *Bible Dictionaries* and the *Encyclopædia Biblica*.

**Devil-fish** is a name used for the Octopus (q.v.), also for the Angler (q.v.), and, in America, for a gigantic species of ray (*Cephalopterus vampyrus*), with very large pectorals. Of the latter a specimen was found in Delaware Bay, 17½ feet by 18 feet, and weighing 5 tons.

**Devil's Bit.** See SCABIOUS.

**Devil's Bridge**, a popular name in most mountainous countries for bridges built over wild chasms. The most notable are (1) a bridge over the Reuss, in the Swiss canton of Uri, 1½ mile W. of Andermatt, on the St Gothard Road, where the river, 4593 feet above sea-level, forms a picturesque

cascade of 100 feet. The granite structure, built in 1830, spanning the stream with a single arch of 26 feet, fell in in August 1888, and traffic was for a time resumed on the old moss-grown bridge 20 feet below, which witnessed some severe fighting between the French and the Austrians and Russians in 1799. (2) A double bridge in Cardiganshire (sometimes called *Pont-y-Mynach*), 10 miles ESE. of Aberystwyth, across a gorge 114 feet deep, and over a mile long, traversed by the Mynach, which makes within a short distance four falls of from 18 to 110 feet. The lower bridge was constructed by the monks of Strata Florida in the 11th century, the upper (20 feet over it) in 1753.

**Devil's Coach-horse** (*Ocypus olens*), a common British and European beetle, in the family Staphylinidae. It has very much reduced wing-covers, and resembles many of its relatives in the habit of curving its posterior body upwards, using the tip to adjust the wings under their covers.

**Devil's Ditch.** See CAMBRIDGESHIRE.

**Devise,** the conveyance of land by Will (q.v.).

**Devizes,** a municipal borough of Wiltshire, near the Kennet and Avon Canal, 50 miles WSW. of Reading, and 20 ESE. of Bath. It lies high at the mouth of Pewsey Vale, between the thinly peopled tracts of Salisbury Plain and the Marlborough Downs. As a town, Devizes owes its origin to a splendid castle built here by Bishop Roger of Salisbury about 1132. It was stormed by Cromwell in 1645, and now is represented by mere fragments. There are two churches with much interesting Norman work; a market-cross (1814), commemorating God's judgment on a perjurer in 1753; a fountain with a statue of Sothorn Estcourt (1879); a good museum; and a large corn exchange (1857). It has manufactures of snuff and malt, and is the seat of an important corn-market. From Henry VIII.'s time till about 1820 Devizes was a great cloth mart. It returned two members till 1867, then one till 1885. Pop. 6000. See *A History of Devizes* (1859).

**Devonian System,** the name proposed by Murchison and Sedgwick for certain slaty and calciferous strata in Devonshire which contain a much more copious and rich fossil fauna than the Old Red Sandstone of Scotland, Wales, and Herefordshire, with which they are believed to be upon the whole contemporaneous. The physical condition under which the strata in Devonshire were deposited differed greatly from those which marked the accumulation of the Old Red Sandstone, and there is still some doubt as to the precise correlation of the two sets of strata. Geologists, therefore, retain both names, and speak of the *Devonian and Old Red Sandstone* system, or *Old Red Sandstone and Devonian* system. See OLD RED SANDSTONE.

**Devonport.** See PLYMOUTH.

**Devonshire,** a maritime county, in the south-west peninsula of England, between the Bristol and the English Channel. Its greatest length is 70 miles; its greatest breadth, 65; and it contains 2600 sq. m., of which about three-fourths are under cultivation. The coast-line approaches 150 miles. The north coast is the boldest, with several hills over 1000 feet. Its chief indentation is Bideford Bay, 18 miles broad and 8 deep, into which fall the Taw and the Torridge. The south coast is also lined with cliffs, chief among them being the bold promontorial district of the Bolt Head and Start Point, the western horn of the great bay of which Portland is the eastern. Tor Bay is 3 by  $3\frac{1}{2}$  miles. Plymouth Sound, the combined estuary of the Tamar and Plym, is one of the finest harbours in the kingdom, the anchorage ground extending 7

miles inland from the breakwater (see PLYMOUTH) by which the outer roadstead is protected. Devonshire is hilly, the most elevated parts being the tablelands of Dartmoor in the south-west, Exmoor in the north-west, running into Somerset, and Blackdown in the east. These are mainly open moorlands. Dartmoor (q.v.) is very rocky; the lower hills grassy. High Willhayse, on Dartmoor (2039 feet), is the highest point. Devonian and Carboniferous strata occupy the greater part of the county; next in importance are the granitic boss of Dartmoor, and the Triassic rocks in the eastern quarter. There are also Archaean rocks, probably Silurian, Greensand, chalk, an Eocene deposit at Bovey Tracey, and many exposures of igneous rocks, intrusive and interbedded. Copper, tin, lead, iron, arsenic, radium, and manganese occur in commercial quantities, with ores of other metals; china, terra-cotta, potter's, and pipe clays; granites, marbles, anthracite, lignite, gypsum, and other earthy minerals. The rivers of Devonshire are numerous. The Tamar, 59 miles, is the longest, and divides Devon from Cornwall; the Exe, 54 miles, which comes next, rises in Somerset. The other leading rivers—the Dart, Teign, Taw, Torridge, and Plym, all from Dartmoor, have estuaries of commercial importance, as have also the Exe and Tamar. The red deer still run wild on Exmoor, and are hunted.

The climate of Devon, especially in the south, is mild and humid, and not liable to great extremes. Hence, several of the towns on the southern and eastern coasts have become famous as health-resorts—notably Torquay; and, on the north coast, Ilfracombe. Myrtles and aloes commonly flourish in the open air; and in specially favoured spots oranges and lemons, with a little protection, will thrive and fruit. The rainfall on Dartmoor is much greater than elsewhere in Devon, and the winters colder and more bracing. The climate is so invigorating, however, that the Moor is rapidly growing into repute as a summer sanatorium, and that the convict prison is regarded as a health-station. The county is most fertile, especially in the South Hams, and on the 'red land' of the Vale of Exeter. The pastures are very rich, and dairy-farming and cattle-breeding are prominent in its agriculture. The red Devon cattle are one of the leading breeds; and the sheep and ponies of Dartmoor and Exmoor have more than a local reputation. 'Clotted cream,' produced by scalding, is a special product almost confined to Devon and Cornwall. There are extensive orchards, from which great quantities of cider are made; and various fruits are largely cultivated in special localities and sent to London and the Midlands by rail. The fisheries are extensive and valuable, the chief centres being Plymouth and Brixham. Though in the main agricultural, Devon has a varied industrial character. Mining and quarrying and clay-working are of considerable importance; and the manufactures include serges, lace, gloves; extensive potteries; manure, chemical, and soap works; paper-mills, breweries, and distilleries. The chief towns are the city of Exeter, Plymouth (including Devonport and Stonehouse), Torquay, Paignton, Barnstaple, Newton Abbot, Exmouth, Ilfracombe, Teignmouth, Tiverton, Bideford, Brixham, Dartmouth. Pop. (1921) 709,488. Under the Representation of the People Act of 1918 Exeter returns one member, Plymouth three, and the rest of the county is divided into seven single-member constituencies.

Devon adds to singular landscape charms anti-quarian attractions of a most comprehensive and varied character, prehistoric and mediæval. The Romans had little to do with it beyond Exeter, which was an important station; the Saxons did not conquer it until the reign of Cynewulf; the Danes ravaged it in the 9th and 10th centuries,

though they were at first repulsed with heavy loss; it was the scene of the western rebellion for the restoration of Roman Catholicism in 1549; Plymouth was the headquarters of the fleet which defeated the Armada in 1588, and the chief mainstay of the parliament in the west of England in the conflict with Charles I.; Brixham was the landing-place in 1688 of William of Orange. No county save Middlesex has given birth to so many eminent men—Raleigh, Drake, Hawkins, Marlborough, Monk, Coleridge, Hooker, Sir Joshua Reynolds, John Davis, Sir Humphrey Gilbert, Sir Richard Grenville, Bishop Jewell, Gay, St Boniface, Newcomen, Wolcott, Kingsley, John Ford, among them.

**Devonshire, DUKE OF.** See CAVENTISH.

**Devrient, LUDWIG** (1784–1832), was a great actor of Shakespearian characters.—His three nephews were also eminent actors—Carl August (1797–1872), husband of the *diva* Madame Schröder-Devrient (1805–80); Philipp Eduard (1801–77), a baritone singer as well as actor, who wrote plays and a history of the German theatre (1848–74), and with his son Otto (1838–94) edited Shakespeare; Gustav Emil (1803–72), the most gifted of the three brothers.

**De Vries, ADRIAAN** (1560–1627), sculptor, born at the Hague, did his best work at Augsburg.

**De Vries, HUGO**, born at Haarlem in 1848, became professor of vegetable anatomy and physiology successively at Amsterdam and at Wurzburg, continued the researches of the Abbé Mendel (q.v.), and wrote on botanical physiology.

**De Vries, MATTHIAS** (1820–92), Dutch lexicographer and philologist, wrote on Middle Low German and Old Dutch.

**Dew.** The question of the origin of dew has been discussed since very early times, and many theories have been advanced on the subject. Among more recent writers, Gersten, followed by Du Fay, held that dew rose from the ground. Others believed that it fell from above, but no really systematic treatment of the subject appeared until the publication of Wells's *Essay on Dew* in 1814. Wells combated the opinion of Du Fay and Gersten, and showed that all the phenomena described by them could be equally well explained by his theory. He asserted that the dew was condensed out of the air in contact with surfaces below a certain temperature. For every definite pressure and temperature of the atmosphere there is a definite amount of water-vapour per unit-volume which can be held in suspension. Hence, when air containing a certain amount of water-vapour is cooled below a particular temperature, the vapour is condensed. This temperature is called the *dew-point* of the atmosphere under the given conditions as to pressure and quantity of vapour. At night the earth and objects at its surface are being cooled by radiation. If the rate of loss of heat by radiation is sufficiently rapid, the temperature of the earth's surface, and consequently of the air in immediate contact with it, may fall below the dew-point. When this occurs, the moisture condenses on the surface in the form of dew. This is Dr Wells's theory regarding the formation of dew. He considered that the vapour had risen from the ground during the previous day, and that very little dew was formed from vapour which had just risen from the ground, although he admitted that some might be so produced.

Wells's theory of the *formation* of dew is undoubtedly correct, but, in a paper read in 1885 before the Royal Society of Edinburgh, Dr John Aitken adduced evidence which shows that the *greater part* of dew is formed from vapour which has *just* risen from the ground and been trapped by the grass and other objects. Dr Aitken was led to

this conclusion by three independent experimental methods. One of these consists in removing at sunset a portion of turf from the ground, placing it in a shallow metal pan and weighing it. The turf, still contained in the pan, is then replaced in the ground in good heat-communication with it. When reweighed after some time, it is invariably found to have lost weight. If the turf be covered by a metal tray so as to prevent escape of moisture, this loss of weight is largely obviated. Similarly, it is shown that moisture rises always during the night from bare soil, from roads, and from the driest earth.

Certain atmospheric conditions are necessary for the copious formation of dew. The sky must be clear, otherwise the clouds will radiate back much of the heat given off from the earth, and so will prevent the surface objects from cooling below the dew-point. The atmosphere must be calm, or the air next the ground will be carried away before it is completely saturated. Below the freezing-point, the dew is deposited in a solid state as *hoar-frost*. See EVAPORATION, METEOROLOGY.

**Dewar, SIR JAMES** (1842–1923), physicist and chemist, was born at Kincardine on Forth, and educated at Dollar Academy and the universities of Edinburgh and Ghent. From 1875 to his death, 27th March 1923, he was Jacksonian professor of natural philosophy at Cambridge; and from 1877 he was also Fullerman professor of chemistry at the Royal Institution, London. His researches covered a wide field, but best known to the public are his achievements in the liquefaction and freezing of gases and other work with low temperatures, out of which sprang his invention of the vacuum or 'thermos' flask.

**Dewas**, two native states of Central India, with a total population of 137,000.

**Dewberry** (*Rubus cæsius*) is distinguished from the Common Bramble (of which, indeed, many regard it as a mere sub-species) by its weaker and more prostrate glaucous stem, with scattered pickles, but without bristles or glandular hairs, also by the few large drupes, which make up its fruit, and which have a characteristic dew-like bloom, whence the name arises. The fruit is very sweet and agreeable, and makes an excellent wine. The dewberry of North America (*R. procumbens*), abundant in the forests of Canada, is a delicious fruit, much superior to the British fruit of the same name, and more tart. The plant is of very humble growth, scarcely rising above the ground.

**D'Ewes, SIR SIMONDS**, antiquary, was born 18th December 1602 at Coxden, near Chard, and in 1618 entered St John's College, Cambridge. In 1623 he was called to the bar, but in 1626 he married a rich child-heiress, and was knighted. He attended the Long Parliament as member for Sudbury. A Puritan, but a moderate, he accepted a baronetcy (1641), sided with the parliament, was expelled by Pride (1648), and died 8th April 1650. His diaries and transcripts of manuscripts which else had perished possess high value; W. Notestein edited his *Journal* (1924).

**De Wet, CHRISTIAN**, born at Viedepoort, Orange Free State, in 1854, had acquired fame as a hunter ere he became conspicuous in the Transvaal war of 1880–81; and in the war of 1899–1902 he was of all the Boer commanders the most audacious, swift in movement, and fertile in expedients, especially in escaping being cornered. After the submission he came to Europe to raise money for the distressed Boer families, and was Orange River Colony Minister of Agriculture in 1907–10. He joined the South African rising of October 1914, was taken prisoner in December, fined and sentenced to six years' imprisonment, but released in December 1915. He died 3d February 1922.

**De Wette**, **WILHELM MARTIN LEBERECHE**, biblical critic, was born at Ulla, near Weimar, on the 12th January 1780. He studied from 1799 at Jena under Griesbach and Paulus, and early attached himself to the philosophy of Fries. He became extraordinary professor of Exegesis at Heidelberg in 1807, and ordinary professor in 1809, and in 1810 was called to the newly-founded university of Berlin. For a letter which he had sent on the 31st March 1819 to his friend, the mother of Sand, the assassin of Kotzebue, he was deprived of his professorship; and retiring to his native place, he completed his *Christliche Sittenlehre* (3 vols. 1819-21), his edition of the *Briefe, Sendschreiben und Bedenken Luthers* (5 vols. 1825-28), and the religious novel *Theodor, oder des Zweiflers Weihe* (1822; Eng. trans. 1849). A call to be preacher at Brunswick was vetoed by the government, and in 1822 he was appointed professor of Theology at Basel, where, in 1829, he was honoured with a seat in the Council of Education, and died 16th June 1849. His great reputation as a biblical scholar rests on his *Beiträge zur Einleitung in das Alte Testament* (2 vols. 1806-7), his *Lehrbuch der hebraisch-jüdischen Archäologie* (1814; 4th ed. 1864), and especially his very useful *Lehrbuch der historisch-kritischen Einleitung in die Bibel* (1817-26), which ran to many editions. His translation of the Scriptures, undertaken in conjunction with Augusti (6 vols. 1809-12); *Commentar über die Psalmen* (1829); and *Kurzfassendes exegetisches Handbuch zum Neuen Testament* (3 vols. 1836-48), were extensively used by students. 'He possesses soul enough,' says Tholuck, 'to distinguish between the spiritual kernel and its husk in the language of the Bible; interest, besides, in its ideas and doctrines; and, finally, a sound exegetical tact, equally removed from exegetical coxcombry and from arbitrariness and inexactitude.' His works on dogmatic theology, *Ueber die Religion* (1827), and *Das Wesen des christlichen Glaubens* (1846), are of less importance.

See the estimates of De Wette's merits by Schenkel (1849), Lücke (1850), Hagenbach (1850), Wiegand (1879), and Stähelin (1880).

**Dewey**, **GEORGE** (1837-1917), American admiral, born at Montpelier, Vermont, served in the civil war, and as commodore in 1898 destroyed or took the whole Spanish fleet at Manila Bay without losing a man.

**De Wint**, **PETER**. See **WINT**.

**De Witt**, **JAN**, a celebrated statesman of Holland, born at Dort in 1625, was the son of Jacob de Witt, a vehement opponent of William II. Prince of Orange. Jan inherited his father's hatred of the office of stadhouder, and of the family that filled it. His education was carefully attended to, and he soon exhibited remarkable ability. He was one of the deputies sent by the States of Holland in 1652 to Zeeland for the purpose of dissuading that province from adopting an Orange policy, and there his eloquence secured him universal confidence. In the following year he was made grand pensionary. The Orange party (supported by the populace and the clergy), during the war carried on between England and Holland, was ever striving to increase the power of the young prince (afterwards William III.), who was then a mere infant; the republican, or oligarchic party, composed of the nobles and the wealthier burgesses, at the head of which was De Witt, on the other hand sought to strip the House of Orange of all power, and to abolish entirely the office of stadhouder. During William's minority the advantage was, of course, with De Witt and the republicans. In 1654, on the conclusion of the war with England, a secret article was inserted in the treaty drawn up

between De Witt and Cromwell, in virtue of which the House of Orange was to be deprived of all state-offices. After the restoration of Charles II., De Witt leaned more to the side of France, all the more when hostilities were renewed between England and Holland in 1665. During the two years' war De Witt's influence declined, but his star paled altogether when the designs of Louis XIV. upon the Spanish Netherlands became manifest. The Orange party carried their point in the elevation of William to the family dignity of stadhouder and commander of the Dutch forces, but the first campaign proved unfortunate. De Witt had resigned his office of grand pensionary. His brother, Cornelis, accused of conspiring against the life of the stadhouder, was imprisoned and tortured. When Jan went to meet his brother on his release they were attacked by an infuriated crowd, and were both torn to pieces (20th August 1672).

De Witt left memoirs and letters, published 1709 and 1725. See Lives of him by Simons (1836), Knottenbelt, Geddes, and Pontalis (trans. 1885).

**Dew-ponds** are water-holding hollows in the waterless Sussex downs and elsewhere, depending for their supply on the depositions from dew or mist on cool summer nights. Some ancient British camps seem to have relied on them. The presence at the edge of a tree or two is thought to be helpful in condensing the moisture. See *Nature* for April 1905, page 61; A. J. and G. Hubbard, *Neolithic Dew-Ponds and Cattle-Ways* (new ed. 1916).

**Dewsbury**, a manufacturing town and county and parliamentary borough in the West Riding of Yorkshire, situated at the base of a hill, on the left bank of the Calder, 32 miles SW. of York, and 8 miles SSW. of Leeds. The Calder navigation connects the town with Liverpool and Hull. Dewsbury has a chamber of commerce formed in 1861, an infirmary (1883), a town-hall (1888), county courts, and a grammar-school (St Augustine's). Along with Batley (q.v.) it is the centre of the shoddy trade. Blankets, carpets, and yarns are largely manufactured. There are also foundries, as well as a number of minor industries. Dewsbury obtained a municipal charter in 1872. Pop. (1861) 18,148; (1881) 29,639; (1901) 28,060; (1911, after absorbing Thornhill, &c.) 53,351; (1921) 54,163. The (one-member) parliamentary borough (1867) included Batley and Soothill till 1918, when it was made continuous with the county borough.

**Dexter**, in Heraldry, that side of a shield or armorial figure or composition which is to the left, not the right, of the spectator. This nomenclature is adopted because it covers the right side of the warrior who carries the shield.

**Dextrine** ('British gum,' 'torrefied starch'). When starch is carefully heated to 392° F. (200° C.), or until vapours arise from it, it becomes soluble in cold and hot water, and loses its gelatinous character; it also has the property, when viewed by polarised light, of turning the plane of polarisation to the right; hence its name. It is often used as a substitute for gum-arabic in the processes of calico-printing, and for stiffening different goods; it is also applied to the back of postage-stamps. Its value as a substitute for gum consists in its being more flexible and less brittle when dry than that substance. Starch may be converted into dextrine by the long-continued action of dilute acids at a high temperature; also by the action of Diastase (q.v.). Dextrine and starch are isomeric, both being composed of  $C_6H_{10}O_5$ ; but dextrine may be distinguished from the latter body by its not being rendered blue by iodine, which gives with it a dingy purple tint.

**Dextrose**. See **SUGAR**.

**Dey** (Turkish *dai*, 'a maternal uncle'), a name applied to the governor of Algiers before its conquest by the French. The name was formerly given to elderly people, especially among the Janizaries; hence came to be commonly applied at Algiers to the commanding-officer of that corps, who frequently became afterwards pasha or regent of that province. See **BEG**.

**Dhar**, a town of Central India, lying at an elevation of 1908 feet above the sea, 33 miles W. of Mhow. It has over 17,000 inhabitants, and preserves, in two large mosques of red stone and a fort defended by a high rampart and twenty-six towers, traces of bygone magnificence. It is the capital of a protected state of the same name, with an area of 1783 sq. m., and 154,000 inhabitants.

**Dharmasala**, a hill-station in the Punjab, 110 miles N.E. of Lahore; pop. 7000.

**Dharwar**, a town and district in the southern Mahratta country, in Bombay Presidency, separated by the river Tungabhadra from Madras. The town has no manufactures of importance, but a good deal of trade. Pop. 30,000.—The district has an area of 4600 sq. m., and a pop. of 1,000,000, mostly Hindus. The most interesting feature of the country is its suitability for the growth of American cotton, which now occupies a third of the total acreage devoted to cotton. Cotton and silk cloth are manufactured in the district. The prevalent language is Canarese.

**Dhole**, the wild dog of India. See **DOG**.

**Dholka**, a town of India, in Bombay Presidency, 22 miles SW. of Ahmadabad, with a reputation for the weaving of women's robes. It is surrounded by a mud wall 4 miles in circuit, and lies amid the ruins of noble palaces and tanks, many dating from the early Hindu period. Pop. 13,700.

**Dholpore**, a native state of Rajputana, in Central India, on the northern bank of the Chumbul, with an area of 1155 sq. m., and a pop. of 263,000, mostly Hindus. Capital, Dholpore, on the Chumbul, 34 miles S. of Agra by rail. A large fifteen days' fair is held here in October, and two religious fairs are held every year at Machkund, a lake 3 miles to the west, with numerous temples on its banks. Pop. 20,000.

**Dhuleep Singh**. See **SIKHS**.

**Dhunchee**, or **DHANCHI** (*Sesbania aculeata*), an annual herbaceous leguminous plant cultivated in Bengal on account of its coarse hemp-like fibre. It is steeped and prepared very much like Sunn (q.v.). Other species are of similar use.

**Dhwalagiri** (*Divalagiri*), once supposed to be the highest peak of the Himalayas, but now ascertained to be exceeded by several in point of altitude, has a height of 26,826 feet above the sea. It is in Nepal.

**Diabase**. See **BASALT**.

**Diabetes** (Gr., lit. 'a syphon,' from *diabainō*, 'I go or flow through'), a disorder of the general system, of which the principal symptom is a greatly increased flow of urine. Diabetes is of two distinct kinds: the one, *diabetes insipidus*, is a mere exaggeration of the water-excreting function of the kidneys, accompanied by extreme thirst, and hence called *polydipsia* (Gr., 'excess of thirst') by some authorities; the other is a more complex disorder of the assimilation, consequent on the formation first, and the excretion by the kidneys afterwards, of an enormous excess of animal sugar or glucose (see **SUGAR**), the sugar being found in excess not only in the renal excretion, but in the blood, and in nearly all the secretions which have been examined. The pathology of this disease, called *diabetes mellitus* (Lat. *mel*, 'honey'), is very obscure, notwithstanding the numerous recent

physiological researches, especially those on the liver, pancreas, and ductless glands, but defective secretion of insulin by the pancreas plays a large part in its origin. Along with wasting of the body, due to the discharge of sugar, there is a tendency to poisoning of the system from the presence in the blood of acid substances, acetone, &c., some of which can also be discovered in the urine. This condition is known as acidosis. The course of the disease is very different at different periods of life. Before middle age it is severe, progressive, and very liable to be fatal. After that period precisely similar symptoms often appear, especially in stout and gouty persons, but are much less dangerous, and much more easily controlled. All diabetics are subject to progressive emaciation, and they often become subject to skin diseases like eczema and boils, and to consumption.

The first fact observed in cases of diabetes is usually the increased flow of urine, when it becomes so great as to amount to a practical inconvenience; and also a considerable increase of the appetite, and an unquenchable thirst, which rarely fail to accompany the disease from the beginning, but often do not attract attention, or at least suggest the idea of anything wrong, till an advanced stage of the disorder. When the patient demands medical assistance he is usually somewhat thin; the pulse is quiet, the skin cool, the heat of the surface, indeed, habitually rather low and easily depressed. There is often a complete absence of perspiration, which gives a peculiar feeling of harshness to the surface, especially of the palms of the hands. Owing to the withdrawal of fluid from the bowels constipation is often a troublesome symptom. With these symptoms the first approaches of pulmonary disease may concur. In the very last stages there is sometimes dropsy of the feet; and the urine may be natural in quantity, or even diminished. For the other characters of diabetic urine, see **URINE**. Diabetic persons bear excitement and fatigue, either mental or bodily, extremely badly; and imprudence in this respect is not unfrequently followed by sudden or rapid collapse and death.

Treatment consists mainly in removing from the diet, as far as consistent with comfort and due nourishment, everything which easily turns to the formation of glucose in the system, and at the same time in preventing the onset of acidosis. The complete suppression of sugar-forming food, however, as recommended long ago by Rollo, has not been found possible, nor is it desirable, since acidosis is more apt to develop on a completely sugar-free diet. Bread composed of gluten of wheat without starch, or bran-cakes baked with eggs, or biscuits made of almonds, have been strongly recommended; and in most of the great capitals, as London and Paris, bakers may be found who regularly furnish bread suitable for diabetics. An oatmeal diet, consisting of a daily allowance of half a pound of oatmeal made into gruel with three ounces of butter and white of eggs, has been strongly recommended. The starvation method of treatment consists in withdrawing all food for one, two, three or more days till the urine becomes free from sugar, then putting the patient on a strict sugar-free diet to which farinaceous and other foods are gradually added till the amount that the patient's system can assimilate without producing sugar is discovered. This amount of farinaceous and sugary material is then allowed in the regular diet. Saccharin (q.v.) has lately been of great service to diabetics, as it supplies the flavour of sugar without its objectionable properties. There is no specific medicine, and the unguarded use of strong remedies is to be condemned. Careful dieting is the main feature in treatment, and the

recent discovery of insulin, a substance extracted from the pancreas of oxen and other animals, has proved of great help. Injected beneath the skin before meals it checks waste of sugar, and is of especial use in the severest cases. The action of the skin should be aided by warm clothing and frequent hot baths, and the bowels must be carefully regulated.

**Diablerets**, a remarkable mountain of the Bernese Alps, Switzerland, on the frontier of Bern and Valais, with a height of 10,651 feet above the sea. The Diablerets, with their four main peaks, are composed of limestone strata, the lower beds of which are so soft and shaly that they are easily disintegrated, and masses falling down into the valley from above cause the most terrible catastrophes, as in 1714 and 1749.

**Diacoustic.** See CAUSTICS.

**Diachylon.** See PLASTERS.

**Diadochi.** See GREECE.

**Diæresis** (Gr., from *diæreō*, 'I divide'), a term used in Grammar to signify the resolution of a diphthong, or of a contracted syllable, into two syllables; as Lat. *auræ* into *aura*. The name is also given to the mark  $\cdot$  placed above a vowel letter to indicate that it is to be independently pronounced, and not in conjunction with a preceding vowel; as in the above example, or in the word *aerial*. See UMLAUT.

**Diagnosis** (Gr., from *dia*, 'through,' and *gnōsis*, 'knowledge'), in Medicine, the discrimination of diseases. It includes the study of all the vital phenomena of diseases, and also of their appearances after death, in so far as this can aid their discovery during the life of the patient. It is usual to speak of rational or physiological diagnosis, or diagnosis by symptoms—i.e. changes chiefly functional, observed by the patient; and of physical diagnosis, or diagnosis by signs—i.e. objective phenomena appreciable by the senses of the observer. The latter method of diagnosis has been much enlarged in scope and increased in importance by the modern methods in medicine of Auscultation (q.v.) and Percussion (q.v.), and also by the great advances made in physiological chemistry, and by the use of the microscope. Skill in diagnosis is one of the highest gifts of the physician, and nothing distinguishes the man of long experience from the tyro more than this unerring insight into some unseen disease. See STETHOSCOPE, LARYNX, OPHTHALMOSCOPE, &c.

**Diagonal Scale.** See SCALES (MATHEMATICAL).

**Diagoras** (surnamed the 'atheist'), a Greek poet and philosopher, was born in Melos, an island of the Cyclades. He is said to have been a disciple of Democritus of Abdera, and he is alluded to by Aristophanes in the *Clouds* (424 B.C.). He seems to have been witty and fearless, and probably treated the superstitions of the popular religion with contempt. He was formally accused of impiety in 411, and only saved his life by flight to Pallene, and afterwards to Corinth, where he died. He wrote lyrics and a philosophical work, none of which have been preserved.

**Dial and Dialling.** A *sun-dial* is an instrument for measuring time by means of the motion of the sun's shadow cast by a stile erected on its surface. It is an instrument of very great antiquity, and before clocks and watches became common, it was in general use as a time-keeper. Some old sun-dials are very elaborate—e.g. that at Glamis Castle, Fife-shire; and many bear quaint mottoes (cf. *Leisure Hour*, 1870, p. 413; and Mrs Gatty's *Book of Sun-Dials*, 4th ed. 1900). Dial-making was

then an important branch of mathematical study; now it is more an object of curiosity than utility. A dial consists of two parts—the *style* or gnomon, usually the edge of a plate of metal, always made parallel to the earth's axis, and pointing towards the north pole; and the *dial-plane*, which may be of any hard substance, and on which are marked the directions of the shadow for the several hours of the day, their halves, quarters, &c. Dials receive various names, according mostly to the positions which they are constructed to occupy. When the dial-plane is on the plane of the horizon, the dial is called a horizontal dial; when perpendicular to that plane, a vertical dial. An equinoctial dial is one whose plane is parallel to the equinoctial plane. The south dial, north dial, east dial, west dial, polar dial, declining dial, are named from the position of the dial-plane. The cylindrical dial is a dial drawn on the curved surface of a cylinder. The ring dial is an ingenious small portable dial, but rather a curious toy than a philosophical instrument. A *night* or *nocturnal dial* is an instrument for showing the hour of the night by the shadow of the moon or stars. Moon-dials may be constructed relative to the moon's motion; or the hour may be found by the moon's shadow on a sun-dial. But because of the irregularity of the moon's motion, due to its varying speed at different parts of its orbit, the time so found is subject to considerable error.

**Dialling.**—The *style* of a dial being parallel to the earth's axis, those familiar with spherical trigonometry will readily see that the problem of constructing a dial resolves itself into that of ascertaining where the hour-lines cut a given circle, with a view to the graduation of the dial-plane. Suppose *Pep* (fig. 1), a hollow and transparent sphere, as of glass, to represent the earth; and suppose its equator divided into 24 equal parts by the meridians *a, b, c, d, &c.*, one of them passing through a given place, say London (see HORIZON), at the point *a*. If the hour of twelve be marked at the equator, both on the latter meridian and that opposite it, and all the rest of the hours in order on

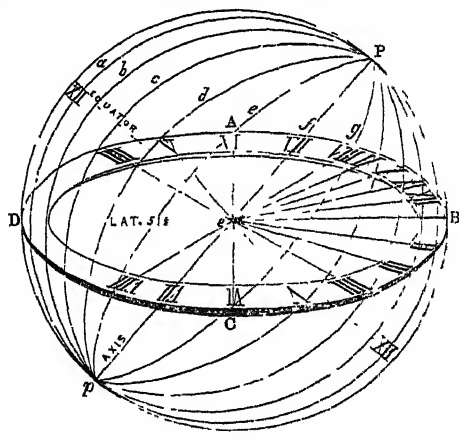


Fig. 1.

the other meridians, those meridians will be the hour-circles of London, because, as the sun appears to move round the earth in 24 hours, he will pass from one meridian to another in one hour. Then, if the sphere has an opaque axis, as *Pep*, terminating in the poles *P* and *p*, the shadow of this axis would fall, in the course of the day, on every particular meridian and hour, as the sun came to the plane of the opposite meridian, and would thus show the time at London, and at all other places

on the same meridian as London. If the sphere were cut through the middle by a plane ABCD, in the rational horizon of London, and if straight lines were drawn from the centre, E, of the plane to the points where its circumference is cut by the hour-circles of the sphere, those lines would be the hour-lines of a horizontal dial for London; for the shadow of the axis would fall upon each particular hour-line of the dial, when it fell upon the like hour-circle of the sphere. Similarly, if we suppose the sphere cut by *any* other plane facing the meridian, the hour-circles of the sphere will cut the edge of the plane in those points to which the hour-lines must be drawn straight from the centre; and the axis of the sphere will cast a shadow on these lines at the respective hours. The like will hold of any plane, whether it face the meridian or not, provided it do not coincide with it, or do not coincide with a plane through the poles, and perpendicular to the plane of the equator. In the latter case, the axis would have no elevation above the plane of the dial; in the former, the shadow would not move circularly.

The *universal dialling cylinder*, an invention of Ferguson's, is represented in fig. 2. ABCD is a

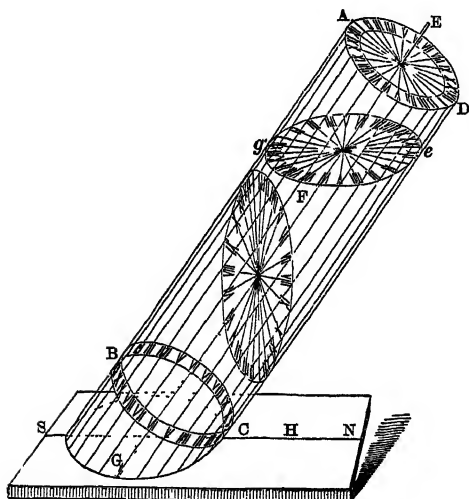


Fig. 2.

glass cylindrical tube, closed at both ends with brass plates, on the centres of which a wire or axis, EFG, is fixed. The tube is either fixed to a horizontal board, H, at an angle equal to the latitude of the place, or moves on a joint, so that it may be elevated till its axis is parallel to the earth's at any latitude. The 24 hour-lines are drawn on the outside of the glass, equidistant from one another, and parallel to the axis. The XII next B stands for midnight; the XII next B stands for noon. When the axis is adjusted for the latitude, and the board levelled, with the line HN on the meridian, and the end towards the north, the axis EFG, when the sun shines, will serve as style, and cast a shadow on the hour of the day among the parallel hour-lines. As the plate AD is parallel to the equator, and EFG perpendicular to it, right lines drawn from the centre to the extremities of the parallels will be the hour-lines of an equinoctial dial, and the axis will be the style. A horizontal plate, *ge*, if put into the tube, with lines drawn from the centre to the several parallels cutting its edge, will be a horizontal dial for the given latitude; and similarly a vertical plate fronting the meridian, and touching the tube with its edge, with

lines drawn from its centre to the parallels, will be a vertical south dial, the axis of the instrument in both cases serving for the stile; and similarly for any other plate placed in the cylinder. If, instead of being of glass, the cylinder were of wood, any of these dials might be obtained from it by simply cutting it in the planes of the plates, and drawing the lines on the surface of the section.

Dialling sometimes occurs as a term for surveying by help of a compass with sights, such as is called a 'miner's dial,' and is used especially in underground surveys.

**Dialects.** The word dialect is rather loosely applied in popular usage to certain local or provincial forms of speech which exist in all countries, side by side with the more important form which is known as the standard language. The latter type of speech is considered as the *Language* proper, and the other, less widely-spread forms are often conceived to be mere offshoots and 'corruptions' of it. So far as the genuine provincial dialects are concerned, this view cannot be supported.

Among students of philology the term *dialect* is generally applied to all closely related varieties of speech, whether these be confined severally to small and obscure communities of peasants, or current among larger groups of population, such as great industrial communities; whether they be the linguistic instruments of highly educated circles, of the most cultivated and refined classes, or whether they pass muster only among the rougher, less instructed, and less distinguished sections of the nation. It is immaterial to the conception of a dialect in this special sense, whether the form of speech so designated is or is not commonly used in writing, or whether it is the vehicle of a literature or not.

There is no essential difference between dialects and languages; both exist as means of social intercourse between members of certain communities, large or small; that is, both are forms of human speech, and are modified by the changing habits of those who speak them. But while this essential identity of character must be borne in mind, it is often useful to apply the term *language* to those forms of speech which acquire importance and prestige by having a wide currency, not only over a large area, but also among all sections of a nation—so that a national language may be used alongside of other, purely local, varieties—a form of speech which is the recognised medium of official, diplomatic, and commercial communication throughout a country, which is the traditional vehicle of a people's culture and of its main literary productions. Such a form of speech, the national language of a great community, is, and can only be, in its origin, one among many varieties, or dialects, which, owing to geographical, social, and political conditions, has gradually attained a degree of importance above other dialects and risen to the dignity of a standard language.

Every civilised country, whose people possess an ancient culture, some degree of unity based upon political constitution, or upon religion, and a national literature, evolves in time, from among its forms of speech, often highly differentiated, one central language which is usually at once the medium of government and the more refined types of its social life, and the means of expression for its best thought and its literature.

The problem which concerns us immediately is how do varieties first arise in a language which, as we must assume that of primitive communities to be, was originally homogeneous?

The conditions which make for unity of speech are those under which the unity of a community is preserved; that is, conditions under which the

greatest possible facilities exist for frequent and intimate social intercourse between all the members of a community. This intensity of social intercourse is chiefly possible when a community is small, when the members live together in a comparatively restricted area, and when there is the minimum of diversity in occupation, and in standing between them. The existence of a system of highly developed occupational specialisation, tending to give rise to different castes or classes, would impair the unity of social intercourse. Another disturbing factor is the scattering of a community over a wide area, in conditions under which the various families dwell some distance apart from each other, and tend, with their households and dependents, to form, in time, so many separate hamlets, or villages.

So long as social unity and actual contiguity of individuals and families are maintained, the dialect of such a community will remain uniform and homogeneous among all the members. There will be, it is true, changes of various kinds which will continue from generation to generation, but such changes will affect equally the speech of every member of the community. The speech of all will change in course of time, but that of each individual will change in the same way. Thus, in spite of natural development, the dialect remains one and homogeneous. The reason for this is that under the conditions described, those tendencies to change which exist among a minority of the speakers only are eliminated. Those tendencies, on the other hand, which exist among all the members of the community are fostered and encouraged. It is the social linguistic intercourse which, without the speakers being aware of it, eliminates the one and fosters the other set of tendencies.

The essential condition for the differentiation of a uniform dialect, and the rise of varieties of speech, is the existence of some factors which disturb the social unity and break up the community into several separate groups or sections. When once this happens, when what was formerly a single community is split into several, the process of linguistic differentiation is inevitable. Each of the new social groups develops its language on lines more or less different from the others, and we have the beginnings of new dialects. The reason for this is that among the new and smaller communities there will be a distribution of linguistic forces and tendencies different from that which prevailed in the original community. The old balance of tendencies of elimination and of preservation is upset. Variations in speech existing among a minority of individual speakers which formerly were suppressed, owing to the unconscious pressure of the general trend of development in the community as a whole, under the new conditions gain ground, find a larger public with whose tendencies they agree, and finally become established as characteristics of this or that new dialect. On the other hand, tendencies which before existed among a majority of the speakers under the old conditions, and were therefore preserved, may now exist among only a small proportion of speakers, and will therefore be suppressed. In each of the new communities a different set of individual tendencies gets the upper hand, and each will differ to a greater or less extent from those which prevailed before the breaking up of the old community took place.

It may be said, then, that dialects arise from the segregation of speakers into groups, and the isolation of these groups from each other. The factors which produce the separation or isolation of group from group may be classed under two heads—geographical factors and social factors.

The former class includes geographical and physical factors of separation generally, the natural features of the country—mountain-ranges, rivers, forests, tracts of desert or tundra. The second group includes whatever barriers to social intercourse and linguistic contact arise from the structure of society—differences of occupation, caste, and class. It is convenient to distinguish varieties in speech, caused severally by these two kinds of factors, as REGIONAL, and CLASS or SOCIAL dialects respectively. The former arise in a primitive condition of society, when, under stress of hunger, large portions of a community wander off to remote areas in search of food for themselves and pasture for their cattle. Migration is clearly a potent means of isolation, and the geographical barriers placed between communities as a result of this, form the completest possible separation between the speakers who compose the various tribes. Moreover, migration may bring about a complete change in the mode of life, difference of climate, food, and social structure, and, further, it may bring the nomads into relation with other tribes possessing a different civilisation, and speaking an entirely different language. All these things, which are incidental to geographical separation, bring in their train so many additional causes of linguistic differentiation. Climate was formerly held to be a powerful factor in determining the character of a language. It cannot be denied that climatic conditions operating over a considerable period must exercise considerable influence upon the physical and mental constitution of speakers, and that these must, in some way, react upon their language. At the same time, it appears at present impossible to say in what precise way language is affected by climate; we have not yet been able to show that this or that feature in a given language is the result of this or that climatic condition. The influence exerted reciprocally by races speaking different languages is more easily understood. No considerable influence of one language upon another is possible without prolonged social contact between the races. When this happens, there is first a period of bilingualism, and then usually the gradual disappearance of one of the languages. The surviving language, which may, according to circumstances, be that either of the conquerors or new-comers, or that of the original inhabitants of the area, cannot fail to be more or less modified by the other before it disappears, in vocabulary, pronunciation, and possibly also in grammatical structure. It must be borne in mind, that unless one of the races is practically exterminated by the other, a thing which perhaps rarely happens, the community is of mixed race, which means that a portion of it has adopted a form of speech which was once foreign to it. A foreign tongue thus acquired is variously altered by those who adopt it. Not only so, but it is started on lines of development to some extent different from those it followed before. The new, mixed community will possess fresh tendencies of change.

Some attribute the remarkable differentiation exhibited by the various branches of Aryan speech, in a large measure, to the influence of non-Aryan speakers. The effects of geographical isolation, and all that this entails, are seen not only in the various character of the principal branches of the Aryan language, but in the high degree of differentiation existing within the individual branches of this family. The Hellenic dialects arose under conditions of geographical dispersion which were ideally favourable to linguistic differentiation, and the same may be said of the innumerable Romance dialects which arose in the widely separated provinces of the far-flung Roman empire. Again, we may point to English, a branch of West Germanic, which has pursued very different lines of develop-

ment from its nearest speech-cousins on the Continent, as a result of centuries of complete geographical isolation from the main body of West Germanic speech.

We now pass to the social factors of isolation, the barriers set up by occupation, caste, or class. These arise in every community so soon as this attains to any complexity of structure. The factors of occupation and class are by no means so thorough in their action as the geographical factors; they do not involve a separation in distance of the various sections of society. On the other hand, social conditions undoubtedly do split a community up into various groups, which, while they often dwell side by side, and admit of much social intercourse between them, are nevertheless isolated from one another in many ways—by more or less different conditions of life, different preoccupations and interests, differences of education, different standards of taste, by the many circumstances which arise out of class distinction. Among these various social groups there exist varieties of dialect, different in degree, and often in kind, from those which obtain between different regional dialects.

An inevitable result of this differentiation is the rise of a standard language, that is, the dialect of a particular region, and a special variety of it spoken by a definite group of speakers, usually the upper class, and especially of an official class of courtiers and governing persons. The standard gradually dispossesses the regional dialects in most areas among the upper and educated classes. But it soon passes beyond the limits of a single class, and is acquired by many others—by all speakers, in fact, who have given up their old regional dialects. Now begins a fresh process of differentiation. By the side of standard type, a number of varieties developed from it spring up among different classes, and in different areas. These modifications of the standard are in part purely the result of social factors, but the existing regional dialects may also play a part in the process.

The modified forms of the standard may become definitely fixed and traditional, and undergo, independently of the standard, characteristic changes of their own. They are, in fact, separate dialects, each with its own tendencies to change. In course of time these new class dialects may react upon the standard itself, and in English, for instance, there is no doubt that for several centuries the spoken form of the standard language, and, through this, the written form also, has been greatly affected by the other class dialects. (See ENGLISH LANGUAGE)

The class dialects, which differ widely from the standard of a given age, are considered by speakers of this as VULGARISMS; features derived from the regional dialects, which are frankly popular forms of speech, when introduced into a form of speech which aims at being the standard, are called PROVINCIALISMS. The importance and interest of class dialects, both as illustrating a particular kind of speech differentiation, and on account of their influence upon the standard spoken and written language, are now recognised by philological students. The study of regional dialects, both in their oldest recorded forms and in their latest living developments, has long been pursued by philologists. In many European countries, notably in France, Scandinavia, and Germany, much learning and ability has been devoted to their investigation.

The special reasons for the study of living popular dialects are the following:

(1) Popular speech is, on the whole, free from arbitrary rules imposed by convention, in the interests of a supposed correctness. They therefore offer a better field than the more polished type of

speech in vogue in polite society, and in literature, for the observation of the actual processes of development which tend, in all ages, to affect human speech.

(2) Popular dialects often preserve old features of all kinds which have been lost in the standard language. They therefore often help to explain forms which occur in the standard itself in its earlier phases.

(3) Since the standard language of most countries is, in origin, rarely a completely pure regional dialect, but rather a combination which has grown up in an area where several regional types of speech are in contact, the study of living dialects often throws light upon the original sources of the standard.

(4) Apart from those types which were naturally mingled by actual juxtaposition in certain areas, a standard language may, at various periods, incorporate isolated forms from more or less remote regional types of speech. These forms appear in the standard as 'exceptional,' and seem at first sight to be out of harmony with the general trend of development. Their origin may often become clear from the study of living regional dialects, in which they are found to be normal. It is not always possible to explain how such isolated features have passed into the standard. The channel through which they have passed is in most cases a class dialect tinged with provincialism. See ENGLISH LANGUAGE (*Dialects*); GREEK (*Language*), &c.

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**Dialectic** is a Greek word which signified originally 'the art of rational conversation,' but came to have a technical signification in the language of philosophy. At first it implied a regular and scientific method of treating general conceptions or general terms—a sort of anatomy of names, and through them of the things denoted. In the Socratic philosophy, and more especially in that of Plato, dialectic was thus the method of the highest and deepest kind of speculation. Aristotle gave another signification to the word. According to him, a scientific proof or deduction is different from a dialectic proof, which is only a probable deduction. After this, dialectic came round to imply a kind of fencing in words, the art of so using the forms of reasoning as to confound your opponent, and make fallacies pass for truth. Dialectic is sometimes used as synonymous with logic. The Hegelian philosophy regards dialectic as at once the method of knowledge and of the evolution of the universe itself.

**Diallage** (Gr. *diallage*, 'interchange;' so called from its changeable colour), a mineral nearly allied to Augite (q.v.), and by some regarded as a variety of it. Its chemical composition is essentially the same. It is seldom found perfectly crystallised, but usually massive, granular, or disseminated, and is characterised by its markedly laminated structure. It is brown, gray, or green in colour, but shows a kind of metallic lustre when broken across the cleavage. This is due to the presence of microscopic tubular inclusions or leaflets, which are disposed parallel to the cleavage-planes or laminae. Diallage is a rock-forming mineral of some importance, occurring as a primary constituent of normal Gabbro (q.v.).

**Dialogue**, a conversation between two or more persons, implying, however, greater unity and continuity of subject than an ordinary conversation. The ancient Greek philosophers were fond of this

way of conducting their investigations and conveying their instructions. The Socratic dialogue is a conversation in the form of question and answer, so contrived that the person questioned is led himself to originate those ideas that the questioner wishes to bring before him. The dialogues of Plato are, as it were, philosophical dramas, in which the Socratic method of investigation is brought to bear upon speculative subjects. One of the greatest masters in this form was Lucian, whose keen-edged and brilliant wit was especially adapted to it. The dialogue is but ill adapted to the exposition of modern science, although elementary hand-books in the form of question and answer are still useful as supplying the student with a series of concrete facts tersely expressed. Of the more eminent modern writers of the literary forms of dialogue, we may mention Erasmus in Latin; Lessing, Herder, and Wieland among the Germans; Petrarch and Machiavelli in Italy; Fénelon, Fontenelle, and Diderot in France; and in England, Berkeley, Swift, Hurd, Harris, Helps, and Landor in his *Imaginary Conversations*. Dialogue combined with action gives us the drama.

**Dialysis.** See OSMOSE, DIFFUSION.

**Diamagnetism.** Bodies such as iron, when placed in a field of magnetic force, tend to move from places of weaker to places of stronger force. The opposite is true of bismuth and other substances. Such substances are said to be *diamagnetic*. For further information, see MAGNETISM.

**Diamantina**, an episcopal town, of mean appearance, in the Brazilian province of Minas Geiaes. It is the centre of a rich diamond district, and has manufactures of cotton and goldware. Pop. 13,000.

**Diameter**, in Plane Geometry, is generally a straight line bisecting any system of parallel chords of a conic section. The lines which it bisects are termed its *ordinates*. In the circle, ellipse, and hyperbola, every diameter passes through the centre of the curve, and is there bisected; but it is only in the case of the circle that all diameters are equal. In the parabola, since the centre of the curve is at an infinite distance, all diameters are parallel to the axis.

**Diamond** is a natural form of crystallised carbon, highly valued as a precious stone, today of more value than the ruby. The diamond crystallises in the cubic or monometric system, its common forms being the regular octahedron, the rhombic dodecahedron, and the six-faced octahedron. The faces are often curved, and the general form of the crystal may be more or less rounded. Cleavage is perfect, parallel to the faces of the octahedron—a fact which is often taken advantage of in splitting off fragments for the purpose of removing flaws. The surface of the diamond frequently exhibits striae and triangular impressions, while the interior may contain microscopic cavities and various inclusions. A distinctly lamellar structure is by no means uncommon.

The lustre of the diamond is peculiar to itself, and hence termed 'adamantine.' In a natural condition, however, the surface often presents a dull lead-gray semi-metallic lustre. The high refractive and dispersive powers of the diamond produce, when the stone is judiciously cut, a brilliancy and 'fire' unequalled by any other stone. The mean index of refraction is 2.417, and the angle of total reflection about  $24^{\circ} 13'$ ; the latter accounts largely for the lustre, inasmuch as a large proportion of the incident light is in a well-cut diamond reflected from the inner surface of the stone. The diamond, especially when coloured, is highly phosphorescent, that is to say, after exposure to brilliant illumination it emits the rays which it has absorbed, and

thus becomes self-luminous in the dark. Under the electric discharge in a highly rarefied medium it exhibits beautiful phosphorescent phenomena, as pointed out by Sir W. Crookes. The diamond also phosphoresces under the influence of radium. It is very translucent to the X-rays, and may thus be distinguished from paste. Some diamonds are fluorescent.

The specific gravity of the diamond is about 3.52, and its degree of hardness greater than that of any other mineral, being indicated by 10 in the ordinary scale. The excessive hardness serves to distinguish the diamond from other gem-stones: any stone which readily scratches ruby and sapphire must be a diamond. Notwithstanding its hardness the diamond is brittle, and hence the absurdity of the ancient test which professed to distinguish the diamond by its withstanding a heavy blow struck by a hammer when placed on an anvil.

Regarded formerly as a peculiar kind of rock-crystal, the chemical composition of the diamond remained for a long time extremely obscure. It was shown by the Florentine academicians Averani and Targioni, about 1695, that the diamond could be volatilised at a high temperature, their experiments having been made at the cost of the Grand-duke Cosmo III.

Newton in 1704 expressed the opinion that the diamond, from its high refrangibility, was probably an unctuous body coagulated. In 1751 the Emperor Francis I. performed an experiment which showed that diamonds strongly heated in a furnace completely disappeared. Lavoisier demonstrated in 1772 that while the diamond is extremely refractory if heated with total exclusion of air, it is readily combustible at a moderate temperature in the presence of air or oxygen, with production of carbonic acid gas. In 1797 Smitson Tennant showed the identity of diamond with carbon. The researches of Dumas, Stas, Roscoe, and Friedel all tended to prove that the diamond is practically pure carbon. Chemists have generally experimented, for sake of economy, with impure specimens, or pieces of board, and have thus obtained on combustion a considerable amount of ash; but the purer the diamond the smaller is the proportion of ash left. Gustav Rose subjected diamonds, inclosed in a vessel free from air, to the intense heat of the voltaic arc, when the gems became gradually incrustated with a dark coating of graphitic matter; and in some cases triangular depressions were developed on the faces, like those often observed in the South African diamond.

Hence it was hoped that carbon might be induced by artificial means to assume the characters of the gem. In 1880 J. B. Hannay of Glasgow produced artificial diamonds by inclosing a mixture of paraffin spirit and bone-oil distillate, with metallic lithium, in a strong wrought-iron tube, and exposing it to prolonged heat in a reverberatory furnace. Specimens of diamantoid carbon were thus obtained, but of small size, and it was found that these, when placed on the wheel, immediately crumbled. Moissan obtained diamond, though in crystals of only microscopic size, by dissolving pure charcoal in pure metallic iron, melted in a powerful electric furnace. On the molten mass being suddenly cooled by plunging into water the carbon separated from solution in the liquid iron, and solidified under intense pressure within the solid crust. The diamond was then separated from the iron in which it was embedded by the tedious process of dissolving away the metallic matrix. J. Friedländer showed that diamond may be obtained, without great pressure, by crystallisation from solution of graphite in fused olivine. R. von Hesslinger and J. Wolf obtained it from a solution of graphite in a fused mixture of silicates, resembling those of the South African matrix.

It is notable that the occurrence of diamonds has been recorded in certain meteorites; one that fell in the Russian government of Penza in 1886 contained 1 per cent. of diamantoid carbon. Diamond was also found in meteoric iron from Canyon Diablo in Arizona.

An imperfect variety of diamond known as *bort*, or *bourt*, occurs in the form of small spherical concretions with crystalline texture. Although unfit for use as an ornamental stone, it is employed when ground as an abrading agent; and the powder mixed with oil serves to feed the lapidary's wheel when cutting hard stones. Much of the bort of commerce is not the mineralogical variety, but consists of splinters, rough fragments, and imperfect crystals of ordinary diamonds. The diamonds used by the glazier for cutting glass are ordinary crystals with rounded faces, and are known as *vitré* diamonds. The cut, though only to the depth of about the  $\frac{1}{16}$ th of an inch, is sufficient to determine with precision the direction in which the glass shall break. Round pieces of bort are of most value.

*Carbon*, or *carbonado*, is the name applied to an opaque, black, granular, or imperfectly crystallised variety of diamond found only in Brazil, where it was discovered in 1843. While its density is less than that of crystallised diamond, its hardness is greater, and hence it is used in the arts, especially for mounting in the steel heads or crowns of the rotary diamond drills for rock-boring.

The art of cutting and polishing the diamond is said to have been discovered in 1456 by Louis de Berquem of Bruges. As formerly practised, the stone was first, if necessary, cleaved or split, and then 'bruted' or rubbed into shape. The faces of the stone thus 'cut' were ground and polished on flat metal discs, fed with diamond dust and oil, and revolving with great rapidity by steam-power. In recent years the process has been greatly modified, and the stone, instead of being subjected to cleaving and bruting, is now usually sawn into the most profitable shape. The saw is a piece of

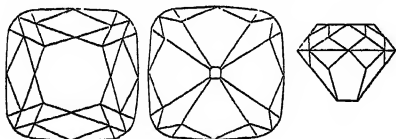


Fig. 1.—Square-cut Brilliant.

very thin steel, supplied with oil and diamond dust, and revolving at great speed by electricity. This process enables the table of the gem to be produced at once, and effects a saving of one-half of the crystal, inasmuch as the piece sawn off is available as another stone, whereas in the older process it was reduced to

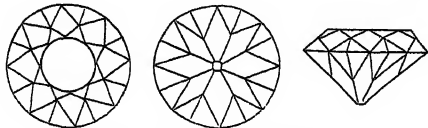


Fig. 2.—Round-cut Brilliant.

dust or practically lost. Amsterdam is the chief home of diamond cutting and polishing, but the trade is also carried on in London, Antwerp, &c. The common form of the diamond is either the *brilliant* or the *rose-cut*. The brilliant resembles two truncated cones, base to base, the edge of the junction being called the *girdle*, the large plane at the top is the *table*, and the small face at the base the *culet*; the sides are covered with symmetrical

facets. Fig. 1 shows a square-cut brilliant, and fig. 2 a round-cut brilliant. The rose has a flat base, with sides formed of rows of triangular facets rising as a low pyramid or hemisphere; but this form of diamond is daily becoming less fashionable. It is illustrated by fig. 3.

India was formerly the only country known which yielded diamonds in quantity, and thence were obtained all the great historical stones of antiquity. The chief diamond-producing districts are those (1) in the Madras Presidency, on the Kistna and Godavari rivers, commonly though improperly termed the Golconda region; (2) in the Central



Fig. 3.—Rose-cut Diamond.

Provinces, including the mines of Sumbulpur; and (3) in Bundelkhand, where the Panna mines are situated.

At present the diamond production of India is insignificant. It is notable, however, that in 1881 a fine diamond, weighing 67½ carats, was found near Wajra Karur, in the Bellary district, Madras. The stone was cut into a brilliant weighing 24½ carats, and is known as the 'Gor-do-Noir.'

Brazil was not regarded as a diamond-yielding country until 1727, when the true nature of certain crystals found in the gold washings of the province of Minas Geraes was first detected. Diamonds occur not only in this province, but in Bahia, Goyaz, Matto Grosso, and Paraná. The geological conditions under which the mineral occurs have been carefully studied by Professors Derby, Gorceix, and Chatrian. The diamonds are found in the sands and gravels of river-beds, associated with gold, specular iron ore, rutile, anatase, monazite, topaz, and tourmaline. In 1853 an extraordinary diamond was found by a negress in the river Bogagem, in Minas Geraes. It weighed 254½ carats, and was cut into a brilliant of perfect water, weighing 125 carats (see fig. 4, b). This brilliant, known as the 'Star of the South,' was sold to the Gaikwar of Baroda for £80,000.

Both the Indian and the Brazilian diamond-fields have been eclipsed by the remarkable discoveries of South Africa (see CAPE OF GOOD HOPE). Although it was known in the 18th century that diamonds occurred in certain parts of South Africa, the fact was forgotten, and when in 1867 they were found near Hopetown, the discovery came upon the world as a surprise. The principal mines are situated in Griqualand West, but diamonds are also worked in the Orange Free State and in the Transvaal. They occur near Gwelo in Rhodesia, and in South-west Africa. The 'river diggings' in the Vaal and Orange rivers have occasionally yielded large stones; one found in 1872 on the Vaal weighed 288½ carats, and yielded a fine pale yellow brilliant, known as the 'Stewart.'

It was soon found that the diamonds of South Africa were not confined to the river gravels, and 'dry diggings' came to be established in the so-called 'pans.' The principal mines are those of Kimberley, De Beer's, Du Toit's Pan, Bultfontein, and Wessleton. At these localities the diamonds occur in a serpentinous breccia, filling pipes or 'chimneys,' generally regarded as volcanic ducts, which rise from unknown depths and burst through the surrounding shales. The 'blue ground,' or kimberlite, is a volcanic breccia containing fragments of various rocks cemented by a serpentinous paste: this ground becomes altered by meteoric

agents as it approaches the surface, and is converted into 'yellow earth.' At Kimberley the neighbouring schists, or 'reefs,' are associated with sheets of a basaltic rock, which are pierced by the pipes. In the early days of the diamond industry in South Africa the blue earth was worked in huge open pits, but about 1889 this quarrying gave place to mining by deep shafts and tunnels. The earth when raised is spread over great distributing floors, where it is disintegrated by weathering, and the friable material is then washed in pans and concentrated in the pulsator. The diamonds are separated by adhesion to grease spread over the percussion tables across which the material travels.

The great number of large stones found in the mines of South Africa is a striking peculiarity. The largest diamond hitherto yielded by South Africa is the famous *Cullinan* diamond, which was found on 25th January 1905 at the New Premier mine in the Transvaal, about 20 miles WNW. of Pretoria. This limpid stone, apparently part of a large octa-

tion, and reappeared a century later cut into three stones. The greater portion, 41½ carats, turned up as the Hope Blue Diamond, while about 11 carats was purchased at the late Duke of Brunswick's sale, and the writer of this article bought in Paris 1½ carats for £300. The Hope Diamond realised £32,000, but brought ill-luck to its purchasers, all of whom came to violent ends.

Of all the great diamonds, the 'Koh-i-nur' is perhaps the most interesting (see fig. 4, c). While tradition carries it back to legendary times, it is known from history that the Sultan Ala-ed-din in 1304 acquired this gem on the defeat of the Raja of Malwa, whose family had possessed it for many generations. In 1526 it passed by conquest to Humayun, the son of Sultan Baber. When Aurungzebe subsequently possessed this stone, he used it as one of the eyes of the peacock adorning his famous peacock throne. On the conquest of Mohammed Shah by Nadir Shah in 1739 the great diamond was not found among the Delhi

treasures, but learning that Mohammed carried it concealed in his turban, Nadir, on the grand ceremony of reinstating the Mogul emperor on the throne at the conclusion of peace, offered to exchange turbans, in token of reconciliation, and by this ruse obtained possession of the gem. It was when Nadir first saw the diamond on unfolding the turban that he exclaimed, 'Koh-i-nur,' or 'Mountain of Light,' the name by which the gem has ever since been known. At Nadir's death it passed to his unfortunate son, Shah Rokh, by whom it was given to Ahmed Shah, the founder of the Durani Afghan empire. By Ahmed it was bequeathed to his son, Taimur Shah; and from his descendants it

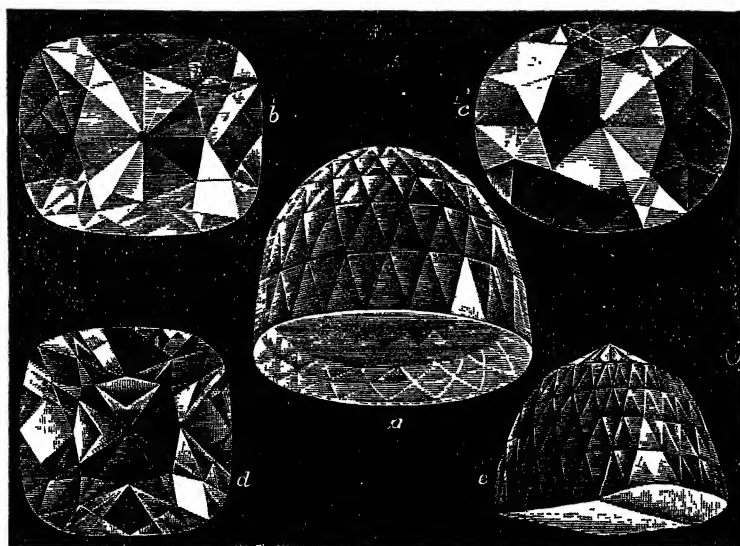


Fig. 4.

a, Great Mogul; b, Star of the South; c, Koh-i-nur; d, Regent; e, Orloff—all actual size.

hedral crystal, weighed 3025½ carats, or about 1½ lb. avoidupois. It was presented by the Transvaal Government, at the instigation of General Botha, to Edward VII. upon his birthday in 1907. The following year it was cut in Amsterdam by Messrs J. Asscher & Co., and yielded nine large brilliants and numerous small stones. The largest of the cut stones weighed 516½ carats and 309½ carats.

Next to the Cullinan, the largest South African diamond is the *Excelsior*, a stone which in its rough state weighed 971 carats, and was found in 1893 at the Jagersfontein mine in the Orange Free State.

The Australian stones are small and harder than other diamonds. Victoria, Queensland, and South Australia have yielded diamonds, but only in New South Wales have the drifts been worked, Bingera being the first notable working. The tin-gravels of Inverell were afterwards worked for diamonds.

A few special diamonds from their size, colour, and history deserve notice. The first blue diamond of value heard of in Europe was considered unique. In the rough it weighed 112½ carats, and was described as *d'un beau violet*. It was bought by Louis XIV. in 1668, and was then cut into a brilliant of 67½ carats. This was stolen during the revolu-

tion, after a series of romantic incidents, to Runjit-Singh. On the death of Runjit, in 1839, the diamond was preserved in the treasury of Lahore, and on the annexation of the Punjab by the British in 1849, when the property of the state was confiscated to the East India Company, it was stipulated that the Koh-i-nur should be presented to the Queen of England. It was consequently taken in charge by Lord Dalhousie, who sent it to England in 1850. After the Great Exhibition of 1851, where it had been exhibited, it was injudiciously re-cut in London by Voorsanger, a skilful workman from Messrs Coster's factory at Amsterdam. The re-cutting occupied 38 days of 12 hours each, and the weight of the stone was reduced from 186½ to 106½ carats. The form is that of a shallow brilliant, too thin to display much fire. According to Lady Burton, it is believed to bring ill-luck to its possessor.

Another famous Indian diamond is the 'Great Mogul' (fig. 4, a), which appears to have been found about 1650 in the Kollur mine, on the Kistna. It was seen by the French jeweller Tavernier at the court of Aurungzebe in 1665, and is described as a round white rose-cut stone of 280 carats. Its sub-

sequent history is unknown, and it is probable that at the sacking of Delhi by Nadir Shah in 1739 it was stolen and broken up. Some authorities have sought to identify the Great Mogul with the Koh-i-nur, and others with the Orloff.

The 'Orloff' (fig. 4, e) is an Indian stone which was purchased at Amsterdam in 1776 by Prince Orloff for Catharine II. of Russia. The stone at one time formed the eye of an idol in a temple in the island of Seringham, in Mysore, whence it is said to have been stolen by a French soldier. It weighs 193 carats, and was mounted in the imperial sceptre of the Tsar.

The 'Regent' is a famous diamond preserved among the national jewels in Paris. It was found in 1701, at the Partael mines, on the Kistna, by a slave, who escaped with it to the coast, where he sold it to an English skipper, by whom he was afterwards treacherously killed. Thomas Pitt, grandfather of the first Earl of Chatham, at that time governor of Fort St George, purchased the stone, and had it re-cut in London, whence it is often known as the 'Pitt.' Its original weight was 410 carats, but it was reduced in cutting to 136½; the result, however, was a brilliant of fine water and excellent proportions. Pitt sold it in 1717, through the financier John Law, to the Duke of Orleans, then Regent of France during the minority of Louis XV.

The large 'Sancy' is an historical diamond, about which many contradictory stories have been told. It appears that the Sancy was an Indian stone, purchased about 1570 by M. de Sancy, French ambassador at Constantinople. It passed temporarily into the possession of Henry III. and Henry IV. of France, and was eventually sold by Sancy to Queen Elizabeth of England. By James II. it was disposed of to Louis XIV., about 1695, for £25,000. At the beginning of the 19th century it passed to the Demidoff family in Russia, and by them it was sold in 1865 to Sir Jamsetjee Jeejeebhoy.

Of coloured diamonds there are a few possessing historical interest. Diamonds occur of all tints, and when the colour is well pronounced, they are prized as fancy stones. A pale green diamond, weighing 48½ carats, is preserved in the Green Vaults at Dresden. But one of the most superb coloured diamonds at present known is the sapphire blue brilliant termed the 'Hope' diamond, which formerly belonged to Mr H. T. Hope, and weighs 44½ carats. It is believed to have been cut from the large blue diamond, weighing in the rough 112½ carats, sold by Tavernier to Louis XIV., which disappeared amid the troubles of 1792.

For further information on the blue diamond, see *Precious Stones and Gems*, page 139; and on historical diamonds, see *The Great Diamonds of the World*, by E. W. Stieler; French works by Jacobs and Chatrain (1884) and Boutan (1886); and Kunz, *Gems and Precious Stones* (New York, 1900). For South Africa, see Gardner Williams, *The Diamond Mines of South Africa* (1906), and Sir William Crookes, *Diamonds* (1909).

**Diamond Beetle.** See WEEVIL.

**Diamond Harbour,** a port and telegraph station on the Hûghl, 38 miles SSW. of Calcutta by rail, 41 by river. Formerly, the Company's ships anchored here.

**Diamond Necklace,** THE, a wonderful piece of jewelry, made in Paris about the year 1775, and intended for Madame Dubarry, the favourite of Louis XV. She, however, was excluded from court on the death of Louis (1774), before the necklace was finished. After being made, this beautiful ornament, adorned with 500 diamonds, was found to be so costly that no one could purchase it. It was valued at 1,800,000 livres, equal to about £80,000 of modern money.

The Prince Cardinal de Rohan, a wealthy, vain,

and profligate man, persuaded by an adventuress named De Lamotte, who waited about court, that the queen (Marie Antoinette) regarded him with favour, became completely infatuated with the idea. One night in August 1784 the poor dupe had the happiness of a moment's interview in the groves around Versailles with the queen in the person of a girl who closely resembled her. De Lamotte had stated to the cardinal that the queen was desirous of obtaining this glorious necklace, and that not having sufficient money just then, she would sign an agreement to purchase it if the cardinal would become security. The cardinal consented. The agreement was approved of and signed with the royal signature, as also with that of the cardinal, who, on the 1st February 1785, carried off the treasure from the maker to Versailles, where it had been agreed the queen should send for it. In a few days De Lamotte and her husband, having disappeared from Paris, were busily engaged in selling the separate diamonds in the necklace. The whole transaction had been a trick; the messages from the queen, oral and written, were without foundation, the latter, indeed, being forged by a *soi-disant* valet, who was skilled in imitating handwriting. The plot was discovered by means of the maker of the diamond necklace, who, not receiving any money when the period of the first instalment had arrived, went to court, demanding to know if the necklace had been delivered to the queen. In a few months the cardinal found himself in the Bastille, where some of those by whom he had been duped had already been lodged. In May 1786 the trial of the prisoners was brought to a close. De Lamotte was branded on each shoulder with the letter V (for *voleuse*, 'thief'), and was sentenced to perpetual imprisonment. Her husband, who had fled to England, was sentenced in his absence to the galleys for life. The cardinal and the girl who had personated the queen were dismissed without punishment. The queen was falsely supposed by the populace of Paris to have had a part in the plot, and the odium resulting from it was heaped upon her, even at the last, when she sat on the tumbril that bore her through a raging and cursing mob to the guillotine.

See Carlyle's study, in his *Essays*; Vizetelly's *Story of the Diamond Necklace* (new ed. 1880); and French works by Campardon (1863), D'Este Ange (1889), and Brentano (trans. 1902).

**Diamper.** See THOMAS (CHRISTIANS OF ST.).

**Diana,** an ancient Italian divinity, identified by the Romans with the Greek Artemis. She was a goddess of light, and represented the moon. It is said that Servius Tullius was the first to introduce her worship at Rome, and apparently she was first worshipped by patricians only. See ARTEMIS.

**Diana** (1) OF POITIERS, a favourite of Henry II. of France, was born in 1499, the eldest daughter of Jean de Poitiers. Married at thirteen, she became a widow at thirty-two, and ere long attached the affections of the nineteen years younger dauphin strongly to herself. On his accession as Henry II. (1547) Diana enjoyed great influence, did much to reform the court, and brought its influence to bear strongly against the reforming party. She was made Duchess of Valentinois in 1548, retired from court to her castle Château d'Anet on the king's death in 1559, and died in 1566. The splendid Château de Chenonceaux (q.v.) was given her by the king, but after her death was taken by Catharine de' Medici. It still contains many memorials of its most famous mistress.—(2) **DIANA OF FRANCE**, Duchess of Angoulême, was born in 1538, natural daughter of Henry II. and

a Piedmontese (according to others, of Diana of Poitiers), was formally legitimised, and married first to a son of the Duke of Parma, next to the eldest son of the Constable de Montmorency. She enjoyed great influence at court under Henry IV., superintended the education of the young prince, afterwards Louis XIII., then retired from court, and died without issue in 1619.

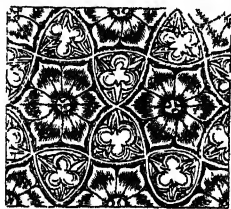
**Dianthus.** See CARNATION, PINK.

**Diapa'son** (Gr.), a term in music by which the ancient Greeks designated the octave. The French use the term as equivalent to *pitch*. Diapason is also the English name given to the fundamental stops of the Organ (q.v.).

**Diaper**, a term applied to certain forms of flat or slightly relieved ornament. Any pattern formed of a floral, leafy, geometric, or other device, repeated over a flat surface, is called *diaper* or *diaper work*; but according to some authorities the device should be free from bounding lines forming squares, as a pattern of this nature should rather be called *checker* or *checker work*.

In *textile fabrics* the term appears to have been given at one time to silk fabrics with almost any kind of repeated pattern upon them. It is an older name for figured silk than Damask (q.v.). The Byzantine Greeks seem to have called a silk with both pattern and ground of one colour *diaspron*, and the Latins, following the Greeks, named such a fabric *diasper*, which through Old French became the English word *diaper*. Chaucer refers to 'cloth of gold diapered wele' (*Knight's Tale*). Any kind of textile fabric, paper, or leather, with a more or less enriched geometrical pattern is, in a general way, said to be diapered. But as regards textiles the term diaper nowadays is almost confined to undyed linen with a woven diamond pattern, although cotton imitations are made. According to the size of this pattern the stuff is called bird's-eye, pheasant's-eye, fish-eye, or Russia diaper.

In Architecture, diaper-work, or diapering, is a kind of decoration applied to plane surfaces, and consists of a small repeated pattern either of conventional flowers, leaves, or other devices, carved or painted. The flower, or other object, is generally inclosed by lines, fillets, or slender mouldings, which constitute in themselves a sort of geometrical diapering. When the pattern is carved, it is generally sunk; and when painted, it consists of a darker shade of the same colour as the plane surface, by which the effect of shadow is communicated to it. The accompanying illustration, from Bloxam's *Gothic Architecture*, exhibits a very beautiful example of Decorated English diapering. It is taken from Canterbury Cathedral.



Diaper.

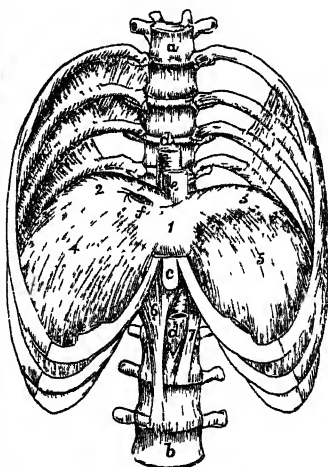
**Diaphony**, a primitive form of Descant (q.v.), in which the parts progressed in similar motion.

**Diaphoretics.** See SUDORIFICS.

**Diaphragm**, or MIDRIF (Gr. *diaphragma*, 'a partition'), is the name applied in anatomy to designate the musculo-tendinous partition which in man and the mammalia generally separates the cavity of the thorax from that of the abdomen. Its general form is that of a *dome* directed towards the chest, the lower part and sides being muscular, while the central or highest portion consists of an expanded tendon. The muscular fibres have an extensive origin from the circumference of the

visceral cavity—viz. posteriorly, a *vertebral* portion arising from the lumbar vertebrae by two pointed processes, or *crura*, of unequal length, and from two fibrous bands, or *arched ligaments*, on each side of the bodies of the vertebrae: laterally, a *costal* portion arising from the cartilaginous and adjoining osseous parts of the lower six ribs; anteriorly, a

*sternal* portion arising from the ensiform cartilage of the sternum, or breast-bone. From these various points the muscular fibres converge to the *central, trefoil*, or *cordiform tendon*, which forms the highest part of the diaphragm, and as its name indicates, consists of three *lobes*. The diaphragm presents three large perforations or *foramina*; one, *quadrilateral*, placed in the highest part of the tendinous centre for the upward passage of the inferior vena cava; one, *oval* in form, surrounded by



The lower part of the Thorax, opened to show the upper side of the Diaphragm from before:

a, sixth dorsal vertebra; b, fourth lumbar vertebra; c, ensiform cartilage; *dd*, aorta; e, oesophagus; f, opening for inferior vena cava. 1, 2, 3, trefoil tendon; 4, 5, central portions of diaphragm; 6, right, and 7, left crus of diaphragm.

muscular fibres derived from the *crura*, for the passage of the oesophagus and pneumogastric nerves; the third, situated in front of the vertebrae and bounded by tendinous fibres of the *crura*, transmits the aorta, thoracic duct, and large azygos vein.

The upper surface of the diaphragm is in relation to the pleural membranes which inclose the lungs, and the pericardium which incloses the heart. The latter membrane is intimately connected with the central tendon, which thus forms a fixed floor for the support of the heart. The lower surface, deeply concave in form, is lined by peritoneum, and has in apposition with it the stomach and spleen on the left side, the convex upper surface of the liver on the right side, and the kidneys, supra-renal capsules, and duodenum posteriorly.

When the diaphragm contracts, the arched portion becomes flatter, and the cavity of the chest being thereby enlarged, air rushes in to fill the vacuum, and expands the lungs during the act of inspiration. It is thus an inspiratory muscle, and in ordinary quiet breathing the central tendon on which the heart rests takes no share in this movement. Every contraction of the diaphragm must diminish the abdominal space and compress the abdominal viscera, and hence it aids in the expulsion of the feces and urine.

Spasmodic action of the diaphragm produces hiccough and sobbing. Stoppage of the action of the diaphragm, whether from great external pressure or from paralysis, is very speedily fatal.

DIAPHRAGM, a partition with a hole in it, employed not only in landscape and portrait lenses for photography, but also in telescopes, microscopes, and other optical instruments, for the purpose of cutting off the superfluous rays of light,

and producing greater intensity or sharpness of the image, as well as to correct aberration.

**Diarbekir**, a town of Asiatic Turkey, capital of a province of the same name, is situated on the right bank of the Tigris, 390 miles NW. of Bagdad. The town is surrounded by high strong walls, and commanded by a citadel built on a high basalt rock, against which the flat-roofed houses rise above each other in terraces. The population has dwindled to about 40,000, mostly Kurds and Armenians. The city is the seat of a Greek bishop, as also usually of the Jacobite patriarch of Antioch. It has numerous mosques and churches, bazaars, fountains, baths, and caravanserais, although the last are now falling into decay. Indeed, only in the centre of the town are any of the buildings handsome; elsewhere ruins meet one at every step. Stagnant pools, weeds, and filth combine to produce fevers. Diarbekir had formerly extensive manufactures of silk and cotton goods, which it still produces, and an active commerce with Aleppo and Bagdad; and it still has considerable trade in raw products. The roads to the coast are equally bad and insecure, and the traffic with Bagdad is mostly by raft. The principal exports are wool, mohair, sheep and goats, copper ore, butter, gall-nuts, goat and kid skins, and furs; the imports include cotton and woollen goods, indigo, coffee, sugar, buffalo-hides, petroleum, and soap. Diarbekir occupies the site of the ancient *Amida*, which was fortified by the Emperor Constantine. It was captured by the Persians in 359, and retaken by Justinian; but in 502 the Persians once more became masters, and put 80,000 of the inhabitants to the sword. In 640 it fell into the hands of the Arabs of the Bekr tribe, whose name became identified with the district; but the Turkish official title remained *Kara Amid* ('Black Amid,' from the colour of its basaltic walls). After many vicissitudes, the town passed into the hands of Sultan Selim in 1515.

**Diarrhœa** (Gr. *dia*, 'through,' and *rhœō*, 'I flow') is the name applied to an increase in the discharges from the bowels, which are usually unduly liquid, sometimes overcharged with bile, and sometimes with mucus. It is, properly speaking, a symptom rather than a disease. Thus it often occurs in the course of diseases of the liver and spleen, of some forms of heart-disease, of many fevers and other acute diseases, and is a common complication of the advanced stage of consumption. Frequently, however, it is the most prominent, perhaps the only symptom of ill-health; and it may then take rank as a disease, or rather as the generic name of a group of diseases. In this aspect the subject will be discussed here.

Diarrhœa is either simple, bilious, or choleraic; the last form has already been discussed (see CHOLERA). The ancients applied the name *lentery* to a diarrhœa in which the dejections consisted of matters not digested, or very partially so; this form is, however, very unusual, at all events in Britain. Dysentery (q.v.) is also a form of diarrhœal disease; as is the group of Fevers (q.v.) called typhoid, enteric, and paratyphoid fevers. Simple and bilious diarrhœa probably often differ only in degree; they are both distinguished from the advanced stages of cholera and dysentery by the presence of abundance of biliary colouring matter in the stools, and by the absence of the distinctive features of the other two diseases as described elsewhere. Diarrhœa is almost always accompanied at first by pain in the abdomen, sometimes severe or even agonising in character. According to its cause and treatment, it may pass off in a few hours, or may persist for a few weeks or months; or it may even prove fatal.

Diarrhœa has many varieties and many causes; but the whole class of more or less epidemic diarrhœal diseases is due to the spread of various kinds of bacteria, and has been studied of late years from the bacteriological and sanitary points of view. It is observed of all of these diseases, without exception, that they are more apt to prevail during summer and autumn than during the earlier seasons of the year; and their prevalence is to a great extent dependent on the height of the summer temperature. The crowding together of people with an absence of first-class sanitary arrangements for the disposal of refuse and excreta, as, for example, in camps, also favours its occurrence. The development of flies in large numbers also greatly conduces to the spread of epidemic diarrhœa when it has once broken out. It has been noticed that cold and wet seasons are the least favourable to the production of diarrhœa. Infants are especially apt to suffer from diarrhœa, and a large number of the infantile deaths in many English towns are caused directly by this disease.

Besides these epidemic diarrhœas, isolated cases of simpler and more obvious origin are very frequent. In some persons diarrhœa is the usual result of catching cold—i.e. they suffer from catarrh of the digestive, instead of, as is most usual, the respiratory organs. But far more frequently diarrhœa results from unwholesome or indigestible food or drink, or from excessive indulgence even in what would otherwise not be hurtful. In all such cases the diarrhœa is to be regarded as beneficial; in fact, it is the natural effort of the intestines to rid themselves of their objectionable contents, and should be encouraged rather than arrested. Diarrhœa occurring as an incident in prolonged constipation is to be explained in the same way, as due to irritation of the intestines by their hardened contents. The diarrhœa which affects infants, apart from epidemic outbreaks, is of this nature, and is usually an indication that their food is unsuitable. A rough guide to the nature of the bacterial changes that are in progress in the child's intestines, and that are responsible for the diarrhœa, is obtained by examination of the stools. When the stools are alkaline, fermenting and offensive, milk and starchy foods form the best diet; and when the stools are acid, sour in smell, and green in colour, albuminous fluids, like barley-water and meat-juice, suit best.

Acute diarrhœa should almost always be treated first by an aperient, as the unaided action of the intestines is often insufficient to expel irritating material. A full teaspoonful of Gregory's powder, or a tablespoonful of castor-oil with ten or fifteen drops of laudanum is especially useful. The food taken should be small in amount, and as easily digestible as possible. Milk, arrowroot, &c., beef-tea, toast, plain biscuits, are among the most suitable articles of diet. Complete abstinence from food for a day or more, which has the effect of resting the bowels and preventing the presence of putrefactive material, is, when combined with rest in bed, one of the most satisfactory methods of treating diarrhœa. Pain may be alleviated by poultices or fomentations sprinkled with laudanum. A small dose of brandy often checks both the pain and the diarrhœa. Should the disease not yield to these measures, opium, carminatives, and astringents should be administered. In some cases, especially of febrile diarrhœa, an emetic of ipecacuanha at the very beginning will sometimes remove the disease with remarkable rapidity; and in most forms of diarrhœa it may be alleged that this medicine (in doses of from one to five or even ten grains) is well borne. Sometimes it is combined with opium in the form of Dover's powder. In chronic diarrhœa (not the consequence of serious

organic disease) careful regulation of the diet is of prime importance, and is generally accompanied by the administration of astringents. But such cases are often very intractable, and no rules can be laid down that would apply to all. In a very large class of cases, especially of infantile diarrhoea, depending upon a too acid state of the intestinal contents, the leading remedy is chalk, either in powder or in the very serviceable form of the *mistura cretæ* (mixture of chalk) of the *pharmacopœias*, from one to three dessert-spoonfuls of which may be given after every disturbance of the bowels. Lime-water, mixed with milk in the proportion of one to four or five, is easily given to very young children, and serves nearly the same purpose.

The astringents useful in diarrhoea are very various. Those of vegetable origin are usually first employed, alone or in combination. The most important are tannic and gallic acids, kino, catechu. The mineral astringents are chiefly salts of the heavier metals, iron, bismuth, copper, lead, &c.; but also chalk and lime, and alum. Opium, one of the most powerful remedies, owes its usefulness to other than astringent properties, and is very frequently given in combination with astringents—e.g. in chalk and opium powder, compound kino powder, lead and opium pills. In many states of the system in which diarrhoea occurs, however, it is dangerous. It must never be given to young children, or in large doses to any one, without medical advice. In some forms of diarrhoea, especially in children, antiseptics are very useful—e.g. grey powder, creasote; and it is probably to its antiseptic properties that corrosive sublimate (bichloride of mercury) owes its value when administered in minute doses.

**Diary** (Lat. *diarium*, 'a daily allowance for soldiers,' 'diary,' from *dies*, 'a day') means simply a daily record of events or observations made by an individual. In it the man of letters inscribes the daily results of his reading or his meditations; to the mercantile man it serves the purpose of an order or memorandum book; while the physician finds it indispensable as a register of engagements. Diaries in many forms and sizes are issued every year, containing also so much miscellaneous information that in one book we have at once a diary and an almanac. The *Ephemeris* of the ancients was originally a military record or journal, a day-book or account-book, also a collection of tables showing the position of the heavenly bodies, but passed into literature to mean a collection of records of what has happened on the same day in various years, or a mere general name for any form of periodical books or magazines.

Diaries have often furnished the historian with invaluable material, supplying the absence of public records, and furnishing minute and intimate details of manners and of motives that do far more to help us to understand the past than more formal records. Such documents as Robert Baillie's *Journals*, the *Diaries* of Pepys and Evelyn, and the *Journals* of Greville are among the most valuable sources of real history. Bacon says 'in sea-voyages, where there is nothing to be seen but sky and sea, men make diaries; but in land-travel, wherein so much is to be observed, they omit it,' but unhappily this no longer holds of modern travellers.

**Diastase**, or **AMYLASE**, is the enzyme which converts starch into sugar (see **FERMENTATION**). It is found chiefly in germinating seeds, in which its function is to convert the insoluble starch stored up in the seed into soluble sugar, which is available for the needs of the growing seedling. It also occurs in the green leaves and other parts of plants. The best-known diastase is that which

occurs in malt (see **BEER**), by the aid of which, in the process of brewing, the starch of the malt is saccharified, and thus rendered capable of being fermented by yeast. Malt extract, prepared by extracting the ground malt with cold or lukewarm water, contains the enzyme, and finds many medicinal and dietetic applications. Malt diastase is precipitated, along with other substances, when alcohol is added to malt extract, and can thus be obtained as a dry, white powder. It converts starch first into a mixture of dextrins and the sugar maltose, and finally into maltose. A similar enzyme, known as *takadiastase*, is obtained from a mould (*Aspergillus oryzae*), and has a more energetic action than malt diastase on starch, which it converts finally into grape sugar, not maltose. It has long been used by the Japanese in the brewing of their national drink, saké, from rice. See **GERMINATION**, **COOKERY**, **DIGESTION**, **FERMENTATION**.

**Diathermancy.** See **HEAT**.

**Diathesis** (Gr. *dia*, 'through,' and *tithēmi*, 'I place or arrange'), a Greek word signifying a disposition or arrangement, and applied by the old medical authors to the predisposition or constitution of the body which renders it prone to certain diseased states. By recent writers the term is applied to the general constitutional tendency of an individual, to indicate not merely the class of diseases to which he is most likely to be liable, but also in many cases the manner in which his normal functions, both bodily and mental, are carried on; and is thus opposed to Cachexia (q.v.), an unhealthy condition associated with actual disease. Though the study of diathesis apart from existing disease is very apt to lead to over-refinement and the pursuit of intangible abstractions, yet a proper appreciation of a person's constitutional proclivities or diathesis often enables a medical man to advise him how to regulate his life and habits to the best advantage—what to do and what to avoid—and may furnish important guidance as to his treatment in disease. The diatheses most usually recognised are the sanguine, the nervous or neurotic, the bilious, the lymphatic, the strumous, and the hæmorrhagic. Numerous mixed varieties are also described by some writers.

**Diatoms** (*Diatomaceæ* or *Bacillariaceæ*) are a group of about 10,000 species and varieties of *Algae* abounding in water or wet places in every part of the world, and although of varied form, they possess unique characteristics. The individuals are microscopic, but their presence is often revealed to the unaided eye by the brownish hue which they frequently impart to submersed or wet objects, on which they grow in enormous numbers. Each individual consists of protoplasm, nucleus, cell-sap in special cavities of the protoplasm, chromatophores, and oil-globules. The chromatophores, which may occur as tiny granules, or as one or more larger bodies of varied shape, contain the chlorophyll, which, however, is usually masked by a yellow-brown pigment (diatomin), for which reason they are not termed chloroplasts. The oil-globules answer to the starch grains of many other plants in that (1) they are the product of carbon assimilation carried on by aid of energy derived from the sun; and (2) they form a reserve of food material for the life, growth, and reproduction of the diatom. The organs just enumerated constitute the active portion of the individual or energid, and differ in minor degree only from those of other plants. They are, however, enclosed and protected by a cell-wall of such peculiar composition, and unique form and structure, as to constitute the characteristic feature by which diatoms are distinguished from all other organisms. This cell-wall consists of an organic substance allied to

cellulose more or less impregnated with silica, and the unique peculiarity lies in the fact that each energid is usually enclosed by two of these siliceous shells of nearly equal size, known as valves. The margin, called the girdle-band, of the older and usually slightly larger valve fits over the girdle-band of the younger like lid and body respectively of an ordinary pill-box, the pair being held together by their overlapping girdles. The complete organism thus composed of energid, two valves, and two overlapping girdles is termed a frustule. The siliceous valves in valve or face view may in the different species be discoid, elliptical, lanceolate,

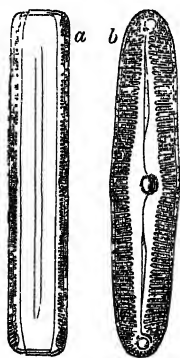


Fig. 1.

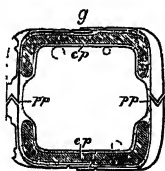


Fig. 2.

An elliptical fresh-water diatom—*Pinnularia viridis*, magnified 470 diameters: 1, a, Girdle view of a frustule, showing overlapping girdle-bands of the two valves, the transverse markings of which are seen on either side; b, valve view, showing central and polar nodules between which runs the median cleft or raphe, its ends being curved in the polar nodules, while a longitudinal area of clear silic runs along each side of it. The transverse striae or markings seen at the sides are really elongated chambers in the silic, each having a tiny pore opening into the interior of the frustule.

2, Diagrammatic transverse section of a frustule; pp, clear protoplasm (lightly shaded) lining the interior of the frustule and containing the large chloroplasts cp (darkly shaded); g, girdle-bands. Opposite pp the raphe is shown as a cleft in the clear siliceous valves which, on the left, exhibit a chamber on each side of the raphe, while on the right the section has passed between the chambers.

linear, triangular, quadrangular, polyangular, or of almost any shape imaginable. Each valve may consist of two or more layers of silic with a complex intermediate structure, or it may be of one somewhat thicker layer provided with minute cavities of very varied size, form, and complexity of structure usually placed in rows, the rows being generally arranged in geometrical designs of extraordinary beauty. Other markings also are of frequent occurrence, such as ribs, bosses, depressions, &c., often placed symmetrically with the cavities. Some species possess spines, horns, or similar processes; others have large protuberances with clear areas at the apex, termed ocelli. Others, again, have minute granules of siliceous matter resembling hoar-frost or tiny spicules scattered over, or almost completely covering the valves.

Besides the internal protoplasm, there is a delicate external protoplasmic mucus either covering the frustule or occurring merely as bands or cushions. In some species this substance is elongated and hardened into a stalk, fixing the organism to the substratum. The same material in other species forms amorphous gelatinous masses, or somewhat firmer gelatinous tubes, in which innumerable individuals are enclosed. In some colonial forms these tubes are much branched, and, being attached by the base to the substratum, resemble in size and shape such filamentous Algae as *Cladophora*. A more common colonial form occurs by the indi-

viduals adhering to one another, by means of tiny mucus cushions on their valves, forming curved, straight, or zigzag filaments of variable length fixed at one end, or floating entirely free.

In the greater number of species the individuals are separate from one another, and certain of the elongated forms may by their own energy be endowed with a small power of locomotion, enabling them to glide over the substratum, while others by floating are transported vastly greater distances by currents. The mechanism of the gliding movement just mentioned has never been satisfactorily demonstrated, but it seems to be due, in some species at any rate, to the protusion of protoplasm through a longitudinal fissure, called the raphe, conspicuous in the valves of those species endowed with that power (fig. 1, b).

The inflexible nature of the siliceous valves when completed usually inhibits their further growth or division; multiplication occurs, therefore, in a remarkable way. The division of an individual into two is initiated by mitosis of the nucleus followed by bipartition of the protoplasm as in the cell division of most other organisms. This takes place within the siliceous shell, the valves of which become slightly separated. Each new energid forms one new valve, the margin of which fits inside that of the pre-existing valve, so that two valves, each with a new girdle-band, are formed within the old girdles of the original frustule. Each individual diatom consists, therefore, of an old and a new valve, the girdle-band of the old overlapping that of the new (fig. 1, a). As the two new valves are formed within a pre-existing frustule they are generally somewhat reduced in size at every division, to which may be ascribed the well-known variation in size of the individuals of a species. This method of bipartition may continue from about twenty-five to fifty or more generations in one season, and such fecundity accounts for the prodigious numbers that occur in every suitable spot; for, in the first case, nearly 17 millions will arise from a single individual, and in fifty generations almost 563 billions. In the cycle of generations, however, numerous losses doubtless occur through enemies or accident, reducing the theoretical limit of progeny from a single original. The restriction in the number of generations limits the diminution in size of the frustules, and when the smallest has been attained for any particular species the largest size is regained by the formation of certain spores called auxospores. These are usually produced after partial or complete conjugation of two of the micro-frustules, and the process may occur in five different ways. The auxospores ultimately germinate and give rise to a sporangial frustule, which moults its temporary shell and soon becomes an individual diatom of the maximum size for the species; it then multiplies by bipartition as previously explained.

Recent investigations on the Diatomaceae of the North Sea reveal the fact that these organisms occur in prodigious abundance; of *Nitzschia delicatissima*, for example, 1½ millions occurred in one quart of water from the open sea, besides many other species in less abundance. Bearing in mind these figures, along with the rate of multiplication previously mentioned, one can the more readily imagine how the vast deposits of these shells, known by geologists to occur in various parts of the world, have been rendered possible. Among such deposits, formed originally at the bottom of seas or lakes by the gradual accumulation of shells of dead diatoms falling from the upper photic stratum of the water where they lived, the following may be mentioned: The soft and friable berg-mehl of Norway, Lapland, Siberia, and other parts of the world, often forming strata 10 to 30 feet

thick. The harder and even more extensive deposits at Richmond, Monmouth, Virginia, and elsewhere in U.S.A. The extremely hard polishing-slates of Tipoli. The well-known deposits at Moir and Nykjöbing in Jutland, Simbirsk in Russia, St Peter in Hungary, Morón in Spain, Sendai in Japan, Oamaru in New Zealand, are all noted for the beauty of the specimens obtainable from them. In various other parts of the world occur deposits of guano, marl, clay, kieselguhr, cement-stone, Turkey-stone, polishing-slates, &c., containing a large proportion of diatoms, and frequently enriched with extraordinary forms. At home we have many deposits of diatomite, but on a smaller scale; those at Lough Moune, Toome Bridge, and Dromore in Ireland, Glenshira, Kinnord, Skye, Mull, Ballateer, and Loch Leven in Scotland, are, among others, well known to diatomophiles. Similar deposits, some even on a more gigantic scale than those already mentioned, are being laid down in all parts of the world at the present time. Although so abundant now, and in the more recent geological times, there is no exact evidence of diatoms in rocks older than those of the Cretaceous epoch, and the great deposits mentioned above are mostly in Tertiary rocks.

Regarding their phylogeny, some thinkers imagine the diatoms to have originated from certain forms of the Peridineales now represented by such species of that group as *Euxivallea marina*, while others associate them with Desmids.

The literature on diatoms is enormous, and a complete bibliography dating from, say, 1830, would contain, at least, 4000 titles—a tribute to the interest they awaken in microscopical and other scientific circles. Of these works some of the following may be found in large libraries: Smith, *British Diatomaceae*, Pritchard, *Infusoria* (4th ed.); O'Meara, *Irish Diatomaceae*; Wolle, *Diatoms of North America*; Van Heurck, *Treatise on Diatoms*; and *Synopsis des Diatomées de Belgique*; Cleve, *Synopsis of Naviculoid Diatoms*; Tempère, *Le Diatomiste*; Schmidt, *Atlas der Diatomaceen-Kunde*; Pantocksek, *Beiträge zur . . . fossilen Bacillarien*; Castracane, *Report on Diatoms* ('Challenger' Expedition); Griffith and Henfrey, *Micrographic Dictionary* (3d and 4th ed.); and all the larger works on the microscope. See ALGÆ, DESMIDS, DYNAMITE, OOZE.

**Diatonic** (from the Greek) means 'by tones,' or 'from tone to tone.' The diatonic species of the ancient Greeks—as distinguished from their chromatic and enharmonic species—formed the foundation of their whole system of music, and was arranged in tetrachords (embryo *scales*) composed of one semitone and two whole tones. In modern music, the term is applied to (1) the natural or normal scale, major or minor, which proceeds mainly by whole tones; (2) the different species of intervals (usually reckoned as fourteen in number) occurring between the various notes of that scale; and (3) music written wholly or for the most part in that scale.

**Diaz**, or DIAS, BARTOLOMEU, a Portuguese navigator of noble birth who flourished during the latter half of the 15th century. His residence at the court of King John II. brought him into contact with many scientific men, among others the German cosmographer Behaim (q.v.). Diaz took a great interest in geographical discovery, and in August 1486 the king gave him the command of two vessels with a view to following up the discoveries already made by Portuguese adventurers on the west coast of Africa. Diaz soon reached the limit which had been attained in South Atlantic navigation, and first touched land in 26° S. lat. Driven by a violent storm, he sailed round the southern extremity of Africa (see CAPE OF GOOD HOPE) without immediately realising the fact, and discovered Algoa Bay. The discontent of

his crew compelled him sorrowfully to return; and arriving in Lisbon, December 1487, he was at first greeted with enthusiasm, but soon saw Vasco da Gama preferred before him, and was compelled to act under the latter in the grand expedition of 1497. Vasco da Gama even sent him back to Portugal after they had reached the Cape Verde Isles. Three years after, he joined the expedition of Cabral, the discoverer of Brazil, but was lost in a storm, 29th May 1500.

**Díaz**, PORFIRIO, born at Oaxaca, 15th September 1830, President of Mexico 1877–80, was repeatedly re-elected, but his administration being felt to be too autocratic, a revolutionary movement compelled him to resign in 1911. He died in Paris 2d July 1915. See Life by D. Hannay (1917); and the article MEXICO.

**Díaz de la Peña**, NARCISO VIRGILIO, painter, was born at Bordeaux in 1807, of Spanish parentage, and, left an orphan at the age of ten, was educated by a Protestant clergyman at Bellevue, where a snake-bite occasioned the amputation of a leg. At the age of fifteen he was apprenticed to a porcelain-painter, but he was ambitious of working in oils, and about 1831 began to exhibit in the Salon. Abandoning his unsuccessful efforts in the direction of history and *genre*, he in time won fame by his landscapes, which he peopled with nymphs, loves, and satyrs. These figures are badly drawn, but as a colourist Diaz ranks highly among the painters of the Romantic school in France, and to colour he was content frankly to sacrifice form. He was also an exquisite painter of flower-pieces. He died at Mentone, 18th November 1876.

**Díaz del Castillo**, BERNAL, the historian of the conquest of Mexico, was born about 1492, and was one of the handful of heroes who accompanied Cortés to Mexico in 1519. He fought through the whole struggle, and afterwards accompanied the heroic young Sandoval on his expedition northwards, and Cortés himself in his expedition to Honduras to punish the defection of his trusted lieutenant, Cristóbal de Olid. He died in Mexico about 1560. His *Historia Verdadera de la conquista de la Nueva España* (1904), written at the age of eighty-four, is invaluable to the historian as a sincere narration by an eye-witness and sharer in the events narrated. With all the ignorance and superstition of its age, it reveals great powers of observation and of vivid and vigorous description; while the rare romantic interest of the story itself, the heroism of Cortés and his companions, and their wonderful deeds, make the book a real epic. See Maudslay's translation (1908–16), and the Life by Cunningham Graham (1915).

**Dibdin**, CHARLES (1745–1814), song-writer, born at Southampton, early attracted notice by his singing, and, still a boy, composed an operetta, *The Shepherd's Artifice*, which was produced at Covent Garden in 1762. He subsequently lived an unsettled life as an actor and composer of stage-music. In 1788 he began a series of musical entertainments, which acquired great celebrity. He retired in 1805 with a pension of £200 granted him two years before; it was withdrawn in 1807, and Dibdin returned to public life with unfortunate financial results. He wrote nearly a hundred songs—among the best *Poor Jack* and *Tom Bowling*—and about seventy dramatic pieces.—Two of his sons, CHARLES (1768–1833) and THOMAS JOHN (1771–1841), wrote songs and dramas. See Dibdin's Autobiography (4 vols. 1803) and *The Dibdins*, by E. R. Dibdin (1888).

**Dibdin**, THOMAS FROGNALL, the bibliographer, was nephew of Charles Dibdin, the writer of sea-songs, and was born at Calcutta in 1776. He lost

both parents when hardly four years of age, his father's death at sea having given Charles Dibdin the subject for his famous song, *Tom Bowling*. He was brought up by a maternal uncle, studied at St John's College, Oxford, tried law, but took orders in 1804. He proceeded D.D. in 1825. Of his precepts the chief were the vicarage of Exning near Newmarket, and the rectory of St Mary's, Bryanston Square, London. He died 18th November 1847. His first contribution to bibliography was an *Introduction to the Greek and Roman Classics* (1802), which was followed by an unfinished new edition of Ames and Herbert's *Typographical Antiquities* (4 vols. 1810-19); *Bibliomania* (1809); *The Bibliographical Decameron* (1817); *Bibliotheca Spenceriana* (1814-15); *Bibliographical, Antiquarian, and Picturesque Tour in France and Germany* (1821); *The Library Companion* (1824); *Bibliophobia* (1832); *Reminiscences of a Literary Life* (1836); and *Bibliographical, Antiquarian, and Picturesque Tour in the Northern Counties of England and Scotland* (1838). All Dibdin's books are valuable and interesting, but whimsical and flippant in style, and unhappily abounding in errors. Dr Dibdin was one of the founders of the 'Roxburgh Club' (1812).

**Dibranchiata.** See CEPHALOPODA.

**Dice** (plural of die), small cubes of ivory marked on their sides with black dots, from one to six. The *points* on the opposite sides of the dice should always sum seven—i.e. ace should be opposite to six (pronounced *six*); deuce to cinque (pronounced *sink*); and trey to quatre (pronounced *later*). Two dice are called a *pair*.

By 13 Geo. II. chap. 19, 'all games invented or to be invented with one or more die or dice' were prohibited, except backgammon and games played on a backgammon board. Hence hazard is illegal, and also raffles with dice, the latter being also forbidden as lotteries even if dice are not used. By 9 Geo. IV. chap. 18 (1828), a duty of twenty shillings was imposed on every *pair* of dice; in 1862 the duty was abolished.

The invention of dice is attributed to Palamedes (circa 1244 B.C.). But the use of cubes with numbered sides for gambling purposes is probably much earlier. See HAZARD.

**Dicentra**, a genus of Fumariaceæ, of which one species, the 'Chinese lantern plant,' *D. spectabilis* (described by Linnaeus in 1753, but only introduced from Asiatic into British flower-gardens in



*Dicentra spectabilis*.

1846), has become a universal favourite on account of its long racemes of drooping, delicate, rosy-pink flowers. In America it is commonly known as 'Bleeding Heart.' It is a herbaceous perennial of

easy propagation. There are several other North American species, one of which *D. formosa* is a favourite and very showy garden-plant. Owing, in the first instance, to a misprint, *Dicentra* has been as frequently called *Dielytra*, the original mistake having become consecrated by habit.

**Dicey**, ALBERT VENN (1835-1922), English jurist, spent his early years at Claybrook, near Lutterworth, and was educated in London and at Balliol College, Oxford. Called to the bar in 1863, he soon gained a reputation as a student of the constitution. He was Vinerian Professor of Common Law at Oxford from 1882 till his retirement in 1909. His chief books, classics in their sphere, are *Law of the Constitution* (1885), *Conflict of Laws* (1896), *Law and Public Opinion in England* (1905). See his *Memorials*, ed. Rait (1925).

**Dichlamydeus**, a term in botany applied by De Candolle to distinguish those dicotyledonous flowers possessed of both calyx and corolla from his *Monochlamydeæ*, in which not more than one floral envelope is present.

**Dichogamy.** See FLOWER (*Fertilisation*).

**Dichotomy** (Gr., 'divided into two equal parts'), a term formerly vaguely used in botanical description to designate any appearance of branching by forking. Thus the stems of some phanerogams—e.g. mistletoe, dum palm, and many inflorescences—e.g. Caryophyllaceæ, Begonias—appear forked, while an ordinary fern-frond has no such appearance. The progress of morphological research has, however, shown that true dichotomy—i.e. complete division of the growing point into two lateral apices, is really as characteristic of the development of the fern-frond as of such obviously dichotomous vegetation as that of *Selaginella*; while conversely the appearance of forking in phanerogams comes about simply by the suppression of the growing point, and the development of two new axes from opposite lateral buds. Outside the cryptogams, indeed, no case of true dichotomy has been described, except perhaps the roots of cycads.

**Dichroism** (Gr. *dis*, 'twice,' *chrōma*, 'a colour') is a term chiefly used in Crystallography to designate the property which many doubly-refracting crystals possess of exhibiting different colours when viewed in different directions. It, or the allied term *Dichromatism*, has also been applied to those fluids which appear of different colours when viewed by reflected and refracted light; when seen in thick or thin layers, &c. For example, venous blood, or any blood impregnated with carbonic acid, hydrogen, or nitrogen, appears, when seen in moderately thin layers, to be of a purple colour; while in extremely thin layers it appears green.—For *Dichroite*, see CORDIERITE.

**Dick**, JAMES (1743-1828) a West Indian and London merchant, who was born at Forres, Morayshire, and left over £113,000 to promote higher learning among the parish schoolmasters of Elgin, Banff, and Aberdeen shires.

**Dick**, SIR ROBERT, major-general, was born at Tulliemet, in Perthshire, about 1785, fought in Sicily and Egypt, held a command at Busaco, Torres Vedras, Ciudad Rodrigo, Salamanca, and Burgos, at Quatre Bras and Waterloo, and fell heading the assault at Sobraon, 10th February 1846.

**Dick**, ROBERT (1811-66), a self-taught geologist and botanist, born at Tullibody, Clackmannanshire, was from 1830 a baker in Thurso.

**Dick**, THOMAS, a popular religious and scientific writer, was born 24th November 1774, near Dundee. At a very early age he became devoted to the study of astronomy, and at twenty went to the university of Edinburgh with a view to the ministry in the Secession Church. Licensed in 1801, he preached

some time; next kept school for ten years at Methven, and for ten years more at Perth. Meantime he laboured laudably to promote popular education by 'Literary and Philosophical Societies' corresponding closely to the Mechanics' Institutes of later days. His first book was *The Christian Philosopher* (1823), which quickly became popular. Its success led Dick to devote himself to astronomy and literary work in a cottage near Broughty-Ferry, where he set up an observatory. His many books brought him great popularity both in England and America, but very little pecuniary return. In 1847 he received a crown pension of £50, supplemented by a local subscription. He died at Broughty-Ferry, 29th July 1857. His degree of LL.D. was given him by Union College, New York. Other works were *Celestial Scenery* (1837), *The Sidereal Heavens* (1840), and *The Practical Astronomer* (1845).

**Dickens, CHARLES**, was born at Landport, now a great town, but then a little suburb of Portsmouth or Portsea, lying half a mile outside of the town walls. The date of his birth was Friday, February 7, 1812. His father was John Dickens, a clerk in the navy pay-office, and at that time attached to Portsmouth dockyard. The familiarity which the novelist shows with seaports and sailors is not, however, due to his birthplace, because his father, in the year 1814, was recalled to London, and in 1816 went to Chatham. They still show the room in the dockyard where the elder Dickens worked, and where his son often came to visit him. The family lived in Ordnance Place, Chatham, and the boy was sent to a school kept in Gibraltar Place, New Road, by one William Giles. As a child he is said to have been a great reader, and very early began to attempt original writing. In 1821, Charles being then nine years of age, the family fell into trouble; reforms in the Admiralty deprived the father of his post and the greater part of his income. They had to leave Chatham and removed to London, where a mean house in a shabby street of Camden Town received them. But not for long. The unfortunate father was presently arrested for debt and consigned to the Marshalsea, and Charles, then only ten years of age, and small for his age, was placed in a blacking-factory at Hungerford Market, where all he could do was to put the labels on the blacking-bottles, with half a dozen rough and rude boys. The degradation and misery of this occupation sunk deep into the boy's soul. He could never bear to speak of this time; it was never mentioned in his presence. Not only were his days passed in this wretched work, but the child was left entirely to himself at night, when he made his way home from Hungerford Market to Camden Town, a distance of four miles, to his lonely bedroom. On Sundays he visited his father in the prison. Of course such a neglected way of living could not continue. They presently found a lodging for him in Lant Street, close to the Marshalsea, where at least he was near his parents, and his father shortly afterwards recovering his liberty, they all went back to Camden Town, and the boy was sent to school again. It was to a private school in the Hampstead Road, where he remained for three or four years of quiet work. It must have been then, one suspects, rather than at Chatham, that he became so great a devourer of books. But he was never a scholar in any sense, and the books that he read were novels and plays. That the family fortunes were still low is proved by the fact that when he was taken from school no better place could be found for him than a stool at the desk of a solicitor. Meantime his father had obtained a post as reporter for the *Morning Herald*, and Charles, feeling small love for the hopeless drudgery of a lawyer's office, resolved also to attempt

the profession of journalist. He taught himself shorthand with the resolution—even the rage—which he always threw into everything he undertook; and he frequented the British Museum daily in order to supplement some of the shortcomings of his reading. In his seventeenth year he became a reporter at Doctors' Commons. At this period all his ambitions were for the stage. He would be an actor. All his life, indeed, he loved acting and the theatre above all things. As an actor one feels certain that he would have succeeded. He would have made an excellent comedian. Fortunately, he was saved for better work.

It was not until he was two-and-twenty that he succeeded in getting permanent employment on the staff of a London paper as a reporter. In this capacity he was sent about the country to do work which is now mainly supplied by local reporters. It must be remembered that there were as yet no railways. He had to travel by stagecoach, by post, by any means that offered. 'I have been upset,' he said years afterwards, speaking of this time, 'in almost every description of vehicle used in this country.'

About this time he began the real work of his life. In December 1833 the *Monthly Magazine* published his first original paper, called 'A Dinner at Poplar Walk.' Other papers followed, but produced nothing for the contributor except the gratification of seeing them in print, because the magazine could not afford to pay for anything. However, they did the writer the best service possible, in enabling him to prove his power, and he presently made an arrangement with the editor of the *Evening Chronicle* to contribute papers and sketches regularly, continuing to act as reporter for the *Morning Chronicle*, and getting his salary increased from five guineas to seven guineas a week. To be making an income of nearly four hundred pounds a year at the age of two or three and twenty, would be considered fortunate in any line of life. At that time such an income represented a much more solid success than would now be the case. The sketches were collected and published in the beginning of the year 1836, the author receiving a hundred and fifty pounds for the copyright. He afterwards bought it back for eleven times that amount. In the last week of March in the same year appeared the first number of the *Pickwick Papers*; three days afterwards Dickens married the daughter of his friend George Hogarth, editor of the *Evening Chronicle*; and his early struggles were finished.

No article, however short, treating of Charles Dickens, can avoid entering into the details of his early history with a fullness which would be out of all proportion to what follows, but for the remarkable fact that the events of his childhood and his youth impressed his imagination and influenced the whole of his literary career so profoundly, that to the very end of his life there is not a single work in which some of the characters, some of the places, are not derived from his early recollections. Many other writers there are who have passed their childish days among the *petites gens*, but none who have so remembered their ways, their speech, and their modes of thought. The Marshalsea prison of *Little Dorrit* is the place where for two years he went in and out. The Queen's Bench and its Rules were close to the Marshalsea; Bob Sawyer's lodgings in Lant Street were his own; David Copperfield, the friendless lad in the dingy warehouse, was himself; the cathedral of Edwin Drood was that in whose shadow he had lived; Mrs Pipchin is his old landlady of Camden Town; the most delightful features in Mr Micawber are borrowed from his own father; the experiences of Doctors' Commons, the solicitors' clerks, the

life in chambers, are all his own; while of individual characters the list of those which are known to be portraits more or less true to nature might be indefinitely extended. And yet, while he was always drawing on these early recollections, while they constantly furnished him with scenes and characters, he could not bear to speak of them, and no one except his friend and biographer, Forster, ever knew that he was, himself, with all the shabby, mean surroundings in early life, exactly such as David Copperfield.

The rest of Dickens's life has the interest which belongs to success after success. It was a long triumphal march. He had no failures; he suffered no defeats. There were times when his hand was not at its best, but never a time when his hand lost its power. This indeed seems the crowning happiness of a successful and singularly happy life, that when he was cut off—he died 9th June 1870—after fifty-eight years of continuous work, his brain was still as vigorous, his eye as keen, his hand as sure as in the first fresh running of his youth. It was indeed more than literary success which he achieved; he conquered the whole English-speaking world. This world, which now numbers one hundred and sixty millions, loves him; all who can read his books love him, and shall continue to love him. This love cheered him in his life, and will keep his memory green. Of the solid wealth which he acquired, the honour he enjoyed, the friends who gathered round him, and the brave and resolute front which he always showed, there is no space here to speak.

The following is the list of Dickens's works in their order of appearance, omitting certain farces and pamphlets which belong to a more extended notice: *Sketches by Boz* (1836), *The Posthumous Papers of the Pickwick Club* (1837), *Oliver Twist* (1838), *Nicholas Nickleby* (1839), *The Old Curiosity Shop* (1840-41), *Barnaby Rudge* (1841), *American Notes* (1842), *Martin Chuzzlewit* (1843), *The Christmas Tales*—viz. A Christmas Carol, The Chimes, The Cricket on the Hearth, The Battle of Life, The Haunted Man, and The Ghost's Bargain (1843, 1846, and 1848); *Pictures from Italy* (1845), *Dombey and Son* (1846-48), *David Copperfield* (1849-50), *Bleak House* (1852-53), *The Child's History of England* (1854), *Hard Times* (1854), *Little Dorrit* (1855-57), *A Tale of Two Cities* (1859), *The Uncommercial Traveller* (1861), the Christmas numbers in *Household Words* and *All the Year Round*, *Great Expectations* (1860-61), *Our Mutual Friend* (1864-65), *The Mystery of Edwin Drood* (unfinished). This long roll by no means represents the whole work of this most active of mankind. Public readings both in this country and in America, private theatricals, speeches, letters innumerable, journeys many, pamphlets, plays, the conduct of a popular magazine—first called *Household Words* and then *All the Year Round*—and an ever-present readiness to enjoy the society of his friends, fill up the space when he was not actually writing. That he could do so much was mainly due to his orderly and methodical habits, to his clearness of mind, and to a capacity for business as wonderful as his genius for fiction. He knew no rest from the day when he first attacked shorthand to the day when he fell from his chair in the fit from which he never recovered. He was incomparably the most active man, the hardest-working man of his age. In the history of letters there are many who have produced more work in bulk; there is not one who led a life so varied, so full, so constantly busy, so active and so rich.

It is as yet too early to speak with certainty as to the lasting popularity of his work as a whole. Very much of it owed its general success to the faithful delineation of manners already passed away.

He was the prophet of the middle class, and the manners of that great section of the community have greatly changed since the days when Charles Dickens lived among them and observed them. With the decay of these manners some part of present popularity must certainly pass out of his work: already a generation has appeared to whom a great deal of Dickens's work proves of no interest, because it portrays manners with which they are not familiar. They do not laugh with those who laughed fifty, forty, twenty years ago, because the people depicted have vanished. But when the second quarter of this century shall belong so truly to the past, that not one survives who can remember it, then these books will become a precious storehouse for the study and the recovery of part, and that a large part, of its life and manners.

Again, it is the essential quality of genius to create the type. In this Dickens has been more successful than any other novelist, ancient or modern. With him every leading character stands for his class. Squeers is the representative of the schoolmaster, then too common, ignorant, brutal, and grasping; Winkle is the Cockney sportsman; it is impossible to think of red tape without naming Mr Tite Barnacle; and so on through all the books. If he sometimes too plainly labels his characters with their qualities and defects, it is a fault caused by his own clearness of conception and of execution. It is another note of genius to suffer every character to work out its own fate without weakness or pity, and though Dickens deals seldom with the greater tragedies of the world in his domestic dramas, necessity pursues his characters as grimly and certainly as in real life. The villain Quilp and his tool make us forget, in the amusement which they cause, their own baseness. But their creator is not deceived. He makes them bring their own ruin upon their heads. To be true, not only to the outward presentment and speech and thought of a character, but also to the laws which surround him, and to the consequences of his actions, is a rare thing indeed with those who practise the art of fiction. Further, in this art there are permissible certain exaggerations, as upon the stage. There is exaggeration of feature, exaggeration of talk, exaggeration of action. There are degrees of exaggeration, by which one passes through tragedy, comedy, farce, and burlesque; but in all there must be exaggeration. Dickens was master of exaggeration—if he sometimes carried it too far, he produced farce, but never burlesque. As for selection, which is perhaps the most important point after exaggeration, it came to him by instinct; he knew from the very outset how to select. It is by selection that the novelist maintains the interest of his story and develops his characters. There are countless things that are said and done in the progress of the history which have little interest and small bearing on the things which have to be told; and it is the first mark of the bad novelist that he does not know how to suppress irrelevant scenes. In the constructive branch of his art Dickens continually advanced. His earlier stories seem, like the *Pickwick Papers*, to be made up of scenes. *Nicholas Nickleby* is a long series of scenes brilliantly drawn, in which new characters are always appearing and playing their disconnected part and disappearing. But as he grew older his conception of the story itself grew clearer, and his arrangement more artistic. It is however in description that Dickens proved himself so great a master. He laid his hand by instinct upon the salient and characteristic features, and he never failed in finding the right—the only—words fit for their illustration. In description he is never conventional, always real, and yet he allows himself, here as in his scenes of character and dialogue, a certain

exaggeration which produces the happiest effects. In the hands of his imitators it becomes grotesque and intolerable.

As to his great and splendid gallery of portraits it is difficult to speak briefly. The whole of London life—the life of the streets, of the city, of the middle class—seems at first sight depicted in this gallery. Here are merchant, shopkeeper, and clerk, lawyer and client, moneylender and victim, dress-maker, actor—one knows not what. Yet there are great omissions. The scholar, the divine, the statesman, the country gentleman are absent, partly because Dickens had no knowledge of them, and partly because he forebore to hold them up to the ridicule which he loved to pour over his characters. His methods imposed upon him certain limitations; he aimed at commanding his readers' attention by compelling laughter and tears, but especially laughter. He who can command neither the one nor the other is no true artist in fiction. But in his laughter and in his tears one feels always the kindly heart as well as the skilful hand. It is for the former—for the deeply human heart—even more than for the latter that the world will continue to love the memory of Charles Dickens.

See his *Letters*, ed. his daughter (1880-82); his *Life* by Forster (1871-74); books by Sir A. W. Ward (1882), Marzials (1887), F. G. Kitton (1889-1905), Fitzgerald (1903), T. Shore (1905), Chesterton (1906), Dibels (1920); Sir A. Quiller-Couch (1925); *The Childhood of Dickens*, by Langton (1891); his *Letters to Walkie Collins* (1892); *My Father as I Recall Him*, by Miss Mamie Dickens (1897); and the study by G. Gissing (1898). See articles CRUIKSHANK, BROWNE (HABLOT K.).

**Dickinson, EMILY** (1830-86), was born at Amherst, Mass., where she spent all her days. A strict recluse, she yet found 'ecstasy in living,' absorbed in the world of the mind and the soul. Introspection led to verse-writing, and with no thought of publication, she accumulated little poems which were not issued till after her death (3 series: 1890-96). Later volumes edited by her niece appeared in 1914 and 1925. Tense, terse, delicate, vivid in imagery, her work proved a beacon of growing brightness to poets of the century that followed her own.

**Diclinous**, a Linnean term for flowers possessing stamens or pistils only—*Monœci*, *Diœcia*, and *Polygamia*.

**Dicotyledons**, one of the two great divisions of the Angiosperms (q.v.), the other being the Monocotyledons. Probably the latter are derived from the dicotyledonous order Polycarpiceæ, which includes Nymphæaceæ, Magnoliaceæ, Calycanthaceæ, Ranunculaceæ, Lauraceæ, &c. The embryo of dicotyledons possesses, with rare exception (usually due to parasitic degeneration—e.g. Dodder, q.v.)—two cotyledons facing each other, and more or less embracing the plumule, while there is generally less endosperm than in monocotyledons, and, in fact, it is frequently absorbed altogether (see OVULE, SEED). The cotyledons usually develop equally, but one may be arrested.

The fibro-vascular bundles of dicotyledons are open and collateral, with few exceptions arranged in a reticulated cylinder, which thus presents a single circle in transverse section. The parenchyma in which they lie is thus divided into two main regions—the cortical layer or cellular envelope, and the pith; while the intermediate spokes of parenchymatous tissue connecting the pith and cortex through the meshes of the cylinder are the medullary rays. While the fibro-vascular bundles of dicotyledons arise like those of cryptogams and monocotyledons, by the differentiation into wood and bast of a special strand of primitive embryonic tissue continuous with that of the growing point, they differ in a marked

tendency to embryonic persistence of a central layer of this as the Cambium (q.v.), and hence in so many groups of dicotyledons there arises that association of perennial habit and continuous growth of stem to which we owe our familiar shrubs and trees. See PHYSIOLOGY (VEGETABLE), WOOD, BARK, BAST. Since the cambium lies between the wood and bast, the new layers of wood are external to the older ones, but those of bast internal to their predecessors: hence Lindley's name *exogens* was apt to be misleading. The softness and delicacy of the cambium layer leads, when force is applied, to the easy separation of the bast elements of the bundles, along with the cortical parenchyma and epidermic layer, as the *bark*.

The reticulated character of the bundles of the stem is similarly present in the Leaf (q.v.), which thus presents a marked contrast to the usually parallel venation of the monocotyledons. It also shows far greater variety of form and adaptation.

The flower has most frequently its parts arranged in whorls of five, although four is also a not uncommon number; hence another very obvious distinction from monocotyledons, in which a timorous symmetry prevails. The outer perianth whorl is most frequently green, as a calyx. See FLOWER, PHANEROGAMS, and VEGETABLE KINGDOM; also ANGIOSPERMS, and MONOCOTYLEDONS.

**Di'cranum**, a genus of mosses, of which some are among the commoner British forms. See MOSSES.

**Dictean Cave**, on Lasithi, in Crete, the birthplace of Zeus, was excavated by Dr Hogarth in 1900.

**Dictamnus**. See DITTANY.

**Dicta'tor**, in the earliest times, was the name of the highest magistrate of the Latin Confederation, and in some of the Latin towns the title was continued long after these towns were subjected to the dominion of Rome. In the Roman Republic the dictator was an extraordinary magistrate, irresponsible and endowed with absolute authority, whose original name was *magister populi*. The frequency of crises, or critical periods, in the quick, aggressive growth of the Roman state, necessitated such an office. The first dictator (T. Larcus or M. Valerius) was appointed 501 B.C., nine years after the expulsion of the Tarquins. According to Livy, the immediate cause of this dictatorship was a formidable war with the Latins. In general, no one could be appointed dictator who had not been previously consul, and this condition was very rarely dispensed with. Niebuhr was of opinion that the dictator was originally created or elected by the curia, like the kings, but it is more probable that the senate passed a decree ordering one of the consuls to name or proclaim (*dicere*) a dictator. Originally, of course, the dictator was a patrician; the first plebeian who filled the office being C. Marcus Rutilius, 356 B.C., who was nominated by the plebeian consul M. Popilius Lænas. The dictatorship could not *lawfully* be held longer than six months, nor was it ever so, except in the cases of Sulla and Cæsar, which were altogether peculiar. It must not be supposed that during a dictatorship the functions of the other magistrates were positively suspended. The consuls and other regular authorities continued to discharge their proper duties, but in subordination to the dictator; being for the time simply his officers. The superiority of his power, when compared with that of the consuls, appears chiefly in these three points: he was far more independent of the senate; he had a more extensive power of punishment, without any appeal; and he could not be called to account after his abdication of the dictatorship for anything he had done during the period of his office. The

*limits* of his power were as follows: he could not touch the treasury; he could not leave Italy; and he could not ride through Rome on horseback without previously obtaining the permission of the people. While the consuls had only twelve lictors, the dictator was preceded by twenty-four, bearing the *secures* and *fascēs*. To him also belonged the *sella curulis* and the *toga praetexta*. The last legally elected dictator was M. Junius Pera, who entered on his office 216 B.C. From this time *nominal* dictators were frequently appointed for the purpose of holding the elections, but even these finally disappeared 202 B.C. See HORSE (MASTER OF); and for modern dictators, FRANCIA and ROSAS.

DICTATORSHIP OF THE PROLETARIAT is a phrase used by Marx in a letter of May 1875. 'Between capitalist and communist society,' he says, 'lies the period of the revolutionary transformation of the one into the other. This requires a political transition stage, which can be nothing else than the revolutionary dictatorship of the proletariat.' This has been variously interpreted. The Russian Bolsheviks and those who agree with them take it to mean a mode of government by force to be adopted by a ruling proletarian party from the time of its gaining political power to the time, at least, when a socialist economic and social system is fully established. By this government democracy is suspended, and suffrage, freedom of the press and of organisation and the like, are to be denied to opposition, even to socialist opposition. Socialist opponents hold that social revolution must adapt its pace to the advance of socialism among the majority, and cannot otherwise be made permanent.

**Dictionary** (late Lat. *dictionary*), a book containing the words of a language alphabetically arranged, with their definitions and significations set forth more or less fully, and often their etymologies and illustrative quotations from literature.

Dictionaries may be divided into two classes—(1) those whose object is to explain words and phrases; and (2) those that aim at giving information about things.

(1) Dictionaries of language are, again, divided into various sub-classes or species. The most common kind—what, indeed, is understood by the term dictionary (and the equivalent Greek term *Lexicon*) when used by itself—is an alphabetical list of the words composing any language either explained in the same language, or interpreted by the corresponding words of one or more other languages. To indicate that all the words of the language are included, the name *Thesaurus* ('Treasury') is sometimes used, as in the great Hebrew dictionary of Gesenius. The words used by particular authors or classes of authors are often explained in *special* dictionaries or lexicons, such as those to Livy, Cicero, Tacitus, Homer, Sophocles, Shakespeare, and the like. A *Glossary* is a dictionary of unusual terms, as archaic, provincial, or technical terms. An *etymological* dictionary is one in which the derivation of words is the sole or a prominent object.

(2) Dictionaries of things (Ger. *Realwörterbücher*), or of information, are also of various kinds. When the whole field of human knowledge is embraced, we have an alphabetical Encyclopedia or Konversations-Lexikon. The name Encyclopedia or Cyclopaedia is sometimes given to dictionaries of special departments of knowledge, as *Anatomy and Physiology*; but in all such cases dictionary seems the correcter term, as in the well-known dictionaries edited by Sir William Smith, which cover the whole ground of Bible terms, Greek and Roman biography and mythology and antiquities, Christian antiquities, and Christian biography.

There is no kind of information, within wide or

narrow bounds, that may not be thrown into the dictionary form. Dictionaries of apt quotations from the classics, the Scriptures, or the fathers were not unknown in the 17th century. There are dictionaries of biography, of geography, of music, of gardening, of dates, of architecture, of cookery, of political economy, of heraldry, of fortification—in fact, of every object of human knowledge and practice.

Dictionaries of language, in our sense of the word, are of modern origin. The Greeks and Romans had no idea of a book embracing all the words of their own or any foreign tongue. Glossaries, however, of unusual words and phrases were early current. The earliest work of the kind extant (though much interpolated) is the Homeric Lexicon (Gr. *Lexicon Homērikon*) of Apollonius, an Alexandrine grammarian of the time of Augustus. Compilations, such as the Lexicon of Suidas (q.v.), and the *Etymologicum Magnum* (see ETYMOLOGY) were made in the middle ages. A real dictionary became first possible after the invention of printing. A broad and sure basis for Greek lexicography was laid by Henry Stephens (q.v.) in his *Thesaurus* (1572), on which the school of Hemsterhuis built further, and which has been greatly extended by the labours of Schneider, Passow, Seiler, Jakobitz, Rost, and Pape. The well-known work of Liddell and Scott (8th ed. 1897) is based on the great German one of Passow. The *Thesaurus* (1531) of Robert Stephens inaugurated Latin lexicography, which has been extended by Joh. Matth. Gesner, Forcellini, Ducange (medieval Latin), Scheller, Freund, Georges, Muhlmann, and Vaniček, and is well represented in English by Riddell and White, Andrews, Smith, and the Americans Lewis and Short. The earliest standard dictionaries of modern tongues were the Italian *Vocabolario della Crusca* (1612); the Dictionary of the French Academy (1694; new ed. 1878 *et seq.*); and that of the Academy at Madrid (1726–39). The great German Dictionary, begun in 1854 by the brothers Grimm, is still unfinished. Littre's French Dictionary (4 vols. and supplement) appeared in 1863–78. The materials collected by the Philological Society formed the main foundation for the great New English Dictionary, edited by Sir J. A. H. Murray, Dr Henry Bradley, Professor W. A. Craigie, and Mr. C. T. Onions, with much assistance from outside. This splendid work follows a strictly historical method, and aims to give all the significations of every English word during the last seven hundred years, with a series of quotations illustrating its usage. English dictionary-making in its larger sense began with Dr Johnson (q.v.), the basis of whose work was an interleaved copy of Nathan Bailey's Dictionary (1721–27).

See for Scots words, Jamieson (1808–25; ed. Donaldson, 1879–87); for etymology, Wedgwood, Edw. Müller (German), Skeat, and Weekley. The great *English Dialect Dictionary* (6 vols. 1898–1905, ed. Jos. Wright) supersedes Halliwell, T. Wright, &c. For older English words, the chief are Elfric's *Glossary* (about 975), Way's edition (1843–65) of the *Promptorium Parvulorum* (about 1440), Bosworth's *Anglo-Saxon Dictionary* (ed. Toller), Sweet's *Student's Anglo-Saxon Dictionary*, Stratmann's *Middle-English Dictionary* (ed. H. Bradley, 1891), Grein's *Sprachschatz der Angelsächsischen Dichter*, and Mätzner's *Altenglische Sprachproben*, &c.; as well also the English words in Cotgrave's *French-English Dictionary* (1611), Minshew's *Guide into Tongues* (1617), &c.—See BIOGRAPHY, ENCYCLOPEDIA, and articles on the various languages; also Vater's bibliography of dictionaries; Murray's *English Lexicography* (1900); and Lindsay, *The Corpus, Epinal and Erfurt Glossaries* (1921).

**Dictynna**, a Cretan nymph, known also as Britomartis and as Aphaia. Pursued by Minos, she leapt into the sea, and became the patron goddess of fishermen.

**Dictys of Crete**, a follower of Idomeneus in the Trojan war, whose name is attached to a professed journal of the leading events of the contest, which has come down to us in Latin prose, under the title *Ephemeris Belli Trojani*. An introduction relates how the narrative, inscribed in Phœnician characters on bark-paper, was found in a coffer of tin in Dictys's tomb, which had been burst open by an earthquake in the reign of Nero, and how the emperor caused it to be translated into Greek; this is accompanied by a letter from one Quintus Septimius, who claims to have prepared the condensed Latin version that follows. This dates probably from the 4th century A.D., and though of no intrinsic value, was a chief source of the romances of the middle ages. The best editions are those of Dederich (Bonn, 1832 and 1837) and Meister (Leip. 1872). See TROY; DUNGER, *Dictys-Septimius* (1878); FARRER, *Literary Forgeries* (1907); and GRIFFIN, *Dares and Dictys* (1907).

**Dicuil**, Irish geographer, wrote in 825 *De Mensura Orbis Terræ* (ed. Parthey, Berlin, 1870), and a lost treatise on grammar.

**Dicyemidæ**, a family of very lowly multicellular organisms, parasitic in habit. They are found in cuttle-fishes, while related organisms known as Onchocnecida occur in a brittle-star and in a Nemertean worm. Professor E. van Beneden has included them all under the title Mesozoa in contrast to the lower (single-celled) Protozoa on the one hand, and the higher (many-celled) Metazoa on the other. The largest species of the genus *Dicyema* measures 5-7 millimetres; the smallest is ten times less. These organisms hardly rise above the level of the embryonic gastrula, and some seem hardly to attain it, but it is still uncertain how much of this simplicity is primitive, and how much the result of degeneration. See E. van Beneden and C. Julin, *Archives de Biologie* (1882); Whitman, *Mitth. Zool. Stat. Neapel* (1883); Braun, *Bronn's Thierreich*, vol. iv.

**Dicynodon**, an important type of Triassic reptile, usually included in the order Anomodontia. They have been unearthed in Africa, India, and the Ural region, and more recently remains have been found in the Elgin Trias of Scotland—e.g. *Gordonia* and *Geikia*. They seem to have been purely terrestrial animals, and exhibit a most interesting combination of reptilian and mammalian characters. See REPTILE.

**Didache**. See APOSTLES (TEACHING OF THE TWELVE).

**Didactic Poetry**, that kind of poetry which aims, or seems to aim, at instruction as its object, making pleasure entirely subservient thereto. It has been disputed whether or not the existence of a kind of poetry especially entitled to the name didactic is consistent with the very nature and object of the poetic art. For it is held that, to point out instruction as the peculiar object of one kind of poetry, is to overlook the high aim of all poetry; and that a poem may be in the highest sense didactic, which yet is epic, dramatic, or lyric in its form; and the Book of Job, the Psalms, and other poems contained in the Sacred Scriptures, are quoted as examples. In the poems generally called didactic, the information or instruction given in verse is accompanied with poetic reflections, illustrations, and episodes. The *Georgics* of Virgil has been the model for most didactic poems, and no subject is so unpromising that it has not found some one to select it as a poetic theme. Examples of admirable success as combinations of argument and poetry are the *Ars Poetica* of Horace and the *Essay on Criticism* of Pope. The great poem of Lucretius, again, stands the masterpiece of the philosophical poem, which is represented in our

own language by poems like the *Nosce Teipsum* of Sir John Davies, and the *Essay on Man* of Pope. See POETRY.

**Didelphia**. See MARSUPIALS.

**Didelphis**. See OPOSSUM.

**Diderot**, DENIS, was born on October 15, 1713, at Langres, in Champagne, where his family had for two centuries been engaged in the manufacture of cutlery. An eldest son, he was intended for the church, and received his early training at the Jesuit school in his birthplace. After studying at the Collège d'Harcourt in Paris, he offended his father by refusing to become either a lawyer or a physician, and was in consequence flung upon his own resources. From 1734 until about 1744 he led a life of haphazard, ill-paid toil as a tutor and a bookseller's hack. In 1743 he married Annette Champion, a young sempstress, against the wishes of her friends, and without the knowledge of his family. After she had borne him a son, he persuaded his wife to remove with the child to Langres, where she brought about a reconciliation between Diderot and his father. His marriage, however, did not prove a happy one. During his wife's absence in Champagne he formed a liaison with a Madame Puisieux which lasted for several years; and later in life he became attached to a financier's daughter, Mademoiselle Voland, to whom he remained devoted until her death in 1774. His *Pensées Philosophiques* were burned by order of the Parliament of Paris in 1746, and three years afterwards he underwent imprisonment for the opinions expressed in his *Lettre sur les Aveugles*. His appointment to the editorship of an encyclopædia which the bookseller, Le Breton, had resolved upon publishing, assured him of a regular income, and gave him a commanding position in the world of letters. Le Breton's intention had been merely to issue an expanded version of the English *Cyclopædia* of Ephraim Chambers, which had appeared in 1727. But in Diderot's hands the character of the work was transformed. He enlisted nearly all the important French writers of the time as contributors, and in place of a storehouse of useful information, produced an engine of war for the *philosophe* party (see ENCYCLOPÆDIA). For some twenty years he stood at his post in spite of dangers and drawbacks, before which even a strong man might pardonably have flinched. The book was again and again threatened with prosecution; its sale was more than once prohibited; its editor ran a constant risk of imprisonment or exile. D'Alembert, at one time co-editor with Diderot, forsook him in despair at the obstacles to be overcome. But his marvellous energy, his varied knowledge, above all, his faculty of rallying and inspiring his fellow-workers, enabled Diderot to carry his vast undertaking to a successful conclusion. The first volume appeared in 1751; the last, in 1765. In his later years Diderot fell into pecuniary difficulties from which he was rescued by Catharine II. of Russia, who purchased his library, but allowed it to remain in Paris, and installed him at a salary as its caretaker. In 1773 he paid a visit to his benefactress, by whom he was most cordially received. He returned to Paris after spending five months in the palace of the empress at St Petersburg, and four months at the Hague as the guest of Prince Galitzin. During his old age he lived principally in his study at the corner of the Rue Taranne, spending his days in reading and meditation, in directing the studies of his daughter—the only survivor of his four children, in the giving of good counsel, and the doing of good works. He died from a stroke of apoplexy on the 30th July 1784.

One of the most prolific and versatile, Diderot was also one of the most careless of writers. He

worked in almost every department of literature. He was a novelist and a dramatist, a satirist, a philosopher, a critic of pictures and books; while as a letter-writer he was surpassed by none of his contemporaries. His published works are far from embodying the results of his labours as an author. He was ever ready to contribute without reward, often without acknowledgment, to the writings of others; he has been well termed the munificent prodigal of letters. His efforts in fiction include a story in the manner of Crébillon, described by Carlyle as 'the beastliest of all past, present, or future dull novels'; *La Religieuse*, a powerful story written with the object of exposing the evils of conventual life; and *Jacques le Fataliste*, a collection of short tales of which some are good and others indifferent, while one of them is a little masterpiece. *Le Neveu de Rameau*, an imaginary conversation between the author and a parasite of the great, is probably the strongest as it is the most curious of all Diderot's works. In the course of this dialogue, which was translated by Goethe, the follies and corruptions of society are laid bare with sardonic humour and piercing insight. Diderot's plays were somewhat unsuccessful examples of what was then known as *tragedie bourgeoise*, or of what we should now term melodrama. His happiest dramatic efforts were two short pieces which were never acted, *La Pièce et le Prologue* and *Est-il Bon? Est-il Méchant?* The letters which he addressed to Mademoiselle Voland, and which were first published some fifty years after his death, form the most interesting section of his voluminous correspondence. They give an entertaining and wonderfully vivid picture of the life that was led in the Baron d'Holbach's country-house at Grandval, the headquarters of the most advanced members of the *philosophe* party. As a critic Diderot stood far in advance of his contemporaries, and anticipated the Romanticists in advocating a return to nature and in seeking to free the drama from the trammels which had been imposed on it by the classical school. His criticisms bear the marks of over-hasty production, but their originality, shrewdness, and abounding vivacity more than atone for the lack of literary finish. His *Salons*, remarks on pictures exhibited at different times in Paris, are the earliest example of aesthetic criticism in modern literature. His philosophical works include *Pensées Philosophiques*, *La Promenade du Septième*, *Lettres sur les Sourds et Muets*, *Lettre sur les Aveugles*, *Le Rêve de D'Alembert*, *Essai sur la Vie de Sénèque*, *L'Interprétation de la Nature*, and a long criticism on Helvétius's treatise *De l'Homme*. Diderot has been frequently described as an atheist; whether justly or not is a matter very hard to decide. He was at one time deeply influenced by the naturalistic religion of Shaftesbury, and that writer's influence upon his mind was never wholly effaced. In certain passages he appears to write as a pantheist. But he never set forth his philosophy in consistent and systematic form.

Diderot is so unequal a writer that his works must be read in the mass before a just estimate can be formed of his extraordinary gifts. His keenest sayings, his most pregnant thoughts, are frequently imbedded in dullness. An indefatigable worker, he yet never took his work seriously enough. He lacked the faculty of concentration and the artist's mastering sense of form. His prose is not sustained at a high level of excellence; he sins grievously against good taste; his thoughts are not seldom crude and shallow; his mannerisms—notably his abuse of apostrophe—his 'sensibility' and his *philosophe* cant are not a little trying to the reader. But with all their defects his writings are wonderfully alive—fertile in original ideas—racy with a stimu-

lating flavour which is all their own; abounding in careless felicities of phrase and in sayings which flash a new light into human nature; rich with the sap of a humour which resembles the humour of no other Frenchman, and which Carlyle has likened to the humour of Cervantes. Inferior to Voltaire and Rousseau as a literary craftsman, he was a deeper thinker than either; his knowledge of men was profound, and his learning was truly encyclopædic. Ardent and generous, though lacking in self-restraint, he was one of the best of friends and the most charming of companions. In the opinion of his contemporaries his powers as a conversationalist eclipsed his gifts as a writer. He appears to have possessed an unrivalled faculty of improvisation; to judge from the testimony of shrewd critics who listened to him, his talk was as pointed and pregnant in its substance as captivating in its eloquence. 'He who knows Diderot only in his writings,' said Marmontel, 'does not know him at all.'

The most complete edition of his works is that by Assézat and Tournoux (20 vols. 1875-77). See the study by Rosenkranz (Leip. 1866); Lord Morley's *Diderot and the Encyclopædists* (2 vols. 1878); E. Scherer's study (1880); Sainte-Beuve's *Portraits Littéraires*, Carlyle's *Miscellanées*; and French monographs by Reinach (1894), Colignon (1895), Ducros (1895, 1900), and Tournoux (1899).

**Dido**, or ELISSA, the legendary founder of Carthage, was the daughter of the Tyrian king Belus or Agenor, and the sister of his successor, Pygmalion. Pygmalion murdered her husband and uncle, Sicharbas or Zacharbaal, a priest of Hercules. With the treasures which Pygmalion had sought for in vain, and accompanied by many Tyrians, Dido escaped to sea. She landed in Africa, not far from the Phœnician colony of Utica, and built a citadel called Byrsa (Gr. *Bursa*, 'the hide of a bull'), on a piece of ground which she had bought from the Numidian king Iarbas. The meaning of the word Byrsa gave rise to the legend that Dido purchased as much land as could be encompassed with a bullock's hide. Once the agreement was concluded, she cut the hide into small thongs, and thus inclosed a large piece of ground, on which she built the city of Carthage. To avoid being compelled to marry Iarbas, she stabbed herself on a funeral pile, which she had caused to be erected, and after her death was honoured as a deity by her subjects. Virgil ascribes the death of Dido to her unrequited passion for Aneas; but many of the ancient writers conceived that the poet had committed an anachronism in making her contemporary with the Trojan prince. In the common chronology, more than three hundred years separated the fall of Troy (1184 B.C.) from the founding of Carthage (853).

**Didot**, the name of a celebrated family of French printers and publishers.—FRANÇOIS DIDOT (1689-1757) was the first of the family that attained eminence. His principal professional achievement was the publication of the *Voyages* of his friend the Abbé Prévost, a work in 20 volumes, perfect as regards the text, and enriched with a great number of engravings. Two of his sons, FRANÇOIS AMBROISE (1730-1804) and PIERRE FRANÇOIS (1732-1795), also acquired distinction as printers, the former publishing editions of the *Delphin* classics, while the latter improved the typefounding and paper-making arts.—HENRI (1765-1852), eldest son of Pierre François, made himself famous as an engraver and letter-founder, producing very beautiful 'microscopic' types.—PIERRE, eldest son of François Ambroise (1760-1853), still further increased the fame of the family. His Louvre editions of Virgil, Horace, Racine, and La Fontaine are magnificent; and he it was who published Boileau's works and Voltaire's *Henriade*.

He was himself an author.—His brother, **FIRMIN** (1764–1836), as a printer, and especially as an engraver and founder, raised the family name to the pinnacle of professional eminence. The perfect Roman characters, used in the Louvre editions printed by his elder brother, were engraved and cast by him. He revived and developed the stereotyping process, and produced singularly perfect editions of many classical, French, and English works. He became a deputy, and obtained some reputation as an author by his tragedies, *La Reine de Portugal* and *La Mort d'Annibal*, and several volumes of metrical translations from the classics.—Firmin's sons, **AMBROISE FIRMIN** (1790–1876) and **HYACINTHE FIRMIN** (1794–1880), aided by their sons, sustained the credit of the Paris house as Firmin Didot Frères.

**Didunculus.** See **SAMOA**.

**Didyma**, or **DIDYMOI**, 12½ miles SW. of Miletus, had a great temple of Apollo with an oracle.

**Didymium** is a very rare substance found in the minerals Cerite, Allanite, &c. It was supposed to be an element of atomic weight 142, and specific gravity 8.5. It is found associated with Cerium and Lanthanum, and as their salts have closely similar properties, their separation is very difficult. The supposed salts of didymium are generally soluble and rose-coloured. Auer von Welsbach showed didymium to be composed of at least two metals. Its constituents have been named neodymium (Nd) and praseodymium (Pr). The former, which preponderates, forms violet and pink, the latter green, salts. They are very much alike in their chemical properties. Their atomic weights are 144.3 and 140.6. Their spectra are characteristic.

**Diebitsch**, **JOHN CHARLES**, COUNT, a Russian field-marshal, was born in Silesia in 1785, and made the campaigns of 1805 and 1812–14. In the Turkish war of 1829 his forcing a passage of the Balkans (Kulevtscha, &c.) by dint of hard fighting was commemorated in the surname conferred on him of Sabalkanski ('crosser of the Balkans'). He died of cholera in February 1831, while endeavouring to suppress the insurrection in Poland.

**Diedenhofen.** See **THIONVILLE**.

**Diefenbach**, **LORENZ**, a great philologist, was born at Ostheim, in the grand-duchy of Hesse, 29th July 1806, studied theology and philosophy at Giessen, travelled much, and was twelve years pastor and librarian at Solms-Laubach. In 1848 he settled at Frankfurt-on-Main, where he was second city librarian 1863–76. He died at Daumstadt, 28th March 1883. His literary industry was enormous, embracing poetry and romances, as well as those more ponderous works by which his name will live. His greatest books—monuments of sagacity and learning—are *Celtica* (3 vols. 1839–40); *Vergleichendes Wörterbuch der Gotischen Sprache* (2 vols. 1846–51); *Glossarium Latino-Germanicum medicæ et infirmæ ætatis*, a supplement to Ducange's well-known Glossary (1857); *Origines Europææ*; *Hoch- und Niederdeutsches Wörterbuch* (with Wulcker, 2 vols. 1874–83).

**Diefenbach**, **JOHANN FRIEDRICH**, surgeon, was born at Königsberg, 1st February 1794, and in 1832 became extraordinary, in 1840 ordinary, professor of Surgery at Berlin, where he died, 11th November 1847. He was distinguished as an operator, especially in the art of forming by transplantation new noses and lips. He wrote several works of no great importance on surgery, being little more than a brilliant operator.

**Diego Garcia**, an island of the Indian Ocean, in 7° S. lat., and 72°–73° E. long., extends in an irregular horseshoe shape, and is 30 miles long, embracing between its extremities three minor

islets (the Chagos Islands). It contains a spacious bay, and exports coconut-oil. The group has about 500 inhabitants, and is a dependency of Mauritius.

**Diego Suarez**, the name of a fine bay at the north end of Madagascar (q.v.), ceded to France by treaty in 1885.

**Dielytra.** See **DICENTRA**.

**Diepenbeck**, **ABRAHAM VAN**, painter and draftsman, was born at Bois-le-Duc in 1607, or, according to other accounts, in 1596 or 1599. He studied under Rubens in Antwerp, and after a residence in Italy, returned to be an assistant of that painter. He first devoted himself to glass-painting; but he soon turned to oil-painting and designing. Examples of his work in oils are in Paris, Dresden, and Vienna. His plates to Marolles' *Tableaux du Temple des Muses* (1655), engraved by Cornelis Bloemaert, were much admired. He visited England in the reign of Charles I., where he painted some windows, and was much employed by the Duke of Newcastle, for whom he executed various portraits and views, and drew the plates for that nobleman's famous folio on Horsemanship (1657). These plates are valuable not only for their excellence, but for the number of portraits they contain. He was elected president of the Antwerp Academy in 1641, a post which he retained till his death in 1675.

**Dieppe**, a seaport in the French department of Seine-Inférieure, on the English Channel, 40 miles N. of Rouen by rail. It is situated among chalk cliffs, at the mouth of the river Arques, and is regularly built. It has a castle (1433), now occupied as barracks, commanding the town and the harbour, which has been recently extended. Dieppe has a college and a school of navigation, and there is a fine Gothic church of the 13th century, as well as a handsome bathing establishment and casino. Being one of the principal watering-places of France, the town has a great accession of visitors during the summer months. It manufactures clocks, lace, and tobacco; and its carved articles of horn, bone, and ivory have long been famous. There are also shipbuilding yards and distilleries; and the fisheries, which are important, employ almost the whole of the population of Pollet, one of the two suburbs of the town. In 1066 Duke William sailed from Dieppe to the conquest of England. It was then a mere village, but its importance steadily increased, until it reached the heyday of its prosperity in the period between the middle of the 14th century and the end of the 17th. Expeditions sailed hence for the west coast of Africa, where Petit Dieppe was founded at the mouth of the Gambia; and many of the early voyages to Canada were made from this port. A terrible bombardment by the English and Dutch, however, destroyed all but two or three buildings in 1694; and though rebuilt, the town never recovered its importance, and even before the rise of Havre had already sunk to a secondary port. Nevertheless, packets still ply regularly to New-haven. The town is a favourite landing-place of English tourists, and its import and export trade is chiefly with England and Norway. Pop. 24,000.

**Diesel**, **RUDOLF**, inventor of the Diesel oil-engine (see **INTERNAL-COMBUSTION ENGINE**), was born of German parents in Paris in 1858, studied at technical colleges in Augsburg and Munich, and managed engineering works in Paris. He disappeared from a steam-packet crossing from Antwerp to Harwich, 29th–30th September 1913.

**Die-sinking**, the art of engraving the die or stamp used for striking the impression on coin and medals, and for stamping thin plates of metal into various shapes. The method of sinking the dies used for coins or medals will serve to illustrate the

general method of die-sinking. Suppose the coin to be of the size of a shilling: a cylindrical piece of carefully selected steel, about three or four inches in length, and two in diameter, is prepared by slightly rounding one end of the cylinder, then turning and smoothing upon the middle of this a flat face equal to the size of the coin. This blank die, which is carefully softened by the process of Annealing (q.v.), is then engraved with the device of the coin in intaglio. This is a very delicate and artistic operation, and is effected by a great number of careful touches with small and very hard steel tools. The face of the die is now protected with a thin coating of lampblack and linseed-oil, and then placed with its face downwards in a crucible containing animal charcoal. In this position it is raised to a cherry-red heat, then taken out, and hardened by being plunged into water. When properly tempered, it is in a state to be used for stamping the coin; but dies of superior workmanship, from which many impressions are required, are not thus directly used, as the expense of engraving is very great, and the risk of breakage considerable. This first engraved die, called the matrix, is therefore reserved only for making other dies. An impression in relief is made from this matrix on a small block of soft steel, which is called the puncheon; this is retouched and hardened, and from it the dies directly used for striking the coins or medals are impressed. When the engraving is not very costly, a small number of impressions required, or a soft metal is to be stamped, as in livery buttons, for example, the work is stamped directly from the engraved die or matrix. See MINT.

Die-engraving is a very ancient art, and was perhaps first suggested by the closely allied art of engraving gems. Notwithstanding the great number of ancient Greek coins which have been preserved, very few of the many dies which were used for these have been found. The Greek coins struck between the years 415 and 336 B.C. show that the art of engraving dies had then reached the highest point of excellence which it ever attained either in ancient or modern times. As works of art, the Italian medals of the 15th and 16th centuries come next in merit to Greek coins, but none of these of the 15th, and only the smaller-sized ones of the 16th, century time were struck from dies. All the others were cast either from wax models or from patterns made in other materials. The art of cutting dies, in the comparatively deep intaglio required for medals, consequently dates from the beginning of the 16th century. Since then, or soon after it, Germany, France, Russia, and England, as well as Italy, have all had many more or less famous die-engravers.

The engraving of dies for medals is perhaps that branch of the art which gives the greatest scope for artistic skill, although the work on those required for coins is nearly identical in its character. Comparatively few dies of new design are, however, required for coins, while many hundreds of medal dies are annually made in England. The medals struck from these are used for such purposes as awards at exhibitions, colleges, and schools; for prizes at various games, and in commemoration of various events. Copper, bronze, and tin are the metals most commonly employed for medals, the copper being usually 'bronzed' on the surface. A copper medal with a head in moderately high relief requires half a dozen blows in the screw-press to bring up a sharp impression; but some in very bold relief require to be struck with as many as thirty blows. The medal requires to be frequently annealed during the process. Coins are finished at one blow, so that the devices upon them are only in slight relief. When a coin or a medal is being

struck, a steel collar, accurately fitted to the die, is used to prevent the metal from spreading.

Dies have been extensively applied to the manufacture of many kinds of objects in metal. These are of all sizes, from those required for parts of jewellery upwards. Large and heavy dies are, however, cast, and only in some cases finished with the graver. Dies for forgings are made by a machine which reproduces a model die. Dies have been used also in the stamping or pressing of solid pieces of wood into ornaments, in high relief, to imitate wood-carving. By the same process similar ornaments, in bas-relief, are made in pieces of wood formed of several layers of veneers.

**Dies Iræ**, the name generally given to the celebrated Latin hymn on the Last Judgment, from the first words of its first stanza:

Dies iræ, dies illa,  
Solvat sæculum in favilla,  
Teste David cum Sibylla.

This incomparable hymn consists of seventeen such stanzas, with an eighteenth of four lines, and is based on the prophetic passage, Zephaniah, i. 14-18. It is probably the work of the Franciscan, Thomas de Celano, who died about 1255. The sublimity and force of its thoughts are well matched with the impressive solemnity of the verse, its stanzas of three lines, each with the same double rhyme, making the inmost soul tremble, 'as with three blows of a hammer,' says Guericke. It is said to have first appeared in the missals made at Venice about 1250, and is one of the five 'Sequences' that have been universally used in the Roman Catholic Church since the Council of Trent. Its place is in the *Missa in commemoratione omnium fidelium defunctorum*. The Tridentine text, published in 1567, is somewhat different from that in the old missals, and another and considerably inferior version appears on a marble tablet of unknown date, in a Franciscan church at Mantua. The *Dies Iræ* has been the subject of musical compositions by Palestrina, Haydn, Cherubini, and Mozart, and no religious poem has been more frequently translated. There are English translations by Crashaw, Macaulay, Lord Lindsay, Isaac Williams, and others. The opening stanzas are paraphrased in the *Lay of the Last Minstrel*, canto vi.

See Julian's *Dictionary of Hymnology* (1892); 'Fifty Versions of the *Dies Iræ*' in the *Dublin Review* (1882); a list of ninety-two versions in the *Athenæum* (July 1890); and C. F. S. Warren, *The Dies Iræ* (1897).

**Diest**, a town and fortress of Belgium, in the province of Brabant, on the river Demer, 37 miles SE. of Antwerp by rail, with manufactures of woollen goods, beer, and gin. Pop. 8200.

**Diet**. The different classes of food-stuffs, and the value or potential of different foods, are described in the article FOOD. In the article DIGESTION the changes which the food undergoes in the alimentary canal are treated. It is here proposed to describe the quantity and quality of food which experience has shown to be required in order to preserve the body in health and vigour. Of course, no two individuals are alike, and the assumption will in the first place be made that an average healthy man of ordinary height and weight, and doing ordinary work, is alone under consideration.

In order to understand the requirements of the body in respect of food, it is necessary to bear in mind how complex the body is. Its chief activities are muscular and nervous, and not only have the brain and the muscular system to be fed, but in addition the various glands, cartilages, bones, and other tissues are all constantly requiring nourishment. If we examine all these tissues under the microscope, we see that although all are alike in some respects, yet that they differ one from another

considerably in others. Their work, too, is different; and we should expect, and experiment shows, that they require different food.

Just as the life of the whole body is the sum of the lives of the different parts (cells) of the body, so the food must contain that which is necessary for these parts. The body has frequently been compared to a steam-engine, but, as we have seen, the body is complex, and the comparison should rather be between it and a collection of steam-engines, each one differing from the other in its pattern, use, and the kind of fuel required to stoke it. A steam-engine requires a store of fuel (containing the potential-power), by the combustion of which it moves. It also requires its parts to be repaired, and sometimes a new boiler or piston is necessary. In addition, it requires other things, so that it may work well, such as oil, which is neither burned nor used to build up the machine. In the same way the body, and each part of it, requires first, a store of fuel, from the combustion of which its energy or activity is obtained; secondly, material by which its wasted parts may be repaired; and, thirdly, substances such as water, salt, &c., which are required by the body, but which are neither burned nor used entirely in forming tissue. The term 'food' may then be applied to all that the body requires from without; and following out our comparison, corresponds with the stoking, mending, and oiling of a number of steam-engines.

Let us consider in the first place the food, which, like the fuel for the engine, the body requires in order to manifest its own peculiar activities. The coal of an engine contains carbon and hydrogen, which become oxidised by the oxygen of the air. As a result of this oxidation, we have heat and mechanical motion. In like manner the body receives food containing large quantities of carbon and hydrogen. At the same time oxygen is absorbed by the blood as it passes through the lungs. The digested food and the oxygen are taken by the blood to the tissues—muscles, brain, &c.—and within these tissues a slow oxidation takes place, giving rise to the heat of the body as well as mechanical and other activities. Just as the steam-engine requires a sufficiency of coal, so the body requires a certain quantity of food. In both cases the supply of oxidisable material must have what may be termed a sufficient 'potential'—that is to say, it must have the power of producing a certain amount of heat and mechanical motion. Some coals and some foods burn better than others, and their potential in that case is greater. Fat among the food-stuffs has the greatest potential, carbohydrates and proteins have less. It is obvious, then, that one cannot speak of the body requiring a certain weight of food per diem. This would mean nothing, for the value of different food-stuffs varies considerably, a pound of one kind of food being equivalent in potential, say, to twenty pounds of another. In arranging a diet one must carefully consider not only the quantity of food given, but in addition one must calculate its potential. The steam-engine may be driven at full or at half power, and in the latter case the amount of fuel required will be diminished. In the same way an individual doing hard work requires food with more potential, or, as we say, more nutritious food, than another living an easy and uneventful life, and still more than one confined to the house or to his bed.

There is yet another important point to be considered. In a steam-engine the production of heat is not what is sought as a result of the combustion within the steam-engine; the engineer constructs the machine with a view to obtaining the result of the combustion not in heat, but in mechanical motion. In the best machines, one-tenth of the

potential is converted into work, while the rest, nine-tenths, is rejected into the atmosphere as heat. The human mechanism can convert as much as one-fifth of the potential of its food into work, and changes four-fifths into heat. In the case of the human machine, however, heat is very necessary, especially if the body be ill clothed or surrounded by a cold medium. The powerlessness of the hands when numbed with cold will illustrate the necessity of a requisite temperature. Warm clothing actually saves food. Not only is the temperature of the body maintained in a cold climate by preventing its conduction and radiation from the body by the use of warm clothing, but appetite prompts the consumption of a large quantity of food, and especially those kinds that contain great potential. The Eskimos devour great supplies of fat blubber, and they are even said to prefer the taste of rancid oil to that of the less combustible sugar.

It has been found by experiment that a man of average height and weight, well clothed, in a temperate climate, and doing a fair day's work, requires such quantity of food that the combustion of it, were it all converted into mechanical work, would raise 4000 tons one foot high, or, as it is expressed, 4000 foot-tons. This result has been arrived at by varying the diet until the minimum but sufficient quantity has been arrived at which will preserve the health and vigour. The potential of the diet can be calculated by an instrument called the calorimeter, which will give the heat produced during the burning of any combustible substance, and from the heat produced the potential in respect to mechanical work can be calculated. In the subjoined table the potentials of one ounce of each of three important food-stuffs are given:

	Foot-tons
Fats (beef fat) . . . . .	351.50
Proteins (albumen) . . . . .	105.2
Carbohydrates (starch) . . . . .	151.66

It will at once be seen how readily one could calculate the amount of food-stuff capable of furnishing the body with fuel for twenty-four hours. All that is necessary will be to divide 4000 by the number of foot-tons which correspond with the article selected; the quotient is the number of ounces required. Thus 11 ounces of fat, or 24 ounces of protein, or 26 ounces of starch would contain the necessary potential.

From what has already been said regarding the complexity of the bodily mechanism, it may be surmised that a single food-stuff (even if a quantity be taken which provides a sufficient potential) is incapable of stoking the body. Numerous experiments, such as those conducted by the Gelatine Commission, by Dr Hammond, and others, indicate that the body is unable to maintain its natural vigour on a diet consisting solely of gelatine, or of starch, or of protein, or of fat, &c. Animals fed on a single food-stuff waste rapidly, and will refuse their food after a few days with marked dislike, dying eventually of starvation. At least two staple articles of food must be given, mixed, even in this case, with many accessories, such as various salts, aromatic substances, &c., in order that health may be maintained.

Liebig taught that the muscular work of the body results from the oxidation of nitrogenous matter (protein, both animal and vegetable), but it is now known that all the classes of food-stuffs except the mineral matters are used by the muscles. Nevertheless proteins (nitrogenous food) are essential, as we shall see on experimental grounds, and from the fact that in the dietary of every nation protein matter is always present, combined at any rate with fat, generally with carbohydrates as well.

In many parts of the world man subsists with-

out the use of carbohydrates. The Eskimo and the North American Indian live entirely on the produce of the chase. The flesh of animals is rich in proteins and fats, but contains practically no carbohydrate. In the same way the Arab of the desert lives upon the flesh and milk of the camel, in districts where the date is not to be found. The use of carbohydrates is extensive in most temperate and tropical climates. Many of the inhabitants of India and Ceylon live chiefly on rice. Wheat, potatoes, and other vegetable foods, rich in carbohydrates, are staple articles of food both in Europe and America. In fact, within certain limits, man, like every other animal, is capable of adapting himself to the food produced by the district in which he lives. The French and Spanish peasants eat little meat, living on carbohydrates and vegetable proteins, and supplying necessary potential by an abundance of oil. The Sussex labourer consumes his beans, rich in vegetable proteins, and bacon, and does a good day's work on them. The Scottish labourer of a former generation lived on porridge and skimmed milk, with meat but once a week. The Arab of the Sahara, together with his family and his horse, subsists almost entirely on the date, while the Arab of the Nubian Desert hardly ever touches vegetable food. The diet of every man, under whatever circumstances, invariably contains proteins, although this may vary in its quantity. The universal use of protein matter in some form or other suggests its importance, and this is fully borne out by the evidence of direct experiment. If protein food be withdrawn from the diet altogether, nitrogenous matter continues to be eliminated from the body by the urine, although its supply is cut off. At the same time the body wastes, and death finally occurs. The experiments of Fick, Wislicenus, and Parkes show that during muscular exertion the body does not excrete any excess of nitrogen; and the writer's own researches show that urea—the most important excretion which contains nitrogen—is not found in abnormal extent in muscular tissue after exhaustive exercise. It would appear, therefore, that nitrogenous matter is not used by the tissues for fuel, and that when protein food is consumed, the muscles burn a non-nitrogenous substance which is formed from it. The nitrogen, in the form of urea, &c., is carried by the blood to the kidneys, and at once excreted. We must look elsewhere than in the ordinary combustion of a muscle or brain cell for a use for the nitrogen which, as we have seen, is so necessary an article of food in the form of a protein substance. In the child, the tissues which contain nitrogen in definite proportion are continually growing, and it will readily be seen that here, at any rate, we have an important use for protein diet—namely, to furnish the necessary nitrogen for the new tissue. Even during adult life we have tissue change and growth. The skin is continually growing in its deeper layers to replace its surface layers worn away by constant friction. In the same way the cells of the blood are always being broken down, and their places taken again by new ones continually forming. Although it is hardly probable that such complete changes take place in all the tissues of the body, yet, without the entire breaking down of individual cells, there are no doubt changes both integrating and disintegrating, which are constantly taking place. As a result of disintegrating changes nitrogenous matter in an effete form is being given off by the system, and it has to be replenished from without in a form which the body can use. The protein food-stuff provides nitrogenous pabulum for the tissues which they assimilate, and builds up new tissue material. For this reason protein matter is indispensable. At the same time the system obtains

from the protein food non-nitrogenous fuel to be burned by the tissues; this property of supplying tissue fuel is shared with the carbohydrate and fatty food-stuffs. It has been found by experiment that an ordinary diet should contain one part of nitrogenous matter (proteins) to about four of non-nitrogenous (fat and carbohydrates). If less nitrogenous matter be given, the tissue consumption of nitrogen will not be supplied, and the body will waste. If a much larger quantity of nitrogenous food be taken, a nitrogenous surfeit occurs, and the body is called upon to digest this excess, and to eliminate an unnecessary quantity of the useless nitrogenous compounds which result.

The following table from Dr Parkes shows the proper proportions of solid water-free food-stuffs in ounces required as daily food by an adult man:

	At Rest.	Ordinary Work.	Hard Work.
Proteins...	2.5	4.6	6 to 7
Fats .....	1	3	3.5 to 4.5
Carbohydrates.....	12	14.4	16 to 18
Total water-free food...	15.5	22.0	25.5 to 29.5

According to Professor Chittenden, who experimented with, amongst others, athletes and soldiers, we need only half the amount of protein suggested above. That is probably true, and is shown by the nature of the food amongst the Scottish and Irish peasantry of half a century ago, not to speak of the Hindu, the Chinese, and the Japanese. These people eat far less protein (meaty matter) than we do, and we must remember that owing to the increased cultivation of peas and beans, as well as the modern abundance of fresh meat, we eat far more protein than did our ancestors. We have got into the habit of eating too much protein, and we have to thank Professor Chittenden and the more moderate vegetarians for reminding us of this fact. It now becomes an easy matter to construct a diet table of articles of food. Most of these have been analysed.

TABLE FOR CALCULATING DIETS (Parkes).

Articles of Food.	Water.	Protein.	Fats	Carbohydrates	Salts.
Uncooked beef } and mutton..	75	15	8.4	..	1.6
Far pork.....	39	9.8	48.9	..	2.3
Dried bacon ..	15	8.8	73.3	..	2.9
Smoked ham....	27.8	24	36.5	..	10.1
White-fish.....	78	18.1	2.9	..	1.2
Poultry .....	74	21	3.8	..	1.2
White bread....	40	8	1.5	49.2	1.3
Wheat-flour....	15	11	2	70.3	1.7
Barley-meal....	11.8	12.7	2	71	3.0
Rye .....	13.5	13.1	2	69.3	2.1
Biscuits .....	8	15.6	1.3	73.4	1.7
Rice .....	10	5	.8	83.2	.5
Oatmeal .....	15	12.6	5.6	63	3
Maize .....	13.5	10	6.7	64.5	1.4
Macaroni .....	13.1	9	.3	76.8	.8
Arrowroot.....	15.4	.8	..	83.8	.27
Dry peas .....	15	22	2	53	2.4
Potatoes.....	74	2	.16	21	1
Carrots.....	85	1.6	.25	8.4	1
Cabbage .....	91	1.8	.5	5.8	.7
Butter .....	6	3.8	88	..	2.7
Eggs .....	73	13.5	11.6	..	1
Cheese .....	86.8	33.5	24.3	..	5.4
Milk .....	86.8	4	3.7	4.8	.7
Cream .....	66	2.7	26.7	2.8	1.8
Sugar .....	8	..	..	96.5	.5

Many articles of food owe their chief importance to their action as stimulants. Such are alcohol, tea, coffee, and beef-tea. Alcohol is no doubt burned within the body, and is a source of energy. Only a small quantity, however, can be so utilised, perhaps one ounce in every twenty-four hours in the case of an ordinary individual. As a source of energy, therefore, it is of little value, and such substances as fat, meat, bread, are capable of supplying the

potential at a very much smaller cost. Alcohol taken with other food stimulates the secretion of gastric juice, assisting in that way the digestive process. At the same time, however, the gastric juice is unable to act quite so readily upon the food, though this is hardly the case with diluted spirits, which form more wholesome beverages than strong wines or beer. No two individuals are the same, and while alcohol, in moderate doses, promotes digestion in most persons, others suffer from its use. See ALCOHOL (*Actions and Uses of Alcohol*). It should never be given in collapse and weakness without giving at the same time easily digested food when that is possible. It excites the body to great and often unnecessary activity, the potential for which it does not supply. Afterwards greater weakness ensues from want of the necessary fuel, which has not in the meanwhile been forthcoming. One should never drink without eating. Tea and coffee are both nervous stimulants, and at the same time they retard both gastric and salivary digestion.

Beef-tea is generally regarded as a food-stuff of high nutritive value. This is, however, not the case. It contains nothing besides salts and extractives, and has a very slight potential indeed. It has a stimulating effect, however, both on digestion and on the nervous system. From the mistaken ideas generally held as to the nutritive properties of this substance, thousands of invalids are annually starved to death (see BEEF-TEA). Beef-tea made by infusing the beef in *tepid* water is more nutritious, especially if the beef be finely minced and eaten as well.

In addition to the stimulants that we have already considered are many substances known as condiments, such as mustard, pepper, pickles, sauces. These are of utility in gratifying the palate, and in addition they probably stimulate the secretory juices. Sufficient information has not as yet been obtained as to their action on gastric and pancreatic digestion. They certainly stimulate the flow of saliva, although the acid condiments will prevent the perfect action of the salivary ferment.

Common salt is a condiment, and at the same time it plays many other important parts in the animal organism. So necessary is it that both man and animals suffer great hardships if it be not supplied in sufficient quantity. It is necessary for the formation of the gastric juice; it is present in the blood and in all tissues of the body.

Inorganic salts, such as sulphates, phosphates, are required for the formation of the skeleton, and salts of iron for the colouring matter of the blood. Organic salts, such as citrates and tartrates, are also of importance. That food should be easily digested is a matter of great importance. The rapidity of digestion will depend upon the amount and quality of the digestive juices, the kind of food, and the condition in which the food is eaten. Rice, tripe, whipped eggs, sago, tapioca, barley, milk, raw eggs, lamb, parsnips, potatoes, hashes of chicken, fish, are all easily digested substances. Beef, mutton, pork, roast fowls, bread, veal, oysters, are digested more slowly. Inasmuch as perfect digestion can only be accomplished when the digestive juices have acted for some time on all parts of the food taken, it follows that fine subdivision of food is very essential. On this account liquid food rapidly disappears from the stomach, which retains for a longer time solid masses upon which the gastric juice acts with greater difficulty. When food is cooked it swells, its fibres and solid particles are separated one from another, and it is more readily permeated by the gastric and pancreatic juices. In addition, starch becomes gelatinous, and in that form is easily digested by the

saliva and pancreatic juice. The diet of early infantile life differs from that of the adult, inasmuch as it should contain no starch. Milk, the natural food of the infant, is rich in fat, proteins, and a sugar called milk-sugar. There is in milk, however, an entire absence of starch, an article of food which the infant is destined to consume in such large quantities in later years. Moreover, during the first few months of its extra-uterine existence the child is unable to assimilate starch given with its food. On no account, therefore, must it be supplied with bread, potatoes, rice, or other vegetable food until the cutting of the teeth suggests a more solid diet. If the mother's milk be not in sufficient plenty, cow's milk diluted with one-third of water, with a pinch of sugar, may be given, or condensed milk diluted with twelve to twenty parts of water (see MILK). Condensed milk, owing probably to its very uniform composition, cannot be given alone for more than a few weeks together. It may, however, be given once or twice a day for months, and children thrive on it, when they in addition are supplied with good cow's, or still better, with their own mother's milk.

In conclusion, it may be well to consider the results which follow the neglect of the most obvious rules of dietetics. As the result of deficient food, one finds loss of muscular and nervous power, wasting of the tissues, and anæmia. If the deficiency be very great, feverish symptoms and great prostration result.

Many persons consume large quantities of food quite out of proportion to their size or activity. In this case, owing to a 'habit of digestion,' much of the food may pass through the digestive tract without being digested or assimilated. Under these circumstances the hearty eater is a wasteful eater, and is using for his own bodily needs only a fraction of the food he consumes. In addition, dyspepsia in various forms, constipation, and diarrhoea are apt to follow, indicating functional derangements of the digestive apparatus. There is often a tendency, especially in advanced years, to absorb more nourishment than is necessary for stoking the body and for replenishing ordinary tissue waste. The excess is stored up in the form of fat, which accumulates under the skin, chiefly under that of the abdomen. In addition, the muscles and internal organs are loaded with fat, the minute globules of which may be seen in the ultimate cells of which the tissues are composed. Hereditary tendency is well marked in cases of corpulency. In addition to corpulency, an excess of food is apt to engender various gastric troubles, engorgement of the liver, plethora, and an excess of effete extractions in the blood and urine. It is probable that humanity suffers more from an excess than from a deficiency of food. An excess of animal is more serious than an excess of vegetable food. The nitrogenous extractions, derived from the incomplete assimilation of meat, when present in large quantity, cause many symptoms, most of which are extremely obscure in their nature. These are provisionally spoken of as symptoms of gout. The ill effects which follow surfeit are more severe in those leading a sedentary and inactive life, bodily activity producing more efficient oxidation of the food taken. A healthy and abstemious man whose tastes have not been enslaved by the culinary art instinctively adapts his food to the requirements of his body. The cold of winter prompts the choice of substantial and energising food, while the heat of summer suggests a lighter dietary. After a country holiday, on returning to a sedentary life one at once reduces one's allowance of beef, or expects to pay the penalty that a disordered digestion is certain to exact. During the ages in which

humanity has been evolving, there has been a constant adaptation of taste and desire to the needs of the economy. The natural gustatory inclinations as a rule are a good indication of the bodily wants. As a rule wholesome things have a pleasant taste, and the reverse also holds good. It is all-important, however, that the satisfaction of mere gustatory pleasure be not allowed to monopolise too much of the energy of any individual. Under these circumstances a surfeit is certain to result. There is a well-known law in physiology to the effect that *greater and greater* stimuli have to be applied in order to produce a series of *equal* sensations. It follows that the excesses of the glutton and drunkard are out of all proportion to the actual pleasures these excesses produce, the wise man drinking and eating only in moderation. See COOKERY, FOOD, DIGESTION, INDIGESTION, VITAMINS.

**Diet**, a meeting of delegates or of dignitaries, held from day to day, for legislative or ecclesiastical purposes; the title was afterwards extended to such bodies themselves. The term is applied to the sessions of church assemblies in Scotland, and also to public worship, but its chief use is as the specific title of the assemblies of the German empire and some other Continental states (see GERMANY).

*Desertion of the Diet*, in Scots law. The proceedings under a criminal libel are in Scotland spoken of technically as a diet, and when the libel is abandoned by the public prosecutor, or where he fails to appear, he is said to desert the diet. The effect of a judgment of the court declaring that the diet has been deserted is to free the accused from prosecution under the particular libel or writ, but not to prevent a new process being raised on the same grounds.

**Diethylbarbituric Acid.** See VERONAL.

**Dietrich of Berne.** See THEODORIC.

**Dietz**, FEODOR (1813-70), historical painter, born at Neunstetten in Baden, died suddenly in France during the Franco-German war.

**Diez**, FRIEDRICH CHRISTIAN, the greatest of Romance philologists, was born at Giessen, 15th March 1794, and educated at Giessen and Göttingen, with one short interval in 1813 of campaigning as a volunteer. In April 1818 he saw Goethe at Jena, and was directed by the sage to the lectures of Raynouard and the study of the Provençal tongue. From 1822 he lived at Bonn as a *privat-docent*, and in 1830 was there appointed professor of the Romance Languages, and there he died, May 29, 1876. His first work, *Altspan. Romanzen* (1821), was followed by a series of valuable works on the Romance languages, of which the greatest are his *Grammatik der Romanischen Sprachen* (3 vols. 1836-38; 5th ed. 1882), and the *Etymologisches Wörterbuch der Romanischen Sprachen* (2 vols. 1853; 5th ed. by A. Scheler, 1887; Eng. trans. 1864). These works discussed these languages for the first time from the comparative historical standpoint, and thus formed a sound foundation for all subsequent Romance philology. See the books on Diez, his life and work, by Sachs (1878), Breymann (1878), and Stengel (1883-94).

**Difference**, CALCULUS OF FINITE DIFFERENCES Difference implies two quantities of the same kind, and means in arithmetic that quantity which must be added to the smaller in order to produce the larger, and in algebra that quantity which must be added to either to produce the other. Thus if the quantities be the numbers 5 and 7, their arithmetical difference is 2, while their algebraical difference may be either +2 or -2. The difference -2 arises from the fact that we may in algebra ask the question what must be

added to 7 to produce 5? and the answer to this is -2.

In certain groups of problems, chiefly relating to series, differences considered in a particular manner are of peculiar importance, constituting in fact a branch of higher algebra, which took its origin in Brook Taylor's *Methodus Incrementorum* (1715), and is now called the Method of Differences or the Calculus of Finite Differences. This method we shall briefly illustrate.

Suppose it were required to discover the law of formation, and thence to continue the series of numbers:

4, 3, 0, 1, 12, 39, 88, 165.

It would be wrong to assume that only one law of formation will produce these eight numbers, just as it would be wrong to assume that only one curve could be drawn through eight given points; but for the full discussion of the difficulty here raised the reader must be referred to the chapter on Interpolation in any text-book on the subject. We shall, however, show how to find one law of formation, and use our figures to illustrate the elementary notation of the subject. The process is to take the difference between each term and the succeeding one, and so get the first series of differences, or, as it is called, the series of first differences; the process is repeated on the first differences, and so on, as follows:

No. of term,	1	2	3	4	5	6	7	8
Given Series,	$u_1$	$u_2$	$u_3$	$u_4$	$u_5$	$u_6$	$u_7$	$u_8$
	4	3	0	1	12	39	88	165
1st Differences,	$\Delta u_1$	$\Delta u_2$	$\Delta u_3$	$\Delta u_4$	$\Delta u_5$	$\Delta u_6$	$\Delta u_7$	
	-1	-3	1	11	27	49	77	
2d Differences,	$\Delta^2 u_1$	$\Delta^2 u_2$	$\Delta^2 u_3$	$\Delta^2 u_4$	$\Delta^2 u_5$	$\Delta^2 u_6$	$\Delta^2 u_7$	
	-2	4	10	16	22	28		
3d Differences,	$\Delta^3 u_1$	$\Delta^3 u_2$	$\Delta^3 u_3$	$\Delta^3 u_4$	$\Delta^3 u_5$	$\Delta^3 u_6$	$\Delta^3 u_7$	
	6	6	6	6	6			

The line of third differences suggests a law of formation, and enables us to continue the series as follows:

	165	276	427	624
77	111	151	197	
28	34	40	46	
6	6	6	6	

It could further be shown that if  $u_x$  be the  $x$ th term of the series above, then

$$u_x = x^3 - 7x^2 + 13x - 3.$$

The operation indicated by  $\Delta$  is defined by the following equation, where  $u_x$  means any function of  $x$ :

$$\Delta u_x = u_{x+1} - u_x \quad (1)$$

or, if we denote the 1 added to  $x$  by  $\Delta x$ , by the equation

$$\frac{\Delta u_x}{\Delta x} = \frac{u_{x+\Delta x} - u_x}{1} \quad (2)$$

or with the appearance at least of greater generality by

$$\frac{\Delta u_x}{\Delta x} = \frac{u_{x+h} - u_x}{h} \quad (3)$$

As a final example let us suppose  $u_x = x^2$ . Then we have, using equation (1) above,

$$\Delta u_x = (x+1)^2 - x^2 = 2x+1$$

This is a case of the direct problem of the calculus, but there is also the inverse problem: Of what function is  $2x+1$  the difference? The solution to this is denoted by the symbols:

$$\Sigma(2x+1) = x^2,$$

or, strictly speaking, for reasons which we need not give, by

$$\Sigma(2x+1) = x^2 + C;$$

and  $x^2 + C$  is said to be the *integrate* of  $2x+1$ .

Between the Calculus of Finite Differences and the Differential Calculus (see CALCULUS) (a title which means the calculus of infinitesimal differences) there are many important points of contrast and of similarity, which would be not less clearly appreciated if the names were changed, as Boole all but suggested, the former to Calculus of Differences, the latter to Calculus of Limits.

The methods of the Calculus of Differences are in vogue among actuaries and others in dealing with statistics such as mortality tables; and from this calculus are derived many formulae of approximation of great practical value, such as the rules for finding the area of surfaces bounded by curved lines.

**Differentiation**, that organic progress which occurs when certain parts of a uniform whole become structurally different from the others, or when, in other words, the homogeneous becomes heterogeneous. Inequality in internal and external conditions of life brings about restriction of certain vital processes and the predominance of others, and as this division of function is established, diversity of structure results. Differentiation is the structural change which is associated with the physiological 'division of labour,' and the process is essentially the same whether it find expression in cells, tissues, organs, or entire organisms. See DIVISION OF LABOUR, EVOLUTION, VARIATION, &c.

**Diffraction**. In general, light is propagated in straight lines in a homogeneous medium; but, if it be caused to pass through an opening which is not large in comparison with the wave-length of the light, the law no longer holds. Such phenomena are said to be due to *diffraction*. This is further dealt with at INTERFERENCE and SPECTRUM.

**Diffusion**. The particles of all material bodies, except such as may be totally devoid of heat, are in rapid motion. In the case of solid bodies the excursions of any one particle are very limited; but in fluids a particle may move more or less freely throughout the whole space occupied. This intermixture of molecules may occur also when different fluids are placed in contact with each other, but it may be prevented by the existence of tension at the common surface (see SURFACE-TENSION and CAPILLARITY). When it does occur, the fluids are said to *diffuse* into each other. Diffusion has been observed in solids.

**Diffusion of Liquids**.—The diffusion of dissolved salts may obviously be considered under this heading. The phenomenon may be conveniently studied by introducing a strong solution of some highly-coloured salt, such as bichromate of potash, into the bottom of a tall glass cylinder nearly filled with water. The rate of diffusion varies with the nature of the liquids. Graham was the first to investigate the subject carefully. He filled a number of similar glass vessels with solutions of different salts. The mouths of these vessels were carefully ground so that they could be closed by means of glass plates. The different vessels were then placed in equal glass jars, and covered with water to a definite extent. Next the glass covers were cautiously withdrawn, and the diffusion was allowed to go on for a certain time. The rate at which each liquid diffused was thus obtained. Graham found that, for any one solution, the rate is proportional to the gradient of concentration—i.e. to the rate at which the quantity of salt dissolved per unit-volume varies per unit-length. Thus the law regulating diffusion of liquids is analogous to that which regulates the conduction of heat in a homogeneous solid. Hence the equations obtained by Fourier in his *Théorie de la Chaleur* apply to the problem under consideration.

Graham found also that rise of temperature

greatly increases the effect. He divided substances into two classes, *Colloids* and *Crystalloids*, the members of the first class diffusing very much more slowly than those of the second. His investigations have been much extended by more recent observers employing various methods of observation.

If two miscible liquids be separated by a membrane of bladder or of parchment paper, &c., diffusion takes place through the septum at rates which are usually very different for different liquids. This phenomenon is known as *Osmose* (q.v.). It was first shown by Nollet that, if a vessel filled with alcohol be closed by a piece of bladder and placed in water, the diffusion of the water is so much more rapid than that of the alcohol that the bladder is burst because of the increase of the contents of the vessel which it closes. By this means the various constituents of a mixture of colloid and crystalloid substances may be separated to any desired extent. The rate at which liquids diffuse into each other through a septum depends greatly upon the molecular action between them and the septum.

**Diffusion of Gases**.—If two flasks, each filled with a different gas at a given pressure and temperature, be placed in communication with each other, the gases will be found to interdiffuse. The rate of interdiffusion is shown by theory to be nearly in inverse proportion to the square root of the product of the densities of the two gases, and the experimental results are in accordance with the theory.

**Effusion of Gases**.—This is exhibited in the passage of a gas into vacuum under constant pressure through a small opening in a very thin plate otherwise impervious to it. The work done in the passage of a given volume of the gas is proportional to the pressure, and the equivalent kinetic energy is proportional to the product of the density and the square of the speed of effusion. Hence the speed for a given pressure varies inversely as the square root of the density. Graham showed that this result of theory is closely realised by experiment. He showed, further, that when a discrepancy exists, it is due to the finite thickness of the plate.

**Transpiration of Gases** is the term for the passage of gases under pressure through a fine capillary tube. This subject was also investigated by Graham, who found that the rate of passage is not affected by the material of the tube. This seems to indicate that the tube becomes coated internally with a thin film of gas, so that the opposition to the flow of gas is due to Viscosity (q.v.).

The rates at which different gases pass through fine unglazed earthenware are inversely as the square roots of their densities. Hence we have a means of separating gases the densities of which are different (see ATMOLYSIS). If the septum be made of caoutchouc, which is not porous, the passage of gases still occurs. The gas seems to combine with the matter of the septum on the one side, to diffuse through it, and finally to be given off on the other side. The passage of some gases, such as carbonic oxide, through hot cast-iron is analogous.

**Digamma** (literally 'double gamma') is the name given by the grammarians of the 1st century to the sixth letter,  $\Phi$  (see the article on  $\Phi$ ), of the early Greek alphabet, from its shape, which was that of a gamma,  $\Gamma$ , with the horizontal stroke doubled. The sound represented by this letter, approximately that of the English *w*, had disappeared from all Greek dialects some centuries before the Christian era; thus the original *woida*, I know, *newos*, new, are represented in classical Greek by *oida*, *neos*. The letter, in its proper

shape, was therefore known to the grammarians only from old inscriptions; but a corrupt form of it,  $\epsilon$ , was retained in the alphabet to serve as the numeral for 6, and, as this character had come to resemble the ligature for *st*, it received in this application the names *stau* and *stigmè*. The metre of the Homeric poems, as Bentley was the first to prove, indicates that they, or, at least, the oldest portions of them, were composed while the sound still existed in the language. The lists of words originally containing the digamma, given by Bentley and other scholars of a former day, were based partly on the testimony of ancient grammarians, and partly on the evidence of the metre of Homer and other poets; but comparative philology has now made it possible to determine with certainty (in most cases) whether any particular Greek word had originally this consonant or not. The letter, as used in modern works treating historically of the Greek language, is commonly printed  $\epsilon$ .

**Digby**, SIR KENELM (1603-65), was born at Gayhurst, near Newport Pagnell, son of Sir Everard Digby (1578-1606), who turned Catholic, and was hanged for his part in the Gunpowder Plot (q.v.). Kenelm himself was bred a Catholic, but in 1618, after a half-year in Spain, entered Gloucester Hall, Oxford (now Worcester College). He left it in 1620 without a degree, and spent nearly three years abroad, in Florence chiefly. At Madrid he fell in with Prince Charles, and following him back to England, was knighted, and entered his service. In 1625, after a singular courtship, he secretly married 'that celebrated beautie and courtezane, Venetia Stanley (1600-33), who had been his playmate in childhood. With two privaters in 1628 he vanquished a French and Venetian squadron off Scanderoon. On his wife's death he passed two hermit-like years, diverting himself with chemistry at Gresham College. In 1636 he announced his reconversion; and his tortuous conduct thereafter was dictated, it seems, by his zeal for Catholicism. He was imprisoned by the Parliament (1642-43), and had his estate confiscated; was at Rome (1645-47), where he finished by 'hectoring at his Holiness'; and thrice revisited England (1649-51-54), the third time staying two years, and entering into close relations with Cromwell. At the Restoration, however, he was well received, and retained his office of chancellor to Queen Henrietta Maria. He was one of the first members of the Royal Society (1663).

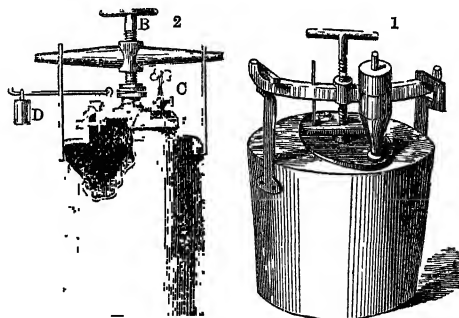
'The very Pliny of our age for lying,' said Stubbes of Digby, whom Evelyn terms 'an arrant mountebank.' Yet he was a friend of Descartes and Sir Thomas Browne; he could appreciate the discoveries of Harvey, Bacon, and Galileo. Sir Sidney Lee points out, that 'as a philosopher—an Aristotelian—Sir Kenelm undoubtedly owed much to Thomas White; and he questions whether his much-vaunted 'powder of sympathy' was not really invented by Sir Gilbert Talbot. Digby said he got the secret from a travelled Carmelite; and the specific was made of 'powder of vitriol' (copperas or some other sulphate), and was applied to a bandage, not to the wound. Digby's Discourse thereon (1658), like his *Treatise of Bodies and of Man's Soul* (1644), contains much that is curious, if little of real value. His *Discourse concerning the Vegetation of Plants* (1660) is the chief of his other twelve works.

See his bombastic *Memoirs*, dealing with his courtship (ed. Nicolas 1827); his *Scanderoon Voyage* (Camden Society, 1868); the Life of him 'by one of his descendants,' Le T. Longueville (1896); and H. M. Digby's *Sir Kenelm Digby and George Digby, Earl of Bristol* (his cousin, 1913).

**Digby**, KENELM HENRY, was born in 1800, youngest son of the dean of Clonfert. Having entered Trinity College, Cambridge, he took his B.A. in 1819, and three years later published the *Broad Stone of Honour*—'that noble manual for gentlemen,' as Julius Hare called it, 'that volume which, had I a son, I would place in his hands, charging him, though such admonition would be needless, to love it next to his Bible.' It was much altered and enlarged in the 1828 and subsequent editions (the latest 1877), its author having in the meantime turned Catholic. He died in London, where most of his long life was spent, on 22d March 1880. Of fourteen other works (32 vols. 1831-74) all the last eight were poetry.

**Digest**, a name often given to the Pandects (see JUSTINIAN) of the Roman law, because they contained 'Legalia præcepta excellenter digesta.'

**Digester**, PAPIN'S, is a strong boiler with a closely fitting cover, in which articles of food may be boiled at a higher temperature than 212° (100° C.). As its name implies, it was invented by Papin (q.v.), and a common form is the *Autoclave*, fig. 1, where the lid can be turned round under clamps or ears, and thus be rendered steam-tight. Another form is given in fig. 2, where a portion of the side



Papin's Digester.

is removed to exhibit the interior. The lid, A, is fastened down by a screw, B, and the steam generated in the boiler is allowed to escape at a stop-cock, C, or by raising the weighted valve, D. The increased pressure to which the contents of the boiler are exposed causes the boiling-point of the water to rise to 400° (204° C.), and occasionally higher. The digester is of great value as a means of preparing soups of various kinds, and especially in the extraction of gelatin from bones.

**Digestion** is the change which food undergoes in order to prepare it for the nutrition of the animal frame, and is carried on in the higher animals in the DIGESTIVE SYSTEM. In some of the lowest forms of animal life (amœbæ) particles of food may be drawn into the body (which possesses no special organs at any part of its surface), and may then be digested. In higher organisms, however, parts have become evolved, which serve more especially the function of digestion. Thus in the common sea anemone there is a simple pouch which leads inwards from the centre of the cluster of tentacles. Into this fish and other food are drawn and digested, while the undigested parts are afterwards voided through the same aperture by which they entered. In still higher organisms, man himself included, this simple pouch is changed into a complex and greatly elongated tube, which is provided with one aperture (the mouth) by which food enters, and another aperture (the anus) through which undigested matter leaves the body. The whole digestive system is lined with a soft mem-

brane, which is richly supplied with blood-vessels. This membrane is called the mucous membrane, and from it is secreted by the glands which it contains a viscid substance called mucus. If the finger be thrust into the back of the mouth, and the mucous membrane gently scraped, the fluid which will adhere to the finger is seen to be viscid: it is secreted by the glands of the mouth. Not only mucus, but many other substances useful in digestion are formed by little glands in the mucous membrane, so that the whole digestive system is bathed during digestion with fluid having a digestive action on the food. In addition there are other glands, such as the salivary, the liver, and the pancreas, which we may look upon as glands of the mucous membrane which have enormously developed. To so great an extent have they increased in size that they have got far outside the digestive system, and have become situated in neighbouring parts of the body, only connected with the digestive system by their ducts or elongated mouths.

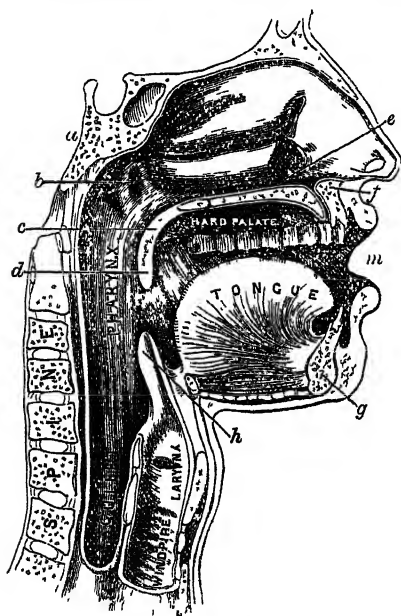


Fig. 1.—Section through Mouth, Nose, &c. :

*a*, sphenoid bone; *b*, Eustachian tube; *c*, soft palate; *d*, uvula; *e*, nasal passage; *f*, upper jaw; *g*, lower jaw; *h*, epiglottis; *m*, mouth.

Through these ducts their secretions, like that of the microscopic mucous gland, pour into the cavity of the digestive system. Outside the mucous coat we have the muscular coat, the function of which is to move the food onwards in its course, and to mix it with the digestive juices. In the mouth, throat, and the upper part of the gullet, the muscles which move the food onwards, as in swallowing, are, when examined by the microscope, seen to be transversely striped, and like other striped muscles their contraction is rapid. In other parts of the digestive system, however, the muscular coat consists of smooth muscle, and like all other smooth muscles this coat contracts slowly. On this account the food rapidly swallowed passes very slowly along the rest of the digestive system.

Having shown that the digestive system is a muscular tube, we may now consider it more in detail. The mouth (fig 1, *m*) is lined with mucous membrane, and into it is poured the secretion of three pairs of salivary glands—the parotids, situ-

ated in front of the ear; the submaxillary, within the angle of the lower jaw; and the sublingual, under the tongue. The mouth in most animals is provided with hard tissues—teeth, beaks—for the subdivision of food before it is swallowed. Vegetable feeders, eating tough grains, roots, and fibres, have large molar or grinding teeth, while the carnivora have these same teeth modified so as to present a cutting edge, with which and their pointed canines meat is torn and cut into pieces, which are then swallowed (see **TEETH**). The mucous membrane of the mouth is covered externally by the muscles of the cheek and lips. Into its cavity the muscular tongue projects. On looking into the mouth with a looking-glass, one sees back into the throat. The entrance to the throat will be observed to be bounded at the sides by two muscular curtains passing downwards obliquely to the sides of the root of the tongue. These are termed the anterior pillars of the fauces, and behind them, one on each side, are masses of lymphoid tissue, subject to enlargement, called the tonsils. Above, another curtain hangs down. It is called the soft palate, and separates the mouth from the hinder part of the nasal cavity. Projecting from its centre is a little cone called the uvula (fig. 1). The cavity of the pharynx, or the interior of the throat, is another cavity lined by mucous membrane, with muscular walls. These muscles constrict it (constrictors). Below, the cavity passes into the gullet or oesophagus, and in front of this tube runs the windpipe which communicates with the pharynx through the larynx, or organ of voice. Food will pass through the pharynx into the gullet; and air, during inspiration, passes through the pharynx on into the larynx and windpipe; a valve, called the epiglottis, partly closes the aperture of the larynx. The pharynx is common, therefore, both to the digestive system and the respiratory passages. Above, the pharynx communicates, as before described, with the mouth and also with the nose. One can demonstrate this latter fact by drawing smoke into the mouth, and expelling it by the nostrils. This communication is closed during the act of swallowing, and also during the singing of pure vowel-sounds, such as *ā*, *ō*, *ū*, and the closure is effected chiefly by the elevation of the soft palate, which acts as a valve. The pharynx communicates in addition with the mid-

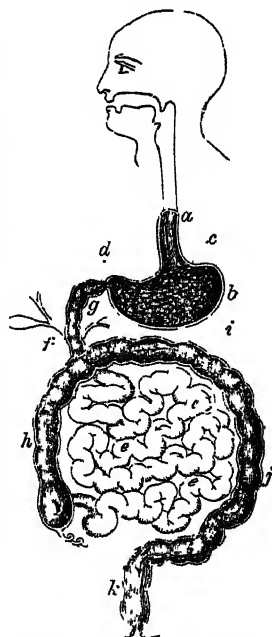


Fig. 2.—Human Alimentary Canal :

*a*, oesophagus; *b*, stomach; *c*, cardiac orifice; *d*, pylorus; *e*, small intestine; *f*, biliary duct; *g*, pancreatic duct; *h*, ascending colon; *i*, transverse colon; *j*, descending colon; *k*, rectum.

dle ear by the Eustachian tubes, and this may be rendered evident if the mouth and nose be closed, and a violent expiratory effort made at the same time. As the pressure of air within the throat is increased, the Eustachian tubes which

previously were collapsed now become distended, and a little wave of air at high pressure is forced into the middle ear, causing a buzzing sound. Occasionally the middle ear communicates with the external air through congenital or acquired apertures in the membrana tympani. In these cases smoke may be propelled from the throat out of one or both ears.

The gullet or oesophagus (figs. 1, 2, and 3) is a long tube passing from the pharynx to the stomach. Its mucous coat is loaded with very large mucous glands, which secrete a quantity of very viscid mucus. Its muscular walls contain striped fibres in the upper, unstriped in the lower part. The stomach itself is a greatly dilated part of the digestive system. Its shape is indicated in the fig. It may be said to consist of two parts, even in the human subject; a more complex arrangement is found in many animals, such as the ruminants. The large dilated portion into which the gullet opens is termed *cardiac*, and the opening the cardiac or oesophageal opening. The narrow part opening into the duodenum is the pyloric part, and the opening the pyloric opening. The whole is lined with mucous membrane, which, in the empty stomach, is thrown into projecting folds or rugae, but these folds are effaced when the organ is distended with food (fig. 3). In the

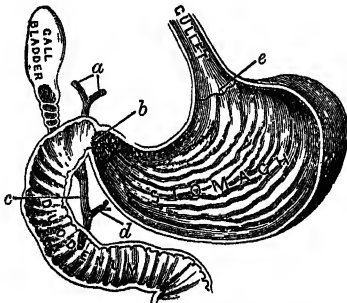


Fig. 3.—Section of the Stomach :

a, ducts of liver; b, pylorus; c, bile duct; d, pancreatic duct, e, cardiac orifice.

membrane are innumerable glands, which secrete the digestive juices of the stomach (fig. 4). If the surface of the membrane be examined with a strong pocket-lens, the apertures of these little glands may be seen. They run down from the surface into the deeper parts of the mucous membrane. They are lined by secreting cells. The greater number of glands situated in mucous membranes have the simple structure diagrammatically represented in fig. 4. Each gland has a mouth or short duct lined by cells. Below this the little tube is lined by cells which secrete the juice peculiar to the gland. This secreting part sometimes branches. Outside the gland blood-capillaries ramify, which supply the gland with nourishment, enabling it to manufacture the substances which it secretes. The gastric juice is acid, and the chief acid secreted is hydrochloric acid. This is formed at the cardiac, but not at the pyloric end. The substance called *pepsine*, which is necessary for digestion, is secreted by the whole of the glands. The cardiac glands therefore secrete both substances, and they possess two sorts of cells, those which form the hydrochloric acid being bigger and more granular than the other sort which secrete pepsine. The pyloric glands secreting pepsine have only one kind of cell similar to the pepsine-secreting cell of the cardiac end. Outside the vascular and glandular mucous coat, and united to it by a loose delicate

layer—submucous coat—is the muscular coat. This is similar to that of the rest of the alimentary canal, except that there are in addition to the circular and longitudinal fibres, many oblique fibres. The circular fibres are very thick indeed at the pyloric aperture, forming a circular sphincter band, which contracts and keeps back the food in the stomach until gastric digestion is nearly completed.

The food, now called the *chyme*, passes into the small intestine, a tube some 20 feet long. This tube, besides the muscular and mucous coats, possesses in addition an external coat of loose fibrous tissue, covered by a single layer of flat epithelial cells. This coat is prolonged into, and helps to form the mesentery, a membrane connecting the intestine with the abdominal walls, which are lined with a similar fibro-epithelial coat. This membrane is called the peritoneum, and is sometimes inflamed (peritonitis) as a result of cold, injuries, &c. The small intestine is somewhat arbitrarily divided into three portions—the upper (duodenum), the middle (jejunum), and the lower (ileum). In all parts the muscular coat is similar to that of the rest of the digestive system. The mucous coat contains glands very like the pyloric glands of the stomach, called Lieberkuhn's follicles. These, however, rarely branch. They secrete the intestinal juice. In the duodenum, one finds in addition highly-branched glands called Brunner's. These extend right down into the submucous coat. Little is known concerning their function. In both the mucous and submucous coats, and generally involving both layers, are found masses of tissue—lymphoid—similar to that found in a lymphatic gland (fig. 6). These are termed solitary glands, but it must be understood that they do not secrete any juice concerned in digestion. Their function is probably connected with the blood and the blood-corpuscles. Collections of these solitary glands,

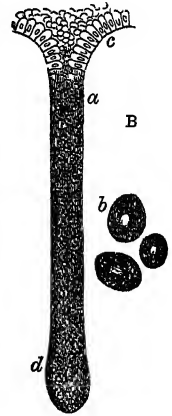


Fig. 4.

B, cardiac gland from the middle of the human stomach, magnified about 150 diameters: a, wall of the tube, lined with large oval nucleated cells; b, the same cells isolated; c, nucleated cells of columnar epithelium, occupying the upper parts of the tubes; d, blind extremity of the tube.

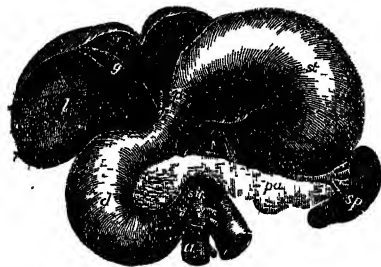


Fig. 5.—The under surface of the Stomach and Liver, which are raised to show the Duodenum and Pancreas: st, stomach; p, its pyloric end; l, liver; g, gall-bladder; d, duodenum, extending from the pyloric end of the stomach to the front, where the superior mesenteric artery, sm, crosses the intestines; pa, pancreas; sp, spleen; a, abdominal aorta.

forming oblong patches about two inches long, are called Peyer's patches. These are affected in typhoid fever. In addition to the follicles of

Lieberkuhn and the glands of Brunner, there are two very important glandular structures, the liver and the pancreas, which pour their digestive juices into the small intestine (fig. 5). The bile, which is the secretion of the liver, is formed continually by that organ, but the amount thus formed is greatly influenced by the kind and quantity of food taken. It passes out of the liver by the two hepatic ducts, and much of it passes by the cystic duct into the gall-bladder, where it is stored up.

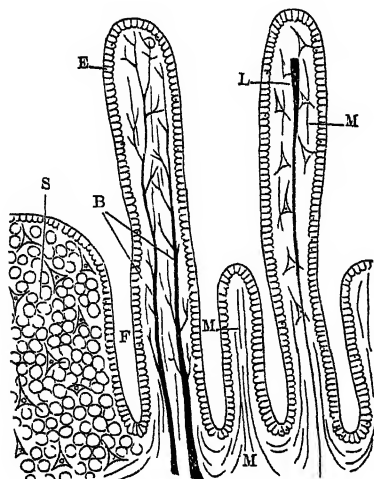


Fig. 6.—Section of Intestinal Mucous Membrane : L, lacteal in centre of villus; E, epithelium covering villus; B, blood vessels represented; F, follicle of Lieberkuhn; S, part of a solitary gland; M, muscular fibres.

From this the bile passes into the common bile duct, which joins the duct of the pancreas, and the two open into the duodenum by a common aperture. The bile is to be looked upon not only as a digestive juice, but as a drain or channel of excretion, whereby effete and useless matters are removed from the body. The flow of bile is easily restrained, as by inflammation of the duct, or the presence of a tumour pressing on the duct, or a gall-stone. In this case, the bile already formed is reabsorbed with the blood, through the lymphatics, and we have jaundice due to absorption of the colouring matter of the bile. The secretion of bile goes on before birth; the meconium of infants consisting chiefly of biliary matter. The pancreas is very similar in structure to a salivary gland. It secretes the pancreatic juice which pours with the bile into the digestive system. The mucous membrane of the small intestine contains, in addition to the structures already mentioned, little projections called villi (fig. 6). These are not, to any great extent at least, secretive, but they are important absorbents. This property they share with the whole of the digestive system, through any part of which, and especially through the walls of the stomach and small intestine, digested matter passes into the numerous blood-capillaries which form everywhere a dense network. The villi are peculiar, however, for each one contains, in addition to blood-vessels, a small lymph-vessel or lacteal. Nearly all the fat absorbed by the digestive system is taken up by the little cells of the villi, and passes on into the lacteals, and thence to the blood (fig. 7). If some osmic acid, which blackens fat, be poured into the intestine of a rabbit, killed during active digestion, and if the villi be examined with a microscope, they will be seen to have been blackened, especially at their

tips, while the rest of the intestine will have preserved its ordinary colour. On further examination it will be seen that the fat has been taken up in microscopic globules by the cells covering the villi, and that they are passing, in a way which is as yet not definitely settled, into the central lacteal.

The small intestine is a tube of great importance, and in order to increase its total area, the mucous membrane is elevated, in the upper part, into transverse folds (the valvulae conniventes, fig 8).

The unabsorbed food, mixed with the various secretions we have mentioned, now passes into the large intestine, when both digestion and absorption go on, although to a less extent. The large intestine is only 5 feet in length, but its girth is much greater than that of the small intestine. It commences with the caecum, a dilated part, into which passes a little blind canal (the vermiform appendix), a large and important structure in some animals. The food remnant (faecal matter) is prevented, under ordinary circumstances, from passing back into the small intestine, by a double fold of mucous membrane (the ilio-caecal valve, fig. 9). The large intestine ascends on the right side (ascending colon), crosses over to the left side (transverse colon), and descends again (descending colon), and makes a bend (sigmoid flexure), and finally terminates in a somewhat enlarged portion (rectum).

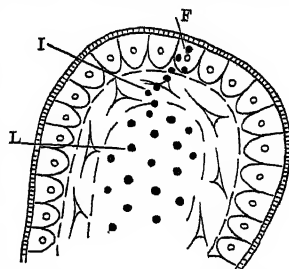


Fig. 7.—The Top of a Villus : Fat globules are represented as passing through one of the epithelial cells, F, on through the tissue of the villus, I, into the central lacteal, L.

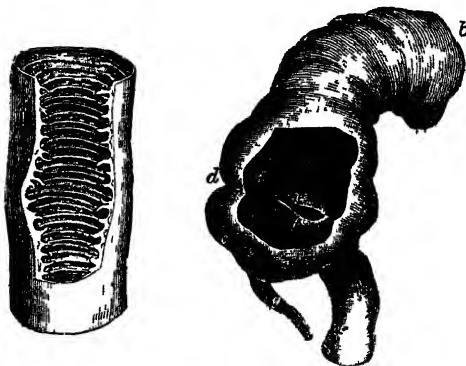


Fig 8—Small Intestine distended and hardened by alcohol, and laid open to show the valvulae conniventes.

Fig. 9.—Caecum inflated, dried, and opened to show the arrangement of the valve : a, termination of the ileum; b, ascending colon; c, caecum; d, a transverse constriction projecting into the caecum; e, f, lips of the valve separating the small from the large intestine; g, the vermiform appendix of the caecum

The anal aperture is closed by muscles, an internal sphincter of non-striped, and an external of striated fibre. The mucous membrane of the large intestine differs from that of the small intestine in containing no villi, or Brunner glands. Lieberkuhn's and solitary glands are present, but the aggregation of the latter into Peyer's patches is nowhere to be found.

*Movements of Food in the Alimentary Canal.*—When food is taken into the mouth it is at once swallowed, unless it is in the solid form. In this case it is chewed or masticated; the use of which is to divide the solid fragments taken into a convenient size for swallowing, for which purpose it, in addition, is mixed with the viscid saliva and juices of the mouth. The chewed food, moreover, is more easily digested, inasmuch as the gastric and other juices can act more readily upon finely divided than upon larger masses of food. Many animals can hardly be said to masticate; such are the carnivora (dog, cat, &c.), and they are not provided with grinding teeth. In most animals living on vegetable food, which frequently consists of hard grains, roots, and fibres, large flat grinding molars are found. In these animals, not only is the food finely divided in the mouth, but the food, largely consisting of starch, is partially digested by the saliva. In mastication, the head is firmly fixed by the powerful muscles of the neck, while the lower jaw is moved upon the upper. The lower jaw is approximated to the upper by powerful muscles (the temporal, masseter, and internal pterygoids), which pass upwards, and are attached to the side of the head and face. Their contraction may be felt by placing the hand in front of the ear and voluntarily contracting the jaws. The lower jaw is depressed by muscles which pass down the front of the neck. Most of these spring from the hyoid bone, which may be felt deep in the tissues of the neck above the 'Adam's apple.' Rotating movements and those of protrusion and retraction of the jaw are produced chiefly by the action of the pterygoid muscles. It is obvious that during mastication the food would naturally tend to escape from between the grinding surfaces of the teeth, and would collect within the mouth and outside the gums. This is prevented, however, by the muscles placed in the substance of the cheeks (buccinators) and lips (orbicularis oris). These keep the cheek and lip walls closely opposed to the outside of the teeth. On this account food will only escape from between the grinders into the interior of the mouth, from which it is collected and pushed back between the teeth by the muscular tongue.

The very complex muscular movements just described result from very perfectly co-ordinated nervous impulses, which pass from the brain to the muscles, and cause and regulate their contractions. One can masticate 'at will'—that is to say, one can consciously cause the muscles to contract. In order that the mastication may be effective, however, it is necessary not only to know the sizes, but also to be aware of the ever-changing positions of the particles of food. This is effected by sensory nerves, which pass to the brain from the mucous membrane of the mouth. Although mastication is frequently voluntary, yet, like most other voluntary actions frequently performed, it can be performed reflexly. In this case the sensory impulses pass from the mucous membrane to the brain, and initiate appropriate motor impulses which pass to the muscles, without exciting attention and special volition in their passage.

As a result of mastication, the food is gathered in the form of a round moist bolus on the upper surface of the tongue (see fig. 1). It is now ready to be swallowed. In the first place, it is pushed backwards by the tongue, and seized by muscles, many of which are attached to the hyoid bone, which can be felt to move during their contraction. According to the most recent investigation, the bolus is propelled with great rapidity through the pharynx and gullet into the stomach. If the finger be placed upon the hyoid bone, or Adam's apple, and the ear placed against the upper third of the back of a patient, the movement of the hyoid bone indicat-

ing the commencement of swallowing is almost coincident with the passage of food down the gullet, which produces a very audible sound. Following the propulsion of the food downwards, there is a wave of contraction, which, commencing in the pharynx, travels downwards through the gullet. This, however, is comparatively slow. It is seen then that swallowing is not due to the falling of liquids down the throat. A horse drinks 'up hill,' and the jugglers, or indeed any one, can drink or swallow with the head vertically downwards.

When the food has reached the back of the mouth, the rest of the act of swallowing occurs irrespective of the action of the will. The nerves, which commence in the mucous membrane of the pharynx and gullet (sensory branches of vagus), carry impressions to the brain, which disengage of themselves the appropriate muscular movements without necessarily involving either the will or consciousness. Thus, in alcoholic stupor, or fainting from drowning, in both of which conditions consciousness is suspended, food and liquid placed at the back of the mouth are at once swallowed.

There is a possibility that during swallowing the food may go the wrong way—i.e. it may pass into the larynx and windpipe. It will be seen from the diagram that the food in its passage to the gullet must actually pass over the aperture of the larynx. It is prevented from passing into it by the elevation of the larynx (this can be felt by the hand placed on the throat), which pushes its aperture against and under the back of the tongue, which at the same time is pushed backwards. In addition, there is a valve called the epiglottis, which is pushed down over the larynx by the movement just described, and by muscular fibres, which act upon it for that especial purpose. If the epiglottis be destroyed, as by ulceration, gun-shot wounds, &c., it is necessary for the patient to have the food he takes carried over the aperture of the larynx into the gullet by a feeding-tube. It is obvious that one cannot speak with the larynx shut, and with the larynx open we cannot safely swallow. Food is prevented from passing into the nose by the elevation of the soft palate which meets the constricting pharynx, and shuts off the cavity of the nose like a valve (fig. 1).

The walls of the stomach and intestine are, like the gullet, provided with muscular fibre. An external layer passes in the length of the gut, and within this is a circular layer. These muscles, unlike the muscles of the limbs, contract slowly on stimulation, and they are outside the domain of voluntary action. During digestion they contract peristaltically, urging the food towards the rectum. The peristaltic waves may begin in any part of the gut and pass slowly downwards, followed at varying intervals by other waves. It is probable that what is called antiperistaltic waves may occasionally occur, tending to bring the food back towards the mouth, for bilious matter is frequently vomited, the bile having in all probability passed upwards into the stomach by antiperistalsis from the duodenum.

Eruptions are frequently caused by antiperistalsis, and by a movement of this kind food is brought back into the mouth for further chewing in the ruminants (sheep, oxen, &c.). The peristalsis is particularly active during digestion, and is produced in great part by the food stimulating the mucous membrane. If a portion of the intestine or the stomach be removed from the body, peristalsis may continue or may be produced artificially, especially by irritating the mucous membrane. In the body the canal is under the influence of additional nerves (vagus), through which fibres the digestive processes are chiefly regulated among themselves.

The peristalsis in the stomach is combined with irregular churning movements.

The act of vomiting is a reflex nervous act. It can be excited by stimulating the branches of the vagus nerve, which are distributed to the stomach, as when indigestible and irritative food is taken; or emetics, such as mustard, hot water, or a hot saline solution, tartar emetic, ipecacuanha, sulphate of zinc, and alum are administered. By tickling the back of the throat with a feather, the glossopharyngeal nerve is stimulated, and vomiting may readily be produced. It is of frequent occurrence when painful irritation of the uterine nerves in pregnancy, of the nerves of the liver and kidneys during

the passage of a hepatic or renal stone, or indeed when irritation of any sensory nerves takes place. Nerve-impulses may pass to the brain through any one of these channels (fig. 10), or may be excited in the brain itself by the sight or smell or even the thought of anything disgusting, and they produce, if the person be conscious, a feeling of nausea. In any case there is a discharge of nerve-impulses, which, as a result of this stimulation, passes to the glands of the mouth through the chorda tympani nerve, and produces a rapid flow of saliva. In addition, motor nerves carry impulses to the muscular walls of the abdomen, and to the walls of the stomach itself. As a result of the muscular contraction which follows, the contents of the stomach are propelled upwards into the mouth. Just before vomiting an inspiration generally occurs, and the aperture of the larynx (glottis) is closed.

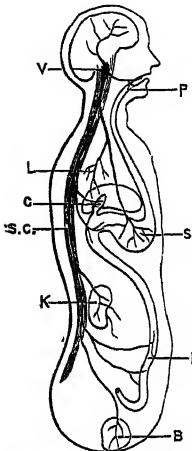


Fig. 10. — Sensory Nerves concerned in Vomiting:

Nerves come to vomiting centre V, through spinal cord SC, from pharynx P, lungs L, gall-bladder G, stomach S, kidney K, intestine I, and bladder B.

The diaphragm—the muscle which separates the thorax from the abdomen—then becomes pressed down upon the abdominal contents, and assists in the act of vomiting. Cases in which irritating or poisonous substances are swallowed are so frequent, that every one should be aware that a large quantity of hot liquid, especially if it contain much salt, or some mustard, forms a safe and speedy emetic. Ice is a valuable sedative, and often prevents vomiting. The undigested food when it reaches the lower part of the intestine (rectum), excites sensory nerves which carry impulses to the brain and spinal cord. A feeling of distension results, and voluntary contraction of the abdominal muscles and of the diaphragm—an inspiration usually taking place—expels the undigested matter. This voluntary effort is aided by the contraction of the bowel itself, and by the relaxation of the band of muscular fibres (sphincters) which, during the intervals between evacuations, remain contracted.

In many animals, such as the sheep, ox, and camel, the stomach consists of several cavities communicating with one another. In the ox and sheep both the cardiac and the pyloric portions are each subdivided into two compartments. The cardiac part consists of a very dilated cavity, the paunch (rumen), into which the food is passed as soon as swallowed. In addition there is a smaller part, the reticulum (honeycomb), so called from the folds of lining mucous membrane which intersect, forming a reticulum. The pyloric half is divided into two

parts. The psalterium (maniples), so called from the lamellated appearance of its mucous membrane, communicates with the last division, the rennet stomach (abomasum, fig. 11).

Fluid passes either into the first, second, or third parts of the stomach, and thence on into the fourth. Solid matter, such as grass, roots, &c., passes either into the paunch or reticulum. This is mixed with the saliva swallowed with it, and in addition it is mixed with juices formed by the mucous membrane of these cavities. When the animal has finished feeding, it lies down and rumination commences. Due in part to the contraction of the abdominal muscles and diaphragm, the food is propelled in the form of rounded pellets from the paunch and reticulum up into the mouth. The pellets are there thoroughly masticated, and are returned in a pulpy condition to the stomach. Now, however, the food passes into the psalterium, and finally into the rennet stomach. It will be seen, therefore, that the consistency of the food determines into which part of the stomach it passes. The walls of the stomach near the gullet are thrown into two folds

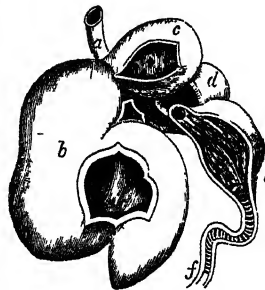


Fig 11.—Compound Stomach of Ox:

a, cesophagus; b, rumen, or paunch; c, reticulum, or second stomach; d, omasum, or third stomach; e, abomasum, or fourth stomach; f, the duodenum.



Fig. 12.—Alimentary Canal of Fowl:

a, cesophagus; b, crop; c, proventriculus, or secreting stomach; d, gizzard, or triturating stomach; e, intestinal canal; f, two long caecal tubes indicating the theoretical commencement of large intestine

or lips which, when in contact, form a tube leading from the gullet into the psalterium. Along this tube the masticated and fluid food can pass. The mouthfuls of grass which are first swallowed pass between their lips, and find their way at once into the paunch or reticulum.

In the bird some interesting modifications in the structure of the alimentary canal are seen (fig. 12). The gullet at about the middle of its course is provided with a pouch or crop. Into this the food passes, and is bathed by a secretion formed by its glands. It is then propelled onwards into a dilated cavity, the proventriculus, and is acted on by digestive juices. Thence it passes into the gizzard. This cavity is provided with muscular walls of enormous thickness in the case of birds that are vegetable-feeders. It is lined by thick and corneous epithelium, and in its interior are generally found pieces of stone, chalk, &c. The gizzard is a powerful mill, which grinds the food into a soft pulp, upon which the digestive juices can readily act (see BIRD).

*The Action of the Digestive Juices.*—By digestion is meant that process by which food is rendered capable of passing through the walls of the digestive system into the blood-vessels and lymphatics, in such a form that it may be of use to the economy. The most essential change which food undergoes is one of solution. Many proteins, starch, fat, and other food-stuffs are quite insoluble in the circulating fluids of the body, and were they injected into the blood they would simply block up the smaller blood-vessels. During digestion these pass either into nearly allied chemical substances which are readily dissolved in water, or in the case of fat partly into a soluble soap, and partly into a state of microscopically minute subdivision. It is not sufficient, however, merely to have a soluble food-stuff in order that it may be absorbed and used by the body. Cane (table) sugar is soluble in water, but it is of no use as cane-sugar to the body. If injected into the blood-vessels, it is at once secreted by the kidneys. During digestion it is converted into another sugar less soluble, but in a form which can be used by the economy.

It must clearly be understood that food introduced into the stomach is not received into the system. It is still 'outside the body.' It is only when it has become absorbed, and has passed in a suitable form, carried by the blood, to the tissues or the brain, muscles, &c., that it is made use of in so-called vital manifestations. The relief and stay that a meal gives is chiefly due to nervous action, the result of gastric distension. Clay and other non-nutritive matter may be swallowed, and will temporarily produce the same effect.

The digestion of food is brought about by the action of juices, the saliva, the gastric, pancreatic, intestinal, &c. These are mixed with the finely divided food by the movements of the alimentary canal. The digestive juices are in all cases secreted by the microscopic cells which line the various glands opening into the digestive system. The digestive juice, whatever be its source, contains either an acid substance or an alkaline one, and in addition a substance termed an unorganised ferment. These ferments differ in many particulars from the organised ferments (bacteria, micrococci), found in putrefaction, diseases such as anthrax, scarlet fever, cholera, &c. The latter are whole living cells, having definite parts or organs. They live and multiply, consume, and excrete in the fluid they inhabit. The digestive ferments are not whole cells, they are the *products of cells*. They are not the broken-down useless substances, such as carbonic acid, water, &c., which all cells give out, and which an animal, like man (an aggregation of cells), excretes. They consist of very complex active matter, of which we know almost nothing, and which we class with some other substances of which we know little more, under the head 'albuminoids.' These ferments in fact possess many of the qualities of cells themselves. They are killed by the temperature of boiling water, like all other living things. They have a certain range of temperature, within which alone they evince activity, and within the limits of that range they are more active the higher the temperature. Then again they require the presence of water, in which fluid they are soluble. In their action they seem to be hydrolytic, that is, they produce important changes in the substances they attach by, amongst other things, adding the elements of water. These digestive ferments, together with the other constituents of the digestive juices, are secreted by the cells of the digestive glands. If we study these glands and their cells with the microscope, they all present several points of similarity. Each gland has a duct, which, as in the case say of the salivary glands, divides into several branches. The duct,

or its branches in the latter case, terminate in the secreting tubules of the gland. These are little tubes, which are lined by the secreting cells, leaving only a small cavity in the centre of each tubule for the escape of the secretion into the duct. Outside the tubule there is a dense network of fine blood-capillaries, from which the liquor of the blood escapes, bathing the gland and the cells within it. These imbibe the liquor, and they have almost certainly the power of selecting such constituents of it as they require. The substances derived from the blood are used by the cells, which manufacture the juice which they excrete. The constituents of the excretion are not found, it will be observed, in the blood; they result from chemical processes which go on within the cells, which use blood as a raw material. The cells are very small, being about  $\frac{1}{1000}$ th to  $\frac{1}{100}$ th of an inch across. They have each a very thin envelope, within which the finely granular contents of the cell are seen. In the centre is a kernel or nucleus. During digestion the cell enlarges, and granules appear in it. These are the manufactured products: they are discharged into the duct of the gland.

We have now to consider how it is that the glands are regulated in their secreting powers, how it is that at certain times, and in sufficient quantity, the secreting juice is poured into the digestive system. This is brought about by the action of the nervous system. Although in some cases—e.g. the stomach, local nerve-cells placed in the walls of the digestive system itself, seem to regulate in part the secretion, yet in all cases nerve-cells placed in the brain are chiefly concerned. It was thought at one time that the brain acted by causing the blood-vessels of the gland to enlarge, and in consequence the food-supply and secretion of the gland to become greater. That this is not the whole truth, is shown by the administration of belladonna. If a rather large dose of this drug be taken, the mouth becomes very dry and unpleasant, and it is difficult to speak and to swallow. In other words, the cells of the salivary glands are paralysed, and the customary flow of saliva is for the time being at an end. It is found, however, that during this condition the blood-vessels are by no means contracted. This experiment, together with others, suggests that although during the secretion of a digestive juice the blood-vessels dilate, the activity of the secreting cells is not always associated with the condition of the blood-vessels. The latter are undoubtedly under the influence of nerves (vaso-motor) which regulate their condition, and it is probable that the secreting cells are themselves under the influence of other nerves, which are special secreting nerves. We have already seen that in the case of the movements of the digestive system, the motor-impulses which started from the central nervous system were called into action by sensory impulses starting from the mucous membrane of the digestive system. So in like manner the nervous impulses which pass to the blood-vessels and the glands are caused, in the first instance, by sensory impulses from the mucous membrane. If food be taken into the mouth, especially if it be 'tasty,' a secretion of saliva rapidly follows, and even the tickling of the mouth by a feather, or the stimulation of the mucous membrane with electricity, will produce the same result. In this case sensory impulses pass to the brain through such nerves as the lingual and glossopharyngeal, and reflexly excite the glands through the medium of the brain, the outgoing impulses passing through nerves such as the chorda tympani (fig. 13). See BRAIN. In the case of salivary secretion, the smell or sight of food may excite a secretion. In this case the sensory impulses pass from the nose or eye along the nerves of these organs to the brain. When the thought of food produces a flow,

this is due to the recalling of previous sight and smell impressions in the brain.

When food is passed into the stomach, secretion occurs. This too may result from mechanical irritation, as when through an opening (fistula) the mucous membrane is brushed with a feather. In all cases the stomach, pale before, becomes suffused with blood, and the gastric juice is poured out.

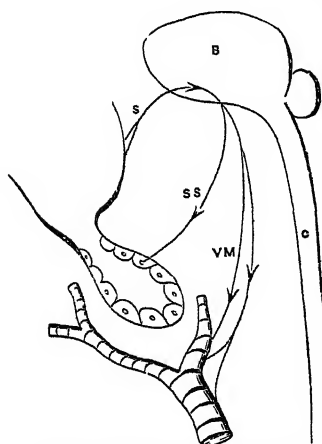


Fig. 13.—Nervous Mechanism of Secretion:

B, brain; C, spinal cord; S, nerve passing from mucous membrane of mouth to brain; SS, nerve passing to cell in salivary gland; VM, nerve passing to blood-vessels of gland.

various glands play in this important process. For our present purpose it is sufficient to speak of foods as belonging to four classes: (1) Proteins—albumens, globulins, &c.—e.g. the white of egg, the chief constituent of meat, the gluten of bread. (2) Carbohydrates—starches, sugars, gums—e.g. potato-starch, cane or grape sugar. (3) Fats and oils—e.g. suet, marrow, olive-oil. (4) Minerals—e.g. water, table-salt, iron, phosphates. See also DIET, FOOD, VITAMINS.

Some few substances are absorbed without being digested at all; they do not need to be. Such are water and the minerals, although even many of these undergo some change or other. Grape-sugar is absorbed, and probably proteins too are often absorbed to some extent at least. Fat is profoundly modified during digestion, although not necessarily as the result of any digesting ferment. It may be said, however, that the great mass of food-stuff which is classed under the heads of proteins and carbohydrates is all digested by the action of ferment-like bodies. The saliva, of which about 30 ounces are secreted during the 24 hours, contains a ferment termed *ptyalin*, which is capable of turning starch into a soluble sugar called *maltose*. This can easily be demonstrated in the following manner: Take a tiny pinch of ordinary starch powder, and shake it up with a tablespoonful of water. It will not dissolve. Then boil it, when the starch will swell up, forming a thin starch paste. Dilute a few drops of tincture of iodine with several volumes of water, and add a drop of this to a small quantity of the starch paste. It will become of a rich blue colour. This is the test for starch. Now add to some of the original starch paste about one-quarter of its volume of saliva from the mouth, and keep the mixture by the fire at a temperature pleasant to the hand. In a minute or so take out some of the starch in order to test it again. The iodine no longer gives a blue colour, but produces a beautiful mahogany brown.

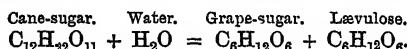
This shows that the starch has disappeared, the brown colour being the reaction given by erythro-dextrine into which the starch has been converted. After a little time another portion tested in a similar way gives no reaction whatever, the erythro-dextrine having in its turn disappeared. The starch is now converted into sugar, mixed with a little unconverted dextrine. The *ptyalin* may be extracted from the saliva or from the salivary glands themselves. It does not appear to be much exhausted during its activity, and has the general characters already discussed of unorganised ferments. The saliva is alkaline, and the starchy food is no doubt partly converted into sugar during its sojourn in the mouth and gullet by its action. When the food has reached the stomach and the acid gastric juice has mixed with it, the saliva is unable to act, and is probably killed. This mixture does not take place until the gastric juice has been secreted, and until the churning movements of the stomach have commenced. As this does not take place for, say, a quarter of an hour after food has entered the stomach, the swallowed saliva has time to act, and to convert a large quantity of the starch into maltose. Any undigested starch is subsequently converted into sugar when the food reaches the small intestine by the pancreatic juice.

When the food reaches the stomach it causes a reflex secretion of gastric juice. This is but slowly produced when insipid heavy food, such as coagulated white of egg, boiled meat, sago, &c., is eaten, but flows readily when soups, broths, and fluids containing salts and extractions in abundance are taken. Thus we have a scientific reason for commencing a dinner with soup, preserving the *pièce de résistance* until the stomach has secreted gastric juice for its digestion. The gastric juice, several pounds of which are secreted daily, is acid in reaction containing free hydrochloric acid. In addition lactic and butyric acids are formed during the progress of digestion. The ferment peculiar to the stomach is termed *pepsine*, and it requires, unlike the *ptyalin* of the saliva, an acid medium for its action. Pepsine and hydrochloric acid convert proteins into substances termed *peptones*. The latter bodies are soluble in water, and are not coagulated by boiling like many of the proteins. In addition they pass readily through an animal membrane, and are therefore easily absorbed. The protein does not pass directly into the peptone, but like the starch is changed into at least one intermediate body. In the first case the protein becomes converted by the hydrochloric acid into what is called *syntonin*, or acid protein, and it is this *syntonin* which alone the pepsine has power to change into *peptone*. The *syntonin* becomes a *propeptone* which is intermediate in its properties between a protein and peptones itself. It is very probable that the whole change from protein to peptone consists in some simple change in the molecular character of the protein, together with the addition of water. A peptone may be termed therefore a hydrated protein, and the pepsine a hydrolytic ferment. Within the stomach, and capable of being readily extracted from the stomach of a calf, is a ferment called the milk-coagulating ferment (*rennet*). This causes milk to coagulate, and form a clot or curd. It subsequently contracts and squeezes out some fluid termed the whey. It is difficult to assign any use to this ferment, for the acid of the gastric juice would cause of itself the milk to curdle. Still more difficult is it to explain the existence of a similar ferment in the pancreatic juice, for we cannot suppose that any milk can even pass through the stomach to be subjected to its action. The milk indeed often forms dense clots which cannot afterwards be digested, and which cause

considerable gastric irritation. Milk when drunk is frequently found to disagree with some stomachs; but even in such cases it may often be 'sipped' with impunity. In this case the formation of large clots is prevented. Lime-water causes the milk to coagulate in small soft clots.

The products of digestion,  $\gamma$  ptone and sugar, together with water and many soluble salts, are absorbed into the blood-vessels which ramify in the gastric mucous membrane. When gastric digestion is over, the undigested food (chyme) passes through the relaxed pyloric sphincter into the small intestine. The chyme consists of some protein and starchy matter, together with fat and oil and indigestible substances, such as vegetable fibre, pure wax, cartilage, &c. mixed with gastric juice. Intestinal digestion is an alkaline one, and all the digestive juices of this part of the digestive system are alkaline in their reaction. They soon counteract the acidity of the chyme, which now becomes alkaline. The alkaline pancreatic juice, indeed, flows as soon as an acid is introduced into the duodenum, and the explanation of this flow is as follows: The secretion of the duodenum contains a substance called 'prosecretin.' This when acted upon by the acid gastric juice forms 'secretin,' which, when absorbed and carried by the blood to the pancreatic cells, causes them to secrete their juice. The proteins which remained undigested by the stomach are now acted upon by a ferment called trypsin found in the juice of the pancreas. This converts the proteins into peptones through an intermediate propeptone. The protein is said to be broken down by this trypsin into amino-acids, such as leucine and tyrosine, &c., in large amount. We must remember, however, that an experiment with a glass vessel—in which most of the experiments were made—is quite different from the digestion of an animal, where the products are being continually removed through the absorbing mucous membrane. It is, therefore, a question whether the peptone is absorbed at once, or whether it is further broken down in the intestine. We now come to a subject which has been elucidated during the last few years, chiefly through the labours of Pawlow and Starling. The fresh juice of the pancreas has a very slight action on proteins—so slight, indeed, that a careful experimenter like Claude Bernard overlooked its action. If fresh pancreatic juice and fresh intestinal be mixed together, the mixture has a most powerful action on proteins. The explanation of this is as follows: The intestinal juice contains a ferment which has been termed enterokinase, which is able to convert a precursor of trypsin, termed trypsinogen, into the active ferment trypsin. The trypsinogen has no action on proteins. The pancreatic juice contains other ferments which operate during digestion, notably a hydrolytic ferment, similar in its action to ptyalin, whereby the remaining starch is converted into sugar. The juice itself is thick and viscous. It is strongly alkaline and secreted in rather small quantity. It is said to possess a ferment capable of splitting oil and fat into glycerine and fatty acid, which it does by adding water to the fat, which is then decomposed. The fatty acid unites with the free alkali present, and a soap is formed which is subsequently absorbed. The alkaline contents of the alimentary canal also emulsify fat; i.e. they cause it to become very freely divided, forming a milky fluid. The minute microscopic globules which result pass readily through the walls of the alimentary canal into the lymphatics (lacteals). The emulsification of an oil can readily be shown by adding about half its volume of carbonate of soda (3 per cent.) solution to cod-liver oil.

The intestinal juice, the secretion of Lieberkuhn's follicles, is strongly alkaline. It assists in the digestion of starch and of protein matter. In addition an important ferment called 'invertin' is found. This has the power of changing cane into grape sugar and an allied substance, levulose. Both these bodies have the same formula, but differ from one another in their action on polarised light:



The importance of this ferment will be appreciated when we consider how large a quantity of food is taken in the form of cane-sugar, and that cane-sugar introduced into the blood is not of any use to the body, and is eliminated at once by the kidneys. The bile may be looked upon both as an excretion from the body and as a digestive juice. The colouring of the faeces and urine is due in part to a pigment hydrobilirubin (urobilin), which is an altered bile pigment. If bile is excreted rapidly, the faeces are dark in colour, and they may be white owing to deficient excretions. Many substances such as mucin, cholesterin, &c. found in the bile are excreted to form part of the faeces. On the other hand many bile constituents, such as the bile salts, are reabsorbed and used again in the economy. Bile has an important action in digestion, as may be shown by making biliary fistula in dogs, whereby the bile leaves the body at once through an aperture in the abdomen. In this case the animal loses flesh; the fat which it takes with its food passes unabsorbed through its digestive system, and its excretions are offensive. The bile seems then to assist in fat absorption, and to have some antiseptic action whereby putrefaction is prevented or lessened within the digestive system. Bile assists in the absorption of fat not only by assisting in its emulsification, but also by helping in some way or other the epithelial cells, covering the villi to take up the minute fatty particles. In addition it is supposed to stimulate minute muscular fibres within the villi, which by their contraction pump the absorbed fat on into the larger lymphatics.

Within the small intestine most of the food undigested by the stomach is rendered fit for absorption. This takes place through the tissue of the mucous membrane; much of the sugar and peptones find their way into capillary blood-vessels. Absorbed products, and notably fat globules, pass into the lacteals, and thence into the blood, circulating through the veins at the root of the neck. The contents of the lacteals during absorption are called *chyle*. The contents of the small intestine pass into the large intestine, where digestion occurs to a very slight extent. Absorption is, however, more rapid, and the contents become far more solid as they pass towards the rectum, due to the deprivation of water and soluble substances. The absorptive power of the large intestine is important to remember; for injections per rectum of liquid food, especially if it has already been artificially digested, may frequently sustain life for long periods.

*Artificial Digestion.*—The digestive juices are occasionally defective in amount or in quality, and in this case they may be supplied artificially. All the digestive ferments may be separated by very simple processes from the glands which secrete them, and many may readily be obtained in the market. Pepsine and hydrochloric acid, taken with or before a meal, are often of great service, the most reliable preparations of pepsine being the ordinary pepsina porci. Food may be digested *outside the body* before its administration. Beef-tea and milk-gruel may be prepared in the following

way: To bring the food to the proper temperature, boil half of it, mix it with the other half, and keep warm near the fire. To this add a preparation of the pancreatic ferments. The food should now be kept warm for an hour or so, and then boiled in order to prevent any further action of the ferment. It may be taken by the mouth or administered as an enema. Preparations of the pancreas are alone to be used in peptonising food outside the body, as pepsine preparations produce a bitter and unpleasant taste. Pancreatic preparations, on the other hand, are useless when taken with the food, as they are destroyed within the stomach.

See BLOOD, CHYLE, LYMPH, BILE, SALIVA, PEPSIN, ABDOMEN, GLANDS, DIET, FOOD, COOKERY, ALCOHOL, INDIGESTION, VITAMINS, &c.

**Digitalis**, a genus of Scrophulariaceæ, natives chiefly of the south of Europe and temperate parts of Asia. One only, the Common Foxglove (q.v.), (*D. purpurea*), is a native of Britain. Other species have been introduced, notably *D. lutea* and *D. grandiflora*, with yellow flowers.

The leaves of the *Digitalis purpurea*, collected before the expansion of the flowers and dried, are largely used in medicine, either in the form of powder, or as tincture or infusion. Digitalin granules, containing minute quantities of a mixture of the active principles, are also employed. The leaves owe their activity to the presence of certain bodies, which have been named digitalin, digitalein, digitoxin, &c. The leaves and their preparations have a bitter taste. When given in large doses by the mouth, they produce violent vomiting and purging; this may prevent their absorption into the blood, but if absorbed, they may cause death by paralysing the heart's action. When the leaves are administered in medicinal doses, a peculiar action is exerted on certain of the nerves, and on the muscular substance of the heart and blood-vessels, causing the heart to beat more slowly, regularly, and powerfully, and the smaller arteries to contract. By this combined action the blood-pressure is raised, and if dropsy be present, a diuretic action is exerted. Digitalis is used in many organic forms of heart-disease, in nervous and functional irregularity of the heart's action, in cardiac weakness from long-continued disease, in oedema of the lungs, internal hemorrhages, and other conditions. When taken for a long time it may cause nausea and other digestive disturbances, and in a very few cases sudden and serious symptoms of poisoning come on. This constitutes the so-called *cumulative* action of digitalis. In therapeutic doses digitalis should slow the pulse; if too large doses be given, the pulse becomes rapid and irregular.

**Digitaria**. See MILLET.

**Digitigrada**. See CARNIVORA.

**Digne**, a cathedral city in the French department of Basses-Alpes, on the Bléonne, 70 miles NE. of Marseilles; pop. 6300.

**Dihong**. See BRAHMAPUTRA.

**Dijon**, chief town in the French department of Côte-d'Or, formerly capital of the old duchy of Burgundy, lies, spread out on a fertile plain at the foot of Mont Afrique (1916 feet), at the junction of the Ouche and Suzon, and on the Canal de Bourgogne, 190 miles SE. of Paris. Its importance as a railway centre has rendered it of consequence in the inner line of French defences towards the east, and strong forts now crown the neighbouring hills. The environs are exceedingly beautiful, and the town is well and regularly built; the streets are broad, the open squares numerous, and the old walls have been turned into tasteful boulevards. Of the mediæval defences, the Gothic castle built

by Louis XI. still remains; formerly it was a state-prison, in which, among others, Mirabeau, Tousseint L'Ouverture, and General Mack were confined. Among the public buildings, which are numerous and imposing, the chief are the cathedral, a massive Gothic structure, dating from the 13th century, with a wooden spire (1742), 301 feet high; the churches of Notre Dame (1252-1334), St Michel (1529), and others; a handsome theatre; the palais de justice; and the former palace of the Dukes of Burgundy, which, commenced in 1366, is now used as the town-hall, and contains a rich museum and a library. Dijon is also the seat of a university with three faculties—law, science, and letters—and possesses in addition a theological seminary, a botanic garden, and an academy of art. The manufactures include liqueurs, brandy, machinery, and mustard, and there is a noteworthy trade in wool, flowers, and agricultural produce; but Dijon's chief commercial importance is as the centre of the Upper Burgundy wine trade. Pop. (1872) 40,116; (1921) 78,578. The *Dibia* of the Romans, Dijon in the 5th century passed from the Burgundians to the Franks, in the 9th was ruled by counts of its own, under the suzerainty of the bishops of Langres, but in 1007 was united to the duchy of Burgundy, of which it became the capital. On the death of Charles the Bold it came with Burgundy into the possession of France in 1477. In October 1870, after a sharp engagement before the city, Dijon capitulated to a German force. There was again severe fighting here in January 1871. Charles the Bold, Crébillon, Bossuet, and Rameau were natives, and close by is the birth-place of St Bernard, of whom there is a statue by Jouffroy (1847).

**Dike**. See DYKE.

**Dilapidation**, in English law, is where an incumbent suffers his parsonage-house or outhouses to fall down, or be in decay, for want of necessary reparation; or pulls down or destroys any of the outhouses or buildings belonging to his living; or destroys woods, trees, &c.; for it is said to extend to committing or suffering any wilful waste on the inheritance of the church. Dilapidation is a species of the legal injury known as Waste (q.v.). A rector or vicar is bound to keep his residence and the chancel of the church in repair, but not to supply or maintain anything in the way of ornament, as painting, white-washing, or papering. An ecclesiastical person suffering the church-property to get out of repair is subject to an action for dilapidation at the instance of his successor; and the money so recovered must be applied to the repairs. The incumbent is not liable for dilapidation occurring during long leases. A surveyor of dilapidations is appointed in each diocese, who, when so ordered by the bishop, may inspect and report on the buildings of a benefice which is not vacant. But the bishop can issue such orders only on receipt of a complaint from the archdeacon, the rural dean, or the patron of the benefice that the buildings of the benefice are dilapidated, and must give a month's previous notice to the incumbent, who is entitled to state written objections to the report within a month, whereupon the bishop may either call in another surveyor to report on the issues of fact, or take counsel's opinion on the issues of law, the incumbent paying the cost of such proceedings, and being obliged to comply with the bishop's final decision. The incumbent must execute the works specified in the report, as settled by the bishop, in the manner and within the time therein prescribed, or such longer time as the bishop may appoint in writing. Or he may, with consent of the bishop and the patron, and the surveyor's approval, substitute other works for them. In cases of dilapi-

dations in vacant benefices, the sum for repairs named in the bishop's order is a debt due from the late incumbent, his executors and administrators, to the new incumbent, and is recoverable at law or in equity. For the corresponding Scottish law, see HERITOR, MANSE.

### Dilatory Pleas. See PLEA.

**Dilemma.** A true dilemma is defined by Whately as 'a conditional syllogism with two or more antecedents in the major, and a disjunctive minor.' The following dilemma, of the kind called destructive, will perhaps convey a clearer notion than any definition. 'If this man were wise, he would not speak irreverently of Scripture in jest; and if he were good, he would not do so in earnest; but he does it, either in jest or earnest; therefore, he is either not wise, or not good.' There being two conclusions, one or other of which your opponent must admit, he is in a manner caught between them; hence we speak of the *horns* of a dilemma.

**Dilettanté** (pl. *dilettanti*, Ital.), in its original sense, is synonymous with an *amateur*, or lover of the fine arts. It is often used as a term of reproach, to signify an amateur whose taste lies in the direction of what is trivial and vulgar, or of a critic or connoisseur whose knowledge is mere affectation and pretence. It is sometimes assumed, in a spirit of self-depreciation, by those who are unwilling that their critical acquirements, or artistic productions, should be judged by the rules which would be applied to those of persons who had made a professional study of art. It was in this sense that it was assumed by the Dilettanti Society, a body of noblemen and gentlemen by whose exertions the study of antique art in England has been largely promoted. The society was founded in 1734, and thirty years later it sent out an expedition to make drawings of the most remarkable artistic monuments of antiquity, under Chandler, the editor of the *Marmora Oxoniensia*; Revett, joint-author with Stuart of a great work, *Athenian Antiquities*; and Pars, as artist. They returned in 1766; and four splendid folios on the *Antiquities of Ionia* appeared in 1769, 1797, 1840, 1881. Other publications were *Specimens of Ancient Sculpture* (1809-35), *Bronzes of Siris* (1836), and *Athenian Architecture* (1851; new ed. 1889). See Lionel Cust's *History of the Society* (1898).

**Diligence**, in the Law of Scotland, is a term used in various significations. (1) It means the care incumbent on the parties to a contract with regard to the preservation of the subject matter. In this sense the term is also used in English law, which recognises three degrees of diligence—(a) common, such as men in general exert in managing their own affairs; (b) high, such as great prudence demands; and (c) low, such as persons of less than common prudence take in connection with their own affairs. (2) The warrants issued by courts for enforcing the attendance of witnesses and the production of writings. (3) The process of law by which person, lands, or effects are attached either on Execution (q.v.) or in security for debt. In the second of these senses, it corresponds to the English *subpoena*; and in the third, generally to execution.

**Dilke, CHARLES WENTWORTH**, an English critic and journalist, was born December 8, 1789, graduated at Cambridge, and served for twenty years in the navy pay-office. In 1830 he became proprietor of the *Athenæum*, and from that year until 1846 he filled also its editor's chair. He took over the *Daily News* in 1846, and managed it for three years. He died at Alice Holt, Hants, August 10, 1864. A collection of his articles contributed to the *Athenæum* and *Notes and Queries*

between 1848 and 1863 appeared in 1875 as *The Papers of a Critic: with biographical sketch by his grandson, Sir Charles Wentworth Dilke, Bart., M.P.* (2 vols.); the first volume treating Pope, Lady Mary Wortley Montagu, and Swift; the second, Junius, Wilkes, the Grenville Papers, and Burke. He is known also by his *Old English Plays* (6 vols. 1814).—SIR CHARLES WENTWORTH DILKE, only son of the preceding, was born in London, February 18, 1810, and educated at Westminster School, and Trinity Hall, Cambridge. He graduated as LL.B. in 1834, but did not practise. One of the most active originators, as well as member of the executive committee, of the Great Exhibition of 1851, he was sent as a commissioner to the New York Industrial Exhibition in 1853, and in 1862 he was one of the five royal commissioners for the second exhibition, and accepted a baronetcy. In 1865 he was returned to parliament for Wallingford, and in 1869 he was sent to Russia as the representative of England, to the horticultural exhibition held at St Petersburg. Here he died suddenly, 10th May of the same year.—SIR CHARLES WENTWORTH DILKE, son of the preceding, was born at Chelsea, September 4, 1843. He studied at Trinity Hall, Cambridge, where he graduated in 1866, being soon after called to the bar. His travels in Canada and the United States, Australia and New Zealand, he described in his *Greater Britain: a Record of Travel in English-speaking Countries during 1866-67* (2 vols. 1868). He was returned to parliament for Chelsea in 1868. He was a doctrinaire Radical in politics, and was once at least an avowed Republican, yet he held office as Under-secretary for Foreign Affairs, and afterwards President of the Local Government Board under Mr Gladstone. His connection with a divorce case led to his temporary retirement from public life. In 1885 he married the widow of Mark Pattison, herself the author of *Claude Lorrain, sa Vie et ses Œuvres* (Paris, 1884), and *The Shrine of Death* (1886). She died 24th October 1904. Author of *European Politics* (1887), and *Problems of Greater Britain* (1890), Sir Charles Dilke organised the Labour members into an influential party, and was an authority on national defence and foreign relations. Returned to parliament in 1892 for the Forest of Dean, he sat till his death, 26th January 1911. He was a contributor to *Chambers's Encyclopedia*. See Life by Gwynne and Tuckwell (1917).

**Dill** (*Anethum*), a genus of Umbelliferae, by some included in Peucedanum. The Common Dill (*A.*, or *P.*, *graveolens*) is an annual or biennial plant, which grows wild in the countries round the Mediterranean, but has from a very early period been in general cultivation as an aromatic, stimulant, and carminative, being used in cookery like anise, and in medicine as dill water, &c. *A. Sowa* is similarly cultivated, and used in Bengal, &c.

**Dilleniaceæ**, a tropical and subtropical order of archichlamydeous dicotyledons, resembling Magnoliaceæ in habit as well as structure, and often of no less beautiful foliage and flowers. There are about two hundred species, generally astringent, and hence frequently useful in medicine and tanning; many yield excellent timber, and some also fruit, that of *Dillenia speciosa* being especially eaten in India.

**Dillingen**, a town of Bavaria, on the Danube, 51 miles WSW. of Ingolstadt by rail, with two monasteries, a high school, a seminary, and a girls' deaf-and-dumb institution. In the old castle the bishops of Augsburg formerly resided, and here they founded a university (1554-1804), which from 1564 was an active Jesuit centre. Pop. 6000.

**Dillmann**, CHRISTIAN FRIEDRICH AUGUST, a great Orientalist, born 25th April 1823, at Illingen, in Württemberg. Already as a student at Tübingen his studies under Ewald's influence had been turned to orientalia, and in 1846-48 he visited the libraries at Paris, London, and Oxford, cataloguing the Ethiopic MSS. at the last two, and returning to Tübingen to join its teaching staff. In 1854 he accepted a call to Kiel, where he became professor of Oriental Languages in 1860, but was transferred in 1864 to the chair of Old Testament Exegesis at Giessen, which in 1869 he resigned to become Hengstenberg's successor at Berlin. Dillmann was beyond question the first authority in Europe on the Ethiopic languages. The best books for the student in this obscure department of learning are his *Grammatik der äthiopischen Sprache* (1857), *Lexicon Linguae Aethiopicae* (1865), and his *Chrestomathia Aethiopica* (1866). Other works are his German translations of the Book of Enoch (1853), of the Book of Jubilees or the 'Little Genesis' (1849-51), and the Book of Adam (1853) in Ewald's *Jahrbücher*, as well as editions in the original of the first two; and an edition of the ancient Ethiopic translation of the Old Testament, *Biblia Veteris Testamenti Aethiopica* (2 vols. 1853-72). His contributions to pure theology are *Ueber den Ursprung der alt-testamentlichen Religion* (1865), *Ueber die Propheten des alten Bundes* (1868), and fresh editions for the 'Kurzgefasstes exegetisches Handbuch' of Hirzel's commentary on Job (1869), as well as of Knobel's commentaries on Exodus and Leviticus (1880), and on Genesis (1882). Dillmann became in 1877 a member of the Berlin Royal Academy of Sciences, and contributed many papers to its issues. He was president of the fifth International Congress of Orientalists, and edited its *Abhandlungen* (3 vols. 1881-82). Other works (1879-84) deal with the history of the Ethiopic kingdom of Axum (q.v.). He died 4th July 1894.

**Dillon**, JOHN, the son of John Blake Dillon (1816-66), who was a prominent member of the Young Ireland party, and member for County Tipperary in 1865-66. Born in New York in 1851, he was educated at the Catholic University of Dublin, after which he became a doctor. He early identified himself with the Parnellite movement, and in 1880 was returned for County Tipperary. In the House of Commons Dillon soon became prominent for the violence of his language, while speeches delivered by him in Ireland led to his imprisonment in 1881, 1881-82, and 1888. From 1883 to 1885 he was absent from political life on account of ill-health; but in 1885 he was elected for East Mayo, and was repeatedly re-elected till 1918. 'Honest John Dillon' was one of the chief promoters of the 'Plan of Campaign.' In 1896-99 he was chairman of the main section of the Nationalists, and in 1918 of the remnant.

**Dilman**, a town of northern Persia, in the province of Azerbaijan, 75 miles W. of Tabriz; pop. 6000.

**Diluents**, medicines for diluting the blood and increasing the excretions, especially the urine. The simplest and best of diluents is water; but all watery fluids, such as lemonade, soda-water, beer, infusions, tea, milk, &c., are diluents. See DEMULGENTS.

**Diluvium**, a term formerly given by geologists to those strata which they believed to have been formed by the Deluge, and more particularly to the boulder clay. The altered opinions as to the origin of these beds have caused the word to fall into disuse in Britain. It is still used on the Continent, however, not in its original sense, but simply as a general term for the glacial and fluvio-glacial accumulations of the Pleistocene system. When

the adjective—diluvial—is employed by modern writers, it is to characterise those accumulations of gravel or angular stones which have been produced by sudden or extraordinary currents of water.

**Dime**, a silver coin, the tenth part of a United States dollar (see DOLLAR), and equal to about fivepence English.

**Dimension**. In Geometry, a point, since it has merely position, is said to have no, or to be of zero, dimensions; a line, straight or curved, is of one dimension—viz. length; a plane surface has two—length and breadth; while a solid is said to be of three dimensions—length, breadth, and thickness. Thus it will be seen that by the term dimension is meant a direction in which extension may be reckoned or measured. The three last-named dimensions are found sufficient to determine all known forms of extension. Hence space is tridimensional. The possibility of space of higher dimensions existing has been much discussed. Since points, lines, and surfaces in general generate by their motion lines, surfaces, and solids respectively, so it is held that some analogous generation of a fourth dimensional figure by one of three dimensions is conceivable. The subject, although interesting, is wholly speculative.—In Algebra, the term dimension is employed in much the same sense as *degree*, to express the sum of the indices of those letters with reference to which the term containing them is considered—e.g.  $xy$ ,  $x^2$ , are both of two dimensions, or of second degree;  $x^2y$ ,  $x^3$ , are of three dimensions, or third degree, &c.

**Dimidiation**, in Heraldry, a mode of marshalling arms, adopted chiefly before quartering and impaling according to the modern practice came into use, and subsequently retained to some extent in continental though not in English heraldry. It consists in cutting two coats of arms in half by a vertical line, and uniting the dexter half of the one to the sinister half of the other. Coats of husband and wife were often so marshalled in England in the 13th and 14th centuries.

**Dimity**, a stout, figured cotton-fabric, used chiefly for bed-hangings and window-curtains. The figure or stripe is distinctly raised. Originally dimity was commonly white or of a single colour; but variegated dimities are now largely made; one band or stripe of the cloth having a woven pattern in white alternating with a plain band—i.e. the fabric is all white as it comes from the loom. A pattern is afterwards printed in colours on the plain band.

**Dimorphism** (Gr. *dis*, 'twice'; *morphē*, 'shape or form'), a technical term applied in Biology to cases where an organism appears in two different forms. Thus in a colony of hydroids there may be 'dimorphic persons'—respectively nutritive and reproductive, and yet fundamentally the same in structure and origin. So too when the two sexes are markedly different, the term sexual dimorphism may be used. Or the organisms may be different at certain seasons and in certain conditions, as in summer and winter Butterflies (q.v.), or in the two kinds of common Primrose (q.v.) and cowslip. Sometimes three different forms of butterfly are known in the same species, and to such cases the term *trimorphism* is conveniently applied. The same is true of the common flower *Lythrum salicaria*. In hydroid and medusoid colonies (e.g. *Hydractinia* and *Siphonophora*) the development of multiple forms resulting from 'Division of Labour' (q.v.) is described as *polymorphism*. The same term is obviously applicable to the different forms exhibited by some social Ants (q.v.). The same set of terms may also be employed in reference to different forms of the same mineral, &c. See also FLOWERS, FERTILISATION.

An inorganic substance is in a somewhat analogous manner said to be dimorphous when it is capable of crystallising in two different forms or systems (see CRYSTALLOGRAPHY). A large number of substances have this property, of which sulphur, carbon, carbonate of lime, and iodide of mercury are the best examples. Thus carbon, as the diamond, crystallises, in the regular system, as octahedra, while as graphite, or Black Lead (q.v.), it forms hexagonal crystals belonging to the rhombohedral system. In some cases there is a great tendency for the one form of crystal to change spontaneously into the other form. The red iodide of mercury is a striking example of this. When heated, this substance is volatilised, and may be condensed on a glass plate as a yellow crystalline crust, consisting of rhombic plates. When this is rubbed, or even scratched, an immediate change takes place, the rhombic plates becoming broken up into octahedra, while the colour at the same time alters from yellow to a brilliant scarlet. So also when sulphur is crystallised from its solution in bisulphide of carbon, it yields transparent amber-coloured octahedra; but when melted sulphur is cooled, prismatic crystals are the result. In the course of a few days the prisms become opaque, owing to their being broken up into small octahedra, while conversely the octahedra, when heated to 230° (110° C.), are changed into smaller prismatic crystals. Those substances, such as sulphate and selenate of nickel, which crystallise in three systems, are said to be *trimorphous*.

**Dimsdale**, THOMAS (1712-1800), an English physician who wrote several works on inoculation, was famous as an inoculator (making journeys in 1768 and 1784 to Russia to inoculate the Empress (Catherine and other magnates), and sat for Hertford in two parliaments.

**Dinājpur**, capital of a district in the Rajshahi division of Bengal, stands 221 miles N. of Calcutta, on the Punabhaba River, which, through the Mahananda, enters the Lower Ganges; pop. 16,000.—The district has an area of 4000 sq. m., and a pop. of 1,700,000, almost entirely rural, and mainly of aboriginal descent. Two-thirds are Hindus.

**Dinan**, a very old town in the French department of Côtes-du-Nord, on the Rance, 30 miles NW. of Rennes, and 14 S. of St. Malo. The situation of Dinan, on the summit of a steep hill of granite, and with the Rance flowing through a valley 250 feet below, is romantic in a high degree. The valley is crossed by a fine granite bridge of ten arches. The town is still partly surrounded by its old ivy-covered walls. The old castle of the Dukes of Brittany is now in part used as a prison. In the older district the streets are crooked, narrow, and steep; in some parts, the overhanging houses, and arcades resting on carved granite pillars, present many picturesque architectural features. The church of St. Sauveur, a fine Romanesque church, contains the heart of the famous French warrior Bertrand du Guesclin, who here had a famous encounter with an English knight. The terraces around the town afford very charming views. Many English reside here. Pop. 10,000. Four miles off lies the village of Corseult, on an old Roman site, where many antiquities have been found.

**Dinant**, a town of Belgium, occupying a narrow site between the Meuse and a limestone hill, 17 miles S. of Namur by rail, and consisting mainly of one narrow street. On the cliff above stands the citadel (1530), and the Gothic church dates from the 13th century. There are manufactures of cotton, paper, leather, iron, &c., with black marble quarries; and the gingerbread of Dinant, com-

posed of rye-flour and honey, has an extensive sale. The place was formerly noted for its copper wares, familiarly known as *Dinanderie*, and still sold. Pop. 5000. Dinant, which dates from the 6th century, has suffered greatly from frequent sieges, and other war-like operations, as in 1914.

**Dinapore** (*Danāpur*), military headquarters of the district of Patna in Bihar and Orissa, on the Ganges, 12 miles W. of Patna city by a road lined with houses throughout. It is divided into two parts, the Cantonments and the Nizamut, or city proper. Pop. 40,000, of whom over 30,000 reside within the Nizamut. In the mutiny of 1857 the three sepoy regiments stationed here rose in July, and escaped into Shahabad district, where they attacked Arrah (q.v.).

**Dinaric Alps**, the name applied to the mountains connecting the Julian Alps with the Balkan system. The main range stretches from north-west to south-east, separating Dalmatia from Bosnia and Herzegovina, as far as the mouth of the Narenta; and a minor chain extends through the Dalmatian coast country. The mountains are principally calcareous; the highest summits are Orjen (6225) and Dinara (5940), and the mean height is 2300 feet.

**Dindigul**, a town in the presidency of Madras, 40 miles NNW. of Madura by rail, with an old fort, still in good preservation, commanding the approaches to Coimbatore from the south. It has a trade in hides, tobacco and cigars, coffee, and cardamoms. Pop. 25,000, three-fourths Hindus.

**Dindorf**, WILHELM, a famous Hellenist, born 2d January 1802 at Leipzig, where his father Gottlieb Immanuel Dindorf (died 1812) was professor of Oriental Languages. In 1817 he began his studies in philology at Leipzig, under Gottfr. Hermann and Chr. Daniel Beck, declined a call to Berlin in 1827, and next year accepted an extraordinary professorship at Leipzig, which he resigned in 1833 to devote himself entirely to his literary activity. Here he died, 1st August 1883. Dindorf's long life gave many contributions of the first value to Greek scholarship, especially in the region of dramatic poetry. Among his works were the preparation of vols. 7-13 of the great Invernizzi-Beck edition of Aristophanes (1820-34), editions of Aristophanes, with notes and scholia (1835-39), of Æschylus (1841-51), Euripides (1834-63), Sophocles, with notes (1832-36), and a second vol. of the series of scholia to Sophocles, edited by Elmsley (1852), also an edition with annotations and scholia of Demosthenes (1846-51), all printed at Oxford. Other works are those on the metres of Æschylus, Sophocles, Euripides, and Aristophanes (1842); the lexicons to Sophocles (1871) and Æschylus (1873-76); his edition of the text of Homer (1855-56), and of the scholia to the *Odyssey* (1855) and the *Iliad* (1875-77). With Hase and his brother Ludwig (1805-71) he edited the *Thesaurus Græcæ Linguae* of Stephanus (1832-65).

**Dingelstedt**, FRANZ VON, German poet, born near Marburg in 1814, was royal librarian at Würtemberg in 1843-50, intendant of the court theatres at Munich, Weimar, and Vienna in 1850-71, and afterwards director of the Hofburgtheater in Vienna. He was ennobled by the Austrian emperor, and died 15th May 1881. Besides several volumes of poems, displaying great versatility and considerable power, he published a series of novels, one fine tragedy (*Das Haus der Barneveldts*), essays, and translations and studies of Shakespeare. His collected works fill 12 vols. (1877).

**Dinghy**. See BOAT.

**Dingle**, a seaport on the north side of Dingle Bay, in County Kerry, Ireland, 27 miles SW. of

Tralee railway station, and 30 WNW. of Killarney. The chief exports are coin and butter. The harbour is landlocked. Pop. 1800.

**Dingo** (*Canis dingo*), a variety of Dog (q.v.) found in Australia, both in a wild and in a half-tamed state. It is probable that this dog, which is found in a semi-fossil state in some of the caves, was introduced by or with the earliest human



Dingo, or Australian Dog (*Canis dingo*).

inhabitants. The dingo has an elongated flat head, which is carried high; the ears are short and erect, and are kept in that position when the animal runs; the fur is soft and predominantly tawny; the tail is bushy and kept low down. It is a very muscular, fierce animal, tamable if taken young. In the wild state it seldom barks. The wild forms, joined doubtless by recent runaways from domestication, used to work very great havoc among the sheep, but vigorous endeavours have vastly reduced their numbers and lessened their ravages.

**Dingwall** (Scand., 'court hill'); the county town of Ross-shire, near the head of the Cromarty Firth, and at the entrance to the valley of Strathpeffer, 13½ miles NW. of Inverness (by rail 18½). It has a town hall, county buildings (1845), a monument to Sir Hector Macdonald (1906), and an obelisk, 57 feet high, which marks the grave of Sir George Mackenzie, first Earl of Cromarty. This obelisk, twisted by an earthquake, is to fall on a white-haired boy. A royal burgh since 1226, Dingwall united till 1918 with Wick and four other towns to return one member to parliament. Pop. (1861) 2099; (1881) 1921; (1921) 2323.

**Dinkelsbühl**, an ancient walled town of Bavaria, on the Wornitz, 19 miles NNW. of Nordlingen by rail, with manufactures of cordage, hosiery, straw-hats, pencils, brushes, &c. It was formerly a free city of the empire, and suffered much during the Thirty Years' War. Pop. 5000.

**Dinocera** (Gr. *deimos*, 'terrible,' and *keras*, 'horn'), an extinct order of mammals, approaching the elephant in size and movements, remains of which have been found extensively in the Eocene lacustrine sediments of southern Wyoming. The dinocera include three genera—*Uintatherium* (most primitive type), *Dinoceras* (intermediate form), and *Tinoceras* (youngest and most specialised). About thirty more or less distinct forms have been recognised. The feet were plantigrade, the fore-foot being larger than the hind-foot, and having five digits; the limbs were massive and heavy, but shorter than in the elephant; the skull was long and narrow, supporting on top three separate transverse pairs of high osseous protuberances or horn-cores, while the canine teeth were enormously developed in the male, and formed short, trenchant, decurved tusks; the nasal bones were elongated so as to form nearly half the length of the skull, though, as the neck was long enough

to allow the head to reach the ground, there was probably no proboscis; finally, the brain was proportionately smaller than in any other known mammal, and even less than in some reptiles. See Professor O. C. Marsh's admirable monograph, published by the United States Geological Survey (1884).

**Dinornis**. See MOA.

**Dinosauria** (Gr., 'terrible lizards'), an important group of Mesozoic reptiles, known partly by their skeletons, partly by their footprints. They were gigantic forms, some of them at least 80 feet in length, and many of their characters lead on to birds. Thus in the hip-girdle the pubic bones were in many cases turned, not forwards as in other reptiles, but backwards as in birds; the legs were also in part bird-like; the fore-limbs were less developed than the legs; some of the bones apparently contained air-cavities, &c. *Atlantosaurus* (q.v.), *Stegosaurus*, *Iguanodon* (q.v.), and *Megalosaurus* (q.v.) are important types. They begin in Triassic strata, become very prominent in the Jurassic fauna, continue well represented in the Chalk, and then terminate. A large number have been found in America, and our knowledge of them is mainly due to Cope and Marsh. They were terrestrial animals, though some, such as *Iguanodon*, frequented marshy ground. Some seem to have been carnivorous, others vegetarian. According to Seeley and Von Huene, Dinosaurs do not form a natural order, but include two distinct orders—*Saurischia* and *Ornithischia*. The latter point the way to birds. See REPTILES.

**Dinotherium** (Gr., 'terrible beast'), a remarkable extinct animal, the cranial bones of which are found in the Miocene and Pliocene of Germany, France, &c. The animal was provided, like the elephant and the walrus, with a pair of long tusks; but these projected from the end of the lower jaw, which is deflected downwards at a right angle to the body of the jaw. Both jaws possessed a series of præ-molars and molars, the crowns of which were traversed by strong transverse ridges. The nasal cavity was large, apparently supplying attachment for a trunk, as in the elephant. Very little is known



Dinotherium, as restored by Kaup.

of the skeleton except the skull (one example of which is 3½ feet long); and hence the true position of the dinotherium has not been satisfactorily determined. Cuvier and Kaup have referred it to the neighbourhood of the tapir, supposing it to have been an inhabitant of large lakes.

**Dinwiddie**, ROBERT, colonial governor of Virginia, was born in Scotland about 1690, and was governor of Virginia from 1752 to 1758, when he was recalled, after precipitating the French and Indian war, and by his ill-temper, avarice, and incompetence, rendering himself generally unbearable to the Americans. He died in 1770.

**Dio Cassius**. See DION CASSIUS.

**Dio'cesan** is a bishop viewed in relation to his own clergy or flock.

**Diocesan Courts.** See CONSISTORY and COMMISSARY.

**Diocese** (Fr., from Gr. *dioklês*, 'administration'), the territory over which a bishop exercises ecclesiastical jurisdiction. The term occurs as early as the time of Demosthenes, to signify the treasury or department of finance. It is found in Cicero, both as a Greek and as a Latin word, as the special designation of districts in Asia Minor. At this time, the area denoted by this term was but a small one, for Cicero mentions that three dioceses were included in the single province of Cilicia. But in the organisation of the Roman empire introduced by Constantine the Great, the designation diocese was applied to the larger divisions, which were subdivided into provinces or eparchies. About the middle of the 5th century, the dioceses of the empire were—the East, Asia, Pontus, Thrace, Macedonia, Dacia, Illyria, Italy, Africa, Gaul, Spain, and Britain. The city of Rome, with its seven 'suburbicarian' provinces, constituted a diocese in itself, and was not included in that of Italy. The dioceses were governed collectively by four Prætorian Prefects, each of whom had several such territories under his jurisdiction, and singly by officers styled Eparchs, Counts, or Vicars. The provinces (numbering one hundred and seventeen) were under Exarchs or Rectors. The government of the Christian church, as established by Constantine, was assimilated to this division, and the term diocese and others passed over to ecclesiastical matters. At first a diocese meant an aggregate of metropolitan churches or provinces, each under the charge of an archbishop, which had previously been called a parish, into a single jurisdiction under an exarch (Balsamon, *ad Can. ix., Conc. Chalced.*); and the actual distribution in the 4th and 5th centuries was founded on, and closely corresponded to, the civil division. The four (later five) patriarchates corresponded to the four prætorian prefectures; and the diocese of the Orient contained fifteen provinces, all under the Patriarch of Antioch, till the erection of the patriarchate of Jerusalem in 450, when Palestine, Phœnicia, and Arabia were withdrawn from Antioch to constitute the new jurisdiction; Egypt, under the Patriarch of Alexandria, had six provinces; Asia, eleven; Pontus, eleven; Thrace, six; Macedonia, six; Dacia, five; Italy, seventeen, of which seven were in the diocese of Rome; Illyria, six; Africa, six; Spain, seven; Gaul, seventeen; and Britain, five. In a later stage of the church's history, the term diocese is applied to a single metropolitanate or province (Greg. *Mag. Epist.*, VII. ii. 17), and lastly it came to signify the local jurisdiction of any one bishop (a meaning already applied to it as early as the second Council of Carthage, in 390 A.D., canon v.), of whatever rank. It does not appear in England till the writings of Matthew Paris in the middle of the 13th century; Bede, for example, using only the terms *episcopatus*, *provincia*, *ecclesia*. On the other hand, it is found as the equivalent of 'parish' in canons of the councils of Agde (506 A.D.), Epaon (517), Orleans IV. (541), and also in the capitularies of Charlemagne, VII. c. 360. England is divided ecclesiastically into two provinces—viz. Canterbury and York, the former being presided over by the Primate of All England, and the latter by the Primate of England. Each of them is subdivided into dioceses, and these again into archdeaconries, rural deaneries, and parishes. See BISHOP.

**Diocletian.** VALERIUS DIOCLETIANUS, Roman emperor (284-305 A.D.), was born of humble parentage near Salona, in Dalmatia, in 245. He inherited from his mother, Dioclea, the name

of Diocles, which he afterwards enlarged into Diocletianus, and attached as a cognomen to Valerius, a name of the most patrician associations. He adopted a military career, and served with distinction under Probus and Aurelian, accompanied Carus on his Persian campaign, and finally, on the murder of Numerianus having been discovered at Chalcedon, he was proclaimed emperor in 284 by the army on its homeward march. The suspected assassin of Numerianus, the prefect Arrius Aper, he slew with his own hands, in order, it is alleged, to fulfil a prophecy communicated to him, while still a lad, by a Druidess of Gaul, that he should mount a throne as soon as he had slain the wild-boar (*aper*). Next year he commenced hostilities against Carinus, the joint-emperor along with the deceased Numerianus, who, although victorious in the decisive battle that ensued, was murdered by his own officers, thus leaving to Diocletian the undisputed supremacy. His first years of government were so molested by the incursions of barbarians, that, in order to repel their growing aggressiveness, he took to himself a colleague—namely, Maximian—who, under the title of Augustus, became joint-emperor in 286. Diocletian reserved for himself the charge of the eastern empire, and gave the western to Maximian. Still the attacks of the barbarians continued as formidable as ever. The empire was menaced by the Persians in the east, by the Germans and other barbarians in the west; and in order to provide for its permanent security, Diocletian subjected it to a still further division. In 292 Constantinus Chlorus and Galerius were proclaimed as Cæsars, and the distribution of the Roman empire was now fourfold: Diocletian taking the East, with Nicomedia as his seat of government; Maximian, Italy and Africa, with Milan as his residence; Constantius, Britain, Gaul, and Spain, with Trèves as his headquarters; Galerius, Illyricum and the entire valley of the Danube, with Sirmium as his imperial abode. It was upon his colleagues that most of the burden of engaging actively in hostilities fell, as Diocletian seldom took the field in person. Among the conquests, or rather re-conquests, that were made under his rule, may be enumerated that of Britain, which, after maintaining independence under Carausius and Allectus, was in 296 restored to the empire; that of the Persians, who were defeated, and compelled to capitulate in 298; and that of the Marcomanni, and others of the northern barbarians, who were driven beyond the Roman frontier. Diocletian, after twenty-one years' harassing tenure of government, desired to pass the remainder of his days in tranquillity. Accordingly, on the 1st of May 305, he abdicated the imperial throne at Nicomedia, and compelled his reluctant colleague, Maximian, to do likewise at Milan. He sought retirement in his native province of Dalmatia, and for eight years resided at Salona, devoting himself to philosophic reflection, to rural recreation, and to horticultural pursuits. Two years before his abdication, he was instigated by his colleague, Galerius, to that determined and sanguinary persecution of the Christians for which his reign is chiefly memorable. He died in 313.

**Dio'dati, JEAN**, a Calvinistic divine, was born at Geneva, 6th June 1576, became professor of Hebrew there in 1597, pastor of the reformed church in 1608, and in 1609, on the death of Beza, professor of Theology. He was a preacher at Nîmes from 1614 to 1617, and at the Synod of Dort was representative of Geneva. Diodati, whose family was originally of Lucca in Italy, tried in vain to introduce the reformed doctrine in Venice. He is remembered chiefly through his Italian translation of the Bible, issued (without imprint) at

Geneva in 1607, which was one of the best translations of the Reformation period, and is still in use. His *Annotaciones in Biblia* (1607) are also of value. He died at Geneva, 3d October 1649. See Budé, *Vie de Jean Diodati* (Geneva, 1869).—A nephew, CHARLES DIODATI (*circa* 1608–38), is remembered as the friend of Milton. Son of a doctor who had settled in England, he was educated at St Paul's School, and Trinity College, Oxford, and for the last nine years of his life practised medicine near Chester and in Blackfriars.

**Diodon.** See GLOBE-FISH.

**Diodorus Siculus**, a Greek historian, was born at Agrigum, in Sicily. Little is known of his life beyond what is told by himself. He lived in the times of Julius Cæsar and Augustus, travelled in Asia and Europe, and lived a long time in Rome, collecting the materials of his great work, the compilation of which occupied thirty years. This work, the *Bibliothêkê Historikê*, was a history of the world, in forty books, from the creation to the Gallic wars of Julius Cæsar. It was divided by the author into three parts—the first of which, in six books, comprises all the Greek and foreign mythical history down to the Trojan war; the second, in eleven books, contains the history from the year 1184 B.C. to the death of Alexander the Great; the third, in twenty-three books, continues the narrative of events from that date to the year 60 B.C. Of this great work, the first five books are extant entire; the next five books are wholly lost; the next ten are complete; and of the remainder of the work, considerable fragments have been preserved in the *Excerpta* in Photius, and in the *Eclogæ* prepared by command of Constantine Porphyrogenitus. Had Diodorus Siculus possessed any powers either of criticism or of arrangement, his work would have been of the greatest importance; but he was in both respects so deficient, that his history has no practical value beyond what belongs to an immense mass of raw and now scarcely available material. His narrative is colourless and monotonous, and his diction, generally clear and simple, holds a sort of middle place between the pure Attic and the colloquial Greek of his time. The best editions of Diodorus Siculus are Wesseling's (Amst. 1746) and L. Dindorf's (1828–31); re edited by Vogel (1888–93) and by Fischer (1905–6).

**Diœcious** (Gr. *dis*, 'twice'; and *oikos*, 'a habitation'), a term applied by Linnaeus to plants in which separate individuals exclusively produce male and female flowers respectively. Great importance was attached to this in the artificial system of classification; but diœcious species occur in all groups of plants indifferently, however commonly hermaphrodite; and similarly, hermaphrodite forms occur in groups usually diœcious. This is probably explained by regarding the complete separation of the sexes as a phase of evolution beyond hermaphroditism which tends to arise in plants as in animals, and from which reversion to hermaphroditism may also readily occur, probably in conditions favourable to vegetativeness, (see SEX, REPRODUCTION). Familiar examples of diœcious plants may be seen in most species of willow, or in the pink or white *Lychnis* (*L. diurna* and *L. vespertina*), or the Common Nettle (*Urtica dioica*). Amongst cultivated plants, hemp, spinach, and the date-palm may be instanced.

**Diogenes**, the Cynic philosopher, was a native of Sinope, in Pontus, where he was born about 412 B.C. His father, a banker named Icesias or Icetas, was convicted of swindling, and so the young Diogenes had to leave Sinope and go to Athens. His youth had been that of a spendthrift and a rake, but at Athens his interest was arrested by the character of Antisthenes, who, however, re-

pelled his first advances. But not even blows could restrain the enthusiastic ardour of the young disciple, and at length Antisthenes, moved with compassion, consented to admit him as a pupil. From an extravagant debauchee, Diogenes at once became an ascetic of the extremest austerity. He would roll in hot sand during the heat of summer; in winter, he would embrace a statue covered with snow. His clothing was of the coarsest, his food of the plainest. His bed was the bare ground, in the open street or under the porticoes. At length he is said to have found himself a permanent residence in a tub which belonged to the Metroum, or the temple of the Mother of the Gods. His eccentric life did not cost him the respect of the Athenians, who admired his contempt for comfort, and allowed him a wide latitude of comment and rebuke. Practical good was the chief aim of his philosophy; for literature and the fine arts he did not conceal his disdain. He laughed at men of letters for reading the sufferings of Ulysses, while neglecting their own; at musicians who spent in stringing their lyres the time which would have been much better employed in making their own discordant natures harmonious; at philosophers for gazing at the heavenly bodies, while sublimely incognisant of earthly ones; at orators who studied how to enforce truth, but not how to practise it. He was seized by pirates on a voyage to Ægina, and carried to Crete, where he was sold as a slave. When asked what business he understood, he answered: 'How to command men.' His purchaser was Xenias of Corinth; but the slave soon came to rule the master, acquired his freedom, was appointed tutor to the children, and spent his old age as one of the household. Here perhaps he had his interview with Alexander the Great. The king opened the conversation with: 'I am Alexander the Great,' to which the philosopher answered: 'And I am Diogenes the Cynic.' Alexander then asked him in what way he could serve him, to which Diogenes rejoined: 'You can stand out of the sunshine.' Alexander is said to have been so struck with the Cynic's self-possession, that he went away remarking: 'If I were not Alexander, I would be Diogenes.' The philosopher lived at Corinth till his death at the age of ninety, 323 B.C. See Hermann's *Diogenes* (1860); Zeller's *Philosophy of the Greeks* (trans. 1881–97).

**Diogenes Laërtius** seems to have been born at Laerte, in Cilicia, and to have taken his surname from that town. Little is known of his history; but it is most probable that he flourished in the 2d century A.D. His name has been kept alive by his *Lives of the Philosophers*, a work in ten books, in which he divides the philosophy of the Greeks into the Ionic—beginning with Anaximander, and ending with Chrysippus and Epicurus—and the Italian, founded by Pythagoras, and ending with Epicurus. The Socratic school was a part of the Ionic philosophy; to the Italian belong the Eleatics, with Heraclitus and the Sceptics. This work contains a great mass of interesting information regarding the private lives and habits of the most eminent philosophers of antiquity. Though it is utterly worthless in respect of plan, coherence, or criticism, it yet contains many piquant anecdotes and many valuable quotations from lost works. The standard edition is Cobet's (1850; new ed. 1862).

**Diognetus**, THE EPISTLE TO, an ancient Christian work in Greek, dating from the 2d or 3d century A.D., erroneously ascribed to Justin (q.v.), and usually printed and commented on with the Apostolic Fathers (q.v.). Diognetus may have been the tutor of Marcus Aurelius.

**Diomed Islands**, three small islands (Fairway, Krusenstern, and Ratmanoff) in Behning Strait.

**Diomedes**, the bravest, after Achilles, of all the Greeks who took part in the Trojan war. The son of Tydeus, he is constantly called by his patronymic, Tydides. He vanquished in fight Hector and Æneas, the most valiant of the Trojans; and even Ares and Aphrodite, when they took the field on the Trojan side, were attacked and wounded by him. In the games instituted by Achilles in honour of Patroclus, he gained the prize in the chariot-race, and worsted the mighty Ajax in single combat. Along with Ulysses, he carried off the Palladium, on which the fate of Troy depended. On returning to Argos, to the crown of which he had succeeded after the death of Adrastus, he found that his wife had proved unfaithful in his absence, whereupon he sailed away to Italy, there married the daughter of King Daunus, and lived to a good old age. The towns of Beneventum, Venusia, Canusium, and Brundisium claimed to have been founded by him.

**Dion**, a Syracusan, whose sister became the second wife of the elder Dionysius the Tyrant, while he himself was married to a daughter of Dionysius, his own niece. His close connection with the tyrant brought him great wealth, but his austere manners and devotion to philosophy made him hateful to Dionysius the Younger, who under the guidance of Philistus and his party disregarded the advice of Plato, and banished Dion. Thereupon he retired to Athens to devote himself to the study of philosophy under the guidance of Plato. His expedition to Syracuse resulted in his making himself master of the city (356 B.C.), but his severity made him unpopular among its luxurious citizens, and a plot was formed against him through which he was murdered in his own house three years later. His life was written by both Plutarch and Cornelius Nepos, and he is the subject of a noble poem by Wordsworth.

**Dionaea**, a very curious and interesting genus of Droseraceæ. Only one species is known, *D. muscipula*, sometimes called Venus's Fly-trap and the Carolina Catchfly Plant. It grows in marshy places in Delaware and North Carolina. The remarkable insect-catching and digestive powers exhibited by the leaves are described under INSECTIVOROUS PLANTS.

**Dion Cassius**, surnamed Cocceianus, from the orator Dion Chrysostomus Cocceianus, most likely his maternal grandfather, a celebrated Greek historian, was born at Nicæa, in Bithynia, c. 155 A.D. About 180 he went to Rome, held successively all the high offices of state, was twice consul, and enjoyed the intimate friendship of Alexander Severus, who sent him as legate to Dalmatia and Pannonia. About 229 he retired to his native city, where he passed the remainder of his life. He is best known by his *History of Rome*, from the landing of Æneas in Italy down to 229 A.D., in eighty books, of which but nineteen, from the thirty-sixth to the fifty-fourth, have reached us complete. These embrace the history from the wars of Lucullus and Pompey against Mithridates, down to the death of Agrippa, 10 A.D. The first twenty-four books exist only in the merest fragments; of the last twenty we have only the 11th-century epitome of Xiphilinus. The *Annals* of Zonaras followed Dion Cassius so closely, that we may almost consider that work as an epitome. The position of Dion Cassius gave him free access to the national archives, and his work has considerable value for the imperial epoch of Roman history. His model was Thucydides. See editions by Sturz (1824), Bekker (1849), L. Dindorf (1865; new ed. 1890), and Boissvain (1895-1901); and the 'Loeb Library' edition with Cary's translation (1914 et seq.).

**Dion Chrysostomus** ('the golden-mouthed'),

an eminent Greek rhetorician, surnamed Cocceianus from his intimate friendship with the Emperor Cocceius Nerva, was born at Prusa, in Bithynia, about 50 A.D. His father, Pasirates, paid great attention to his education, which was perfected by travel. He came to Rome under Vespasian, but had afterwards to leave the city, having had the misfortune to excite the suspicion of Domitian. He next visited—in the disguise of a beggar, and on advice of the Delphic oracle—Thrace, Mysia, and Scythia. On the accession of Nerva (96 A.D.) he returned to Rome, and lived in great honour under that ruler and his successor Trajan till his own death, about 117 A.D. As many as eighty of his orations are still extant, with fragments of fifteen others. They are, however, treatises rather than orations proper, discussing questions in politics, morals, and philosophy. These are well reasoned, clear, and eloquent, and are written in pure Attic Greek. Dion Chrysostomus was 'the first writer after Tiberius,' says Niebuhr, 'that greatly contributed towards the revival of Greek literature.' Good editions are by Reiske (1784), Emper (1844), Dindorf (1857), and Von Arnim (1893-95).

**Dionysius of Alexandria**, often surnamed 'the Great,' was the greatest pupil of Origen, succeeded Heraclas as head of the Catechists' school in 232, became Bishop of Alexandria in 247, was banished during the persecutions of Decius (250) and Valerian (257), and died in 264. He distinguished himself by his wisdom and moderation in the great church controversies of his time, on the Novatian schism, on the baptism of heretics, on Chiliasm, and on the heresies of the Sabellians and Paul of Samosata. He was distinguished also as an exegete; the Apocalypse he refused to assign to the Apostle John on grounds which show that he had critical faculty and independence.

Of his numerous writings only a few fragments remain; these were collected by Routh in his *Reliquiæ Sacre* (1814), by Mai in *Auctores Classici* (1838), and by Feltes in *The Letters and Remains of Dionysius of Alexandria* ('Patristic Texts,' 1904-5). See also Feltes's translation (1918), and books on him by Dittrich (German, 1867) and Morize (French, 1881); and works quoted at ORIGEN.

**Dionysius of Halicarnassus**, critic, historian, and rhetorician, lived in the 1st century B.C. He came to Rome about 29 B.C., and lived there on terms of intimacy with many distinguished contemporaries till his death, c. 7 B.C. His most valuable work is unquestionably his Greek *Archæologia*, a history of Rome down to 264 B.C., a mine of information about the constitution, religion, history, laws, and private life of the Romans. Of the twenty books of which it originally consisted, we possess only the first nine in a complete form, the tenth and eleventh nearly so, coming down but to 441 B.C.; of the rest, only a few fragments are extant. He was a greater rhetorician and critic than historian, and his extant works on oratory, on the criticism in detail of the great Greek orators, on the characteristics of poets and historians from the time of Homer to Euripides, and upon Thucydides and Dinarchus, possess great interest and value. See the editions by Jacobi (1835-91) and Usener and Rademacher (1899); and books on him by W. R. Roberts (1901) and Max Egger (Paris, 1902).

**Dionysius**, surnamed THRAX ('the Thracian'), a native of Alexandria, who taught at Rhodes and at Rome about 100 B.C. His *Techne Grammatike* is the foundation of all subsequent European works on grammar. There is an edition by Uhlig (1884).

**Dionysius the Areopagite** (i.e. member of the Areopagus, q.v.), one of the few Athenians who, according to Acts, xvii. 34, were converted by the preaching of the Apostle Paul. Tradition makes him the first Bishop of Athens, and a

martyr of the church. The celebrated Greek writings which bear his name, and, connecting Neoplatonism with Christianity, laid the foundation for the mystical theology of the church, were not written by him, but attributed to him after a fashion not uncommon in antiquity. They are first mentioned in 533, when they were appealed to by the Monophysite sect of the Severians against the authority of the Council of Chalcedon. From the 6th century they were generally accepted as genuine, and exercised a very great influence on the development of theology. They include writings *On the Heavenly Hierarchy*, *On the Ecclesiastical Hierarchy*, *On Divine Names*, *On Mystical Theology*, and a series of ten *Epistles*. In the Western Church they are first referred to in one of the *Homilies* of Gregory the Great. In the 9th century Erigena, at Charles the Bald's command, prepared an annotated Latin translation; and he and many of the scholastic theologians who followed him drew much of their inspiration from this source. The date assigned to the pseudo-Dionysian writings is fixed by Kanakis as early as 120, by Frothingham as late as 520. Harnack holds that it has not yet been decided at what period between 350 and 500 they were written, and adheres provisionally to the second half of the 4th century, with a final recension about the year 500. This great unknown thinker was probably an Alexandrian. His fundamental thought is the absolute transcendence of God, which he attempts to connect with Pantheism by regarding God as absolute causality, and as multiplying himself through his indwelling love in all things. His theology is twofold—on the one hand, descending from God to created things, and concluding from these the absolute inexhaustible being of the One; on the other hand, rising from things to God, denying of him everything that is conceivable, and finding him exalted above truth and error, being and not-being. 'The divine darkness is unapproachable light.' The Incarnation is part of the self-unfolding of God in the world, and the redemption of the individual is mediated by the three degrees of the heavenly hierarchy, and by the three degrees of the church's hierarchy—bishops, priests, and deacons, and the *media* between them are the six 'mysteries', or symbolical priestly actions, to each of which is attributed a special mysterious significance.

The standard edition is that of the Jesuit, Balthasar Corderius (Antwerp, 1634; Brescia, 1854; and reprinted in Migne's collection). German translations by Engelhardt (1823), French by Darboy (1845), and English by Rev. John Parker (1894). See DEMIS (Str); and the studies by Hippler (1861), Niemeyer (1869), and Schneider (1884); Dörner's *Doctrine of the Person of Christ*, div. ii. vol. i.; Harnack's *Dogmengeschichte*, vol. ii.; and Hugo Koch's *Pseudo-Dionysius* (1900).

**Dionysius** the Elder, tyrant of Syracuse, was born about 430 B.C. He was originally a clerk in a public office, but early showed a passion for political and military distinction. When the Agrigentines, after the conquest of their city by the Carthaginians, charged the Syracusan generals with treachery, Dionysius supported their accusations, and induced the Syracusans to appoint new commanders, of whom he himself was one. But in a very short time he supplanted his colleagues also, and so made himself at twenty-five absolute ruler of the city. To strengthen his position he married the daughter of Hermocrates, the late head of the aristocratic party. After suppressing with ferocity several insurrections, and conquering some of the Greek towns of Sicily, he made preparations for a great war with the Carthaginians, which began in 397. At first fortune favoured Dionysius, but after a short time he suffered a series of reverses so calamitous, that all his allies abandoned him, and he was shut up in Syracuse apparently without hope

of escape. When he was about to fall a victim to despair, a pestilence broke out in the Carthaginian fleet. Dionysius took courage, and suddenly attacking his enemies by land and sea, obtained a complete victory. In the years 393 and 392 the Carthaginians renewed hostilities, but were defeated on both occasions, and Dionysius was enabled to conclude a most advantageous peace. He now turned his arms against Lower Italy, and in 387, after a siege of eleven months, captured Rhegium. From this time he continued to exercise the greatest influence over the Greek cities of Lower Italy, while his fleets swept the Tyrrhenian and Adriatic seas. But Dionysius was not contented with the reputation of being the first warrior and statesman of his age; he wished to shine as a poet also. He even ventured so far as to contend for the prize at the Olympic games, but the best reciters of the time, reading his poems with their utmost art, could not induce the judges to decide in his favour. Dionysius was more successful at Athens, where he several times obtained the second and third prizes for tragedy, his last production obtaining the first. He also invited many poets and philosophers to his court, as Philoxenus and Plato, but these distinguished guests were not always safe from his capricious violence. He adorned Syracuse with splendid temples and public buildings. One of his works was the gloomy and terrible rock-hewn dungeon called Lautumia. In 368 he renewed the war with the Carthaginians, whom he wished to drive out of Sicily altogether, but died suddenly next year, not without a suspicion that his physician had hastened nature to make favour with his son. Dionysius was a most vigorous but unscrupulous ruler. His last years were tormented with an excessive dread of treachery.

**Dionysius** the Younger, son of the preceding, succeeded his father in 367 B.C., and celebrated his accession by a splendid festival, which lasted ninety days. His political education had been designedly neglected by his father, and in consequence he grew up an indolent, pleasure-loving, and dissolute prince. Dion (q.v.), who was at once his father's son-in-law and brother-in-law, sought to improve him by the instructions of Plato, but his endeavours were frustrated by Philistus, the historian, who disgracefully encouraged the excesses of the youth. Dion was banished, but afterwards returning to Sicily, expelled Dionysius from Syracuse in 356. The latter fled to Locri, the birthplace of his mother, Doris, where he was hospitably received. He repaid the kindness of the Locrians by making himself master of their city, which he ruled despotically for several years. In 346 the internal dissensions of Syracuse enabled him to return thither, and here he ruled for three years until Timoleon came from Corinth to free Sicily. Dionysius soon had to surrender, and was allowed to spend the rest of his life at Corinth, where he haunted low company, spent his means, and had to keep a school for bread.

**Dionysius Exiguus** (or 'the Little'), so named either from his small stature, or by his own monkish humility, was a Scythian by birth, and became abbot of a monastery at Rome, where he died in 556. He was one of the most learned men of his time, translated various theological writings from Greek into Latin, and is especially noted for his fixing of the Christian era (see CHRONOLOGY), and his collection of canons. See CANON LAW.

**Dionysus.** The worship of Dionysus, who was originally the god of vegetation, and not till after the time of Homer the god of wine, was borrowed by the Greeks from the Thracians. When adopted as a Greek god he was naturally made the son of

Zeus, the sky from which falls the rain that makes the vegetation grow. His mother, Semelē, was destroyed before his birth through her own folly in begging the sky-god to visit her in all his majesty of thunder and lightning. As the remainder of the period of gestation was accomplished in the thigh of Zeus, the paternity of Dionysus was made doubly sure by the myth, and Dionysus was called the 'twice born.' The spread of the worship of the god is mirrored in myths which represent him as bestowing blessings on those who accepted him, and madness on those who, like Lycurgus and Pentheus, resisted him. The peculiar characteristic of the cult is that it is *orgiastic*. Of the orgies as they were actually celebrated we may form an idea from the way in which at the present day in France (on the *jour des brandons*) the peasants carry torches, and utter loud cries, for the purpose of insuring fertility in vineyard and orchard; and in South Germany they dance and leap and make every kind of noise in order to 'rouse the corn,' 'to wake the spring'—the madder the dance and the cries, the more effectual the invocation. In mythology the 'orgies' are imagined as being performed by Mænades, Bacchantes, and others, who in their ecstasies rend animals to pieces, as they rush with their torches by night over the land. Part of the cult of Dionysus consisted in eating oxen and goats, which were regarded as the incarnation of the generative power of which Dionysus was the god. Mythology makes Dionysus himself, under the name of Zagreus, to have been devoured by the Titans; his heart alone was saved, and he was born again as the son of Semelē. The orgiastic worship of Dionysus explains the fact that wine when it became known was regarded as the gift of Dionysus (see BACCHUS).—The *Dionysia* were festivals held in his honour throughout Greece. In Attica alone there were four *Dionysia* at different seasons of the year—the most important, the *Lenæa*, celebrated with a procession and scenic contests in tragedy and comedy, out of which grew all the glories of the Greek drama.

**Dioön.** See CYCADS.

**Diophantus**, one of the last of the great Greek mathematicians, lived at Alexandria, most probably in the second half of the 3d century of our era. He died at the age of eighty-four. The titles

of three of his works are *Arithmetics*, *Polygonal Numbers*, and *Porisms*. Of the first, which consisted of thirteen books, only six remain; of the second we possess merely a fragment; and the third has been entirely lost. The *Arithmetics* is the earliest extant treatise on algebra, but it would be rash to say that Diophantus was the inventor of algebra, though to what extent he was indebted to his predecessors cannot now be decided. The first book of the *Arithmetics* is occupied with problems leading to determinate equations of the first degree, the rest of the books with problems leading to indeterminate equations of the second degree, the sixth book in particular being devoted to the finding of right-angled triangles where some linear or quadratic function of the sides is to be a square or a cube. The treatise on *Polygonal Numbers* is not analytical but synthetical—i.e. in the manner of Euclid's arithmetical books—and in it numbers are represented by lines. The *Porisms* were probably a collection of propositions on the properties of certain numbers. The first translation of Diophantus was into Latin by Xylander (Wilhelm Holzmann) in 1575. The only edition of the Greek text was that by Bachet (published with a Latin translation in 1621, and reprinted with Fermat's notes and many misprints in 1670), until it was critically edited by Tannery (1893-95). See T. L. Heath's *Diophantos of Alexandria* (1885; enlarged ed. 1910).

**DIOPHANTINE ANALYSIS**, so called from Diophantus, is that part of algebra which treats of the finding of particular rational values for general expressions under a surd form. A simple example of a diophantine problem is to find a right-angled triangle whose three sides are expressible by rational numbers, or in other words, to divide a square number into two squares (Diophantus, *Arithmetics*, ii. 9). A diophantine theorem less simple is the statement of Fermat, which even yet has only been partially proved, that the equation  $x^n + y^n = z^n$  is impossible for every integral value of  $n$  greater than 2. The diophantine analysis is really a part of what is now called the theory of numbers, and its development is to be sought in the writings of those mathematicians, from Fermat and Euler downwards, who have cultivated this subject. Much information regarding it will be found in the second part of Euler's *Algebra*.





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